Pediatric OSCE Stations

PART 2

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PEDIATRIC OSCE STATIONS

WITH

SYNOPSIS OF HISTORY TAKING & PHYSICAL EXAMINTION IN PAEDIATRICS

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DEDICATION

I dedicate this book for those whom without them I could not be able to write my book, those who are fighting to create peace and life out of this cruel surrounding death.
To the popular Mobilization, and Iraqi Military Forces.
May God bless them all?

ZUHAIR M. ALMUSAWI

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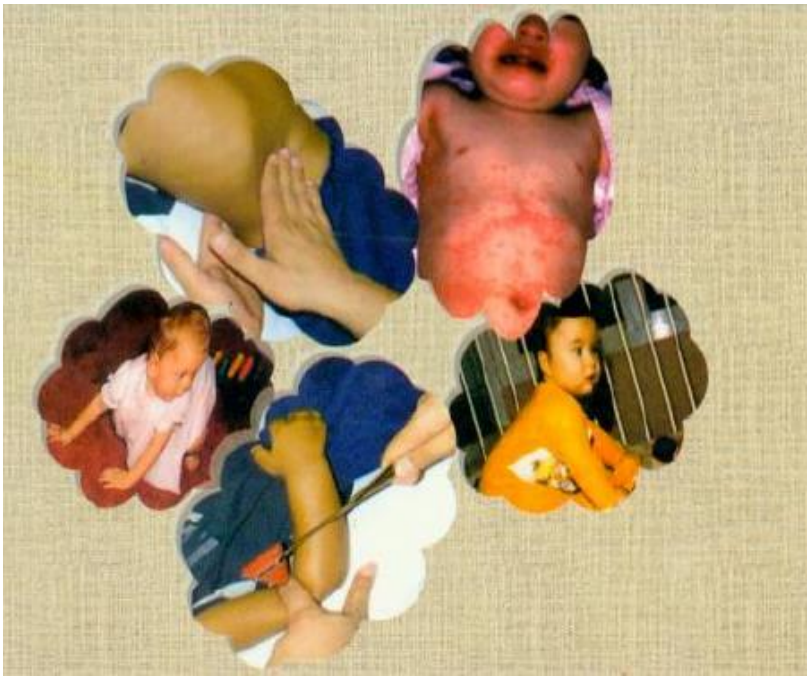
CHAPTER 1

SYNOPSIS OF

HISTORY TAKING & PHYSICAL EXAMINTION IN PAEDIATRICS



Sophisticated technological advances in medicine have proved to be remarkably beneficial in the diagnostic process, yet the well-performed history and the physical examination remain the clinician's most important tools.

A relatively complete physical examination should be performed on each patient, regardless of the reason for the visit. Numerous medical anecdotes relate instances in which the examination revealed findings unrelated to and unexpected from the patient's chief complaint and major concerns. On occasion, a limited or inadequate examination may miss a significant condition, mass lesion or potentially life-threatening condition.

History Taking

General facts

Name
Date of birth or age
Place of birth
Sex
Address
Date of admission

The information is given by: Mother, caregiver (Children over 5 years can give their account about events)
Some childhood illnesses occur with increased regularity at various ages, with higher frequency in one gender or more commonly in one ethnic group. For instance, anorexia nervosa is more common in white adolescent females, whereas complications of sickle cell anemia are more common in Basra and En-Tamur of both genders.

Always refer to the child by name, rather than using ‘‘he’’ or ''she''. You will appreciate his individuality, and make him a focus on your concern.

Chief complaint & duration

This is usually the response that the patient or the patient’s family member gives to the question: “Why are you seeing the doctor today?”
Brief account of the complaint & its duration.

History of present illness

- How & when did the illness start?
- When was the patient perfectly well?

- The current symptoms in order of occurrence & an account of any repeated episodes of symptom as in asthma and epilepsy.
- Changes noticed since the occurrence of the illness.
- Significant medical attention and medications given.
- Specific inquiry of a number of symptoms relating to general health like appetite, bowels, micturition, sleeping habits &energy.
- Selective questions often employed relevant to the illness
- Both positive findings (the stool was loose, voluminous, and foul-smelling) and negative findings (without blood or mucus) are appropriate.

Systemic review

A – General questions: Activity, tiredness, mood, sleep, school absences

B – Gastro-intestinal system: Appetite & feeding habits , composition of foods , weight gain or loss, height growth, bowel movements (frequency, consistency, blood, mucus, pain during defecation), abdominal pain (site, duration, effect on normal activity , associated symptoms and signs), how many teeth?

C –E.N.T. and Respiratory system: Respiratory difficulty, abnormal noises (croup, wheezing), cough (under what circumstances?)
Earache, discharge, hearing loss, (turn TV unusually loud?)
Sore throat, swallowing difficulty
Nasal obstruction, discharge, snoring, swollen glands

D – Cardiovascular system: Palpitation, cyanosis at rest or exertion, sweating day or night

E – Nervous system: Headache, convulsion, loss of consciousness at any time, eye problems, hearing, speech, any weakness of limbs, abnormal movements

F – Genito- urinary system: Pain (site), frequency of micturation, enuresis (day or night), color of urine, dysuria, mensis in girls above 10 years

G – Locomotor system: pain, swelling or stiffness of joints, weakness or unsteadiness

H – Blood: Tiredness, bruising, bleeding, pallor, change in skin color

Prenatal history (pregnancy)

- Mother age, previous pregnancies, miscarriages, and abortions
- Pregnancy duration, term, preterm (by how many weeks), post term
- Maternal health before and during pregnancy (hyperemesis, bleeding, illnesses, accidents, infections, X-Ray exposure)
- Specific illnesses related to or complicated by pregnancy like diabetes and hypertension
- Drugs taken
- Antenatal care
- Smoking and drinking alcohol

Natal history (Birth history)

- Nature of labor and delivery
- Degree of difficulty and length of labor
- Whether the baby breathed & cried spontaneously or required resuscitation
- Analgesia given
- Complications encountered
- Birth order and birth weight
- Gestational age
- Apgar score

Postnatal history

- Onset of respiration
- Resuscitation efforts
- Cyanosis
- Jaundice
- Convulsions
- Time of urination and first bowel movement
- Congenital anomalies
- Infections

Previous history

- Specific illnesses experienced such as childhood communicable diseases or recent contact with them (chicken pox, measles, mumps, rubella, whooping cough)
- Operations , injuries or hospitalization
- Allergies
- Current medications
- Similar illness

Vaccination

Exact date of each immunization.
The following table shows the Iraqi protocol of vaccination

Age	Type of vaccination
First week	OPV , Hepatitis B vaccine , BCG
2 / 12	OPV , Hepatitis B vaccine + DTP+ Hem.infl, Rota virus
4 / 12	OPV, DTP+ Hem. infl, Rota virus
6 / 12	OPV, Hepatitis B vaccine + DTP+ Hem.infl, Rota virus
9 / 12	Measles vaccine+100000 IU VIT. A
15 / 12	MMR
18 / 12	OPV, DTP+ Hem.infl+200000 IU VIT. A
4 – 6 years	OPV + DTP

Feeding

Infant feeding method – breast or formula, if breast-fed; duration & any associated problem.

For formula – fed infant; formula type, its dilution, any formula changes, feeding frequency, the amount taken at each feed, and mode of sterilization.
For older infant; age at introduction of solid foods, the current diet composition, problems like difficulty feeding, regurgitation or vomiting
Vitamin supplements are taken or not? Record the dose.

Vitamin D 400 I.U. daily shortly after birth for exclusively breast fed babies.

Development

- Smiling (4 – 6weeks)
- First vocalization (12 weeks)
- Head control (16 weeks)
- Reach out & get objects (28 weeks)
- Baby turn over (28 weeks)
- Sit with support on the flour (28 weeks)
- Sit up unsupported (40 weeks)
- Single word with meaning (12 months)
- Walk without help (15 months)
- Feed self using cup with no help (15 months)
- Sentences not in imitation (21 – 24 months)
- Sphincter control by night (3 years)
- Dress self apart from rear buttons & shoe laces (3 – 4 years)

Family history

Father & mother age, consanguinity & condition of health.
Sibling's ages & condition of health.

Family history of asthma, eczema, hay fever, tuberculosis, cardiovascular disease & others.

Psychosocial history

- Occupation and employment history including frequent and prolonged parental absences (absence of a parent can destabilize the family life)
- Describe household; rural or urban
- Brief physical description of the home; how many rooms? Number of occupants? Frequency of moves (household move is frequently a major life events)
- Support system: grandparents, other relatives, neighbors, help with babysitting
- Financial problems, income
- Major life events; major illnesses; death, accidents, separation, divorce, date of occurrence
- Psychiatric illness; depression
- Substance abuse; (alcohol, drugs)
- Marital stability; Ask: How would you describe your marriage?

THINGS NOT TO DO

- **Do not get the gender of the child wrong**
- **Do not misjudge the child's age**
- **Do not use medical terms without explanation**
- **Do not fit an adult history to a child history**

Physical examination

Every child should receive a complete systemic examination & one should not restrict the examination to the portion of the body involved on the present complaint.

Hands must be washed before examining a child. Warm smile, warm hands and a warm stethoscope all help!

General condition

- State of consciousness
- State of nutrition
- Alertness , activity & responsiveness to both the examiner & the parent
- Color (cyanosed, jaundiced, pale)
- Presence of dyspnea
- Evidence of toxemia, including lethargy (defined as poor or absent eye contact and refusal to interact with environment), signs of poor perfusion, hypo- or hyperventilation, and cyanosis
- Stigmata of syndromes (such as Down or Turner)

Vital signs & evaluation of somatic growth

- Weight & percentile
- Height or length & percentile (sometimes parental heights) **(Length or height: at birth = 50cm, one year = 75cm, two years = 85cm, three years=95cm, four years = 100cm, and for the next 8 years add 5.5 cm for each year)**
- Head circumference & percentile (generally measured until age 3 years), and when indicated.

Age	OFC
At birth	35 cm
1 month	38 cm
3 month	41 cm
6 month	44 cm
9 month	46 cm
1 year	48 cm
2 year	50 cm
3-7 year	1/2 cm per year
8-12 year	1/3 cm per year

- Temperature
- Blood pressure (generally begin routine measurement after 3 years)

- **Infant 80\55**
- **Preschool 85\60**
- **School child 90\60**

- Respiratory rate
- Pulse rate & peripheral pulses

Better to begin with examination of system which is likely to reveal the most valuable information & to leave to the end the systems which are likely to be less relevant (opportunistic examination)

Examination of individual regions

Head & Neck

Cranium: For the neonate, the size of fontanelles and presence of overriding sutures, craniotabes, caput succedaneum (superficial edema or hematoma that crosses suture lines, usually located over crown), or cephalohematoma (hematoma that does not cross suture lines) should be noted.

For the older child, the size and shape of the head as well as abnormalities such as swellings, depressions, or abnormal hair quality or distribution may be identified.

Ear: For all children, abnormalities in the size, shape, and position (low set ear: upper edge of attachment of auricle to the head below the level of medial canthus) of the ears can provide important diagnostic clues. Whereas tympanic membranes are difficult to assess in newborns, their integrity should be assessed in older children (color, bulging, and perforation) .For all children, the quality and character of discharge from the ear canal should be documented

Eyes: For infants, abnormalities in the size, shape, and position of the orbits, the color of the sclera (blue sclera, for instance, may indicate osteogenesis imperfecta), conjunctival hemorrhages, or the presence of iris defects (such as coloboma) may be found.

Telecanthus (widely spaced eyes) seen in Apert syndrome, hypertelorism , crouzon , orofaciodigital dysostosis , otopalato digital syndrome & Warrensburg syndrome .

Nose: The size, shape, and position of the nose (in relation to the face and mouth) can provide diagnostic clues for various syndromes, such as a small nose in Down syndrome.
Patency of the nostrils, especially in neonates who are obligate nose breathers, is imperative.
Abnormalities of the nasal bridge or septum, integrity of the mucosa, and the presence of foreign bodies, polyps should be noted.
A butterfly rash around the nose can be associated with systemic lupus erythematosus (SLE), and a transverse crease across the anterior portion of the nose is seen with allergic rhinitis.

Mouth and throat: The size, shape, and position of the mouth and lips in relation to other facial structures should be evaluated.
In infants, common findings of the mouth include disruption of the palate (cleft palate syndrome), Epstein pearls (a tiny white papule in the center of the palate), and short frenulum ("tongue-tied").
For all children, the size, shape, and position of the tongue and uvula must be considered.
The number and quality of teeth for age should be assessed, and the buccal mucosa and pharynx should be examined for color, rashes, exudate, ulceration, and size of tonsils.

Face: Potter , mongolism , cretinism , gargolysm , Treacher-collin syndrome ,mumps , myasthenia gravis , rubella syndrome , nephrosis , Turner syndrome , tetanus (risus sardonicus) .

Localized disease as cystic hygroma , osteomyelitis of maxilla , congenital ptosis , Horner syndrome , facial palsy , facial wasting , micrognathia , parotid swelling .

Neck: Shortening, webbing, torticollis, head retraction, and abnormal swellings.

Lymph nodes: Examine systematically – occipital (located above the hairline), post and preauricular, posterior and anterior cervical, submandibular, submental, supraclavicular, axillary, inguinal, epitrochlear lymph nodes. Note size, number, consistency of any glands felt.

In general, nodes up to 1 cm in diameter can be considered normal if there are no other suspicious findings.

Total absence of palpable lymph nodes, should lead you to consider the possibility of an immune deficiency, such as agammaglobulinemia.

Supraclavicular (or lower cervical) lymphadenopathy is associated with a high risk of malignancy (up to 75 percent) in children.
Right supraclavicular adenopathy is associated with cancer of the mediastinal lymph nodes.
Left supraclavicular adenopathy ("Virchow's node") suggests intraabdominal malignancy, most often lymphoma.

Respiratory System

Cyanosis

Central cyanosis is best observed on the tongue.

Clubbing of the Fingers and/or Toes

Clubbing is usually associated with chronic suppurative lung disease (e.g. cystic fibrosis) or cyanotic congenital heart disease. It is occasionally seen in inflammatory bowel disease or cirrhosis. It may be familial (benign).

Look at the profile of the nail bed. The normal angle is lost very early in the clubbing process. Then juxtapose the index finger nails together. In clubbing you do not see light between the nails.

Tachypnea (Rate of respiration is age-dependent)

Respiratory rate in children (breaths/min)

Age group	Normal	Tachypnea
Neonate	30-50	> 60
Infants	20-30	> 50
Young children	20-30	> 40
Older children	15-20	> 30

Dyspnea

Labored breathing: Increased work of breathing is judged by:

- nasal flaring
- expiratory grunting – to increase positive end-expiratory pressure

- use of accessory muscles, especially sternomastoids
- retraction (recession) of the chest wall, from use of suprasternal, intercostal and subcostal muscles
- difficulty speaking (or feeding).

Inspection

- Hyperexpansion or barrel shape, e.g. asthma
- Pectus excavatum (hollow chest) or pectus carinatum (pigeon chest)
- Harrison's sulcus (from diaphragmatic tug), e.g. from poorly controlled asthma
- Precordial bulging
- Thickening of costo- chondral junction

Asymmetry of chest movements. Absent or minimal movement of either the chest or abdomen during respiration is usually abnormal.

Palpation

- Chest expansion – place your hands on the child's chest with thumbs just touching each other. Ask the child to take a deep breath; the distance your thumbs move apart determines the degree of chest expansion. It is normally 1 cm in a 5 year old.
  Check for symmetry
- Trachea – checking is it central or deviated to one side
- Location of apex beat to detect mediastinal shift
- Abnormal pulsations , veins, and obvious swelling
- Vocal fremitus

Percussion

(Percussion is seldom informative in infants)

Place the middle finger of your left hand along the line of the rib and strike it with the middle finger of the right hand. Percuss the entire chest back and front in a systematic way, including the clavicles and axillae. The percussion note is resonant except liver dullness starting just below the nipple.

- Hyper-resonance in hyperinflation (chronic asthma) and pneumothorax
- Dullness in consolidation or lung collapse
- Stony dullness in pleural effusion

Auscultation

Ask the child to breathe in and out through the mouth. Use diaphragm of the stethoscope.

Start at the top of the chest comparing one side with the other and then listen over the back in a similar way.

- Note quality and symmetry of breath sounds and any added sounds.
- Harsh breath sounds from the upper airways are readily transmitted to the upper chest in infants.
- Hoarse voice – abnormality of the vocal cords.
- Stridor – harsh, low-pitched, mainly inspiratory sound from upper airways obstruction.
- Breath sounds – normal are **vesicular**, there is no interval between inspiration and expiration, the expiratory phase is shorter. **Bronchial breathing** has a

harsher sound, a pause and the lengths of inspiration and expiration are equal. It is heard normally over the trachea, but also occurs pathologically with pneumonia, and collapse of the lung.

- Rhonchi (wheeze) – high-pitched, expiratory sound from distal airway obstruction (asthma, bronchiolitis).
- Crepitations (crackles) – sound like the soft rustling of leaves. These are heard with consolidation but are likely to be normal if cleared by coughing.
- Absent breath sounds in one area suggests pleural effusion, pneumothorax, fibrosis or dense consolidation.
- Tactile vocal fremitus (by palpation) and vocal resonance (listening): if you find signs of consolidation examine for vocal fremitus and resonance when the child says 44. The sounds and vibration are increased over an area of consolidation and decreased or absent over effusion or collapse.
- Pleural rub in pleurisy.

Cardio – Vascular System

Inspection

Cyanosis: observe the tongue for central cyanosis
Anemia: can cause tachycardia and heart murmur
Breathlessness: in heart failure, the child is breathless, pale, and sweaty
Chest shape:
Clubbing of fingers and toes:

Look for:
Respiratory distress: tachypnea, is abnormally rapid respiration, while dyspnea, is a difficult breathing.
Precordial bulge: caused by cardiac enlargement
Ventricular impulse: visible if thin, hyperdynamic circulation or left ventricular hypertrophy
Operative scars: mostly sternotomy or left lateral thoracotomy.

Pulse

Check: radial, brachial, carotid and femoral pulses for:

- Rate

Normal resting pulse rate in children

Age	Beats/min
< 1 year	110-160
1-5 years	95-140
6-12 years	80-120
> 12 years	60-100

Pulse rate ↑ with stress, exercise, fever, and arrhythmia.

↑1°C = ↑ PR 10 beat/min and ↑ RR 2.5-3.5 breath/min.

- Rhythm – sinus arrhythmia (variation of pulse rate with respiration) is normal
- Volume – small in circulatory insufficiency or aortic stenosis; increased in high-output states (stress, anemia)
- Character: collapsing in patent ductus arteriosus, aortic regurgitation, and slow rising in ventricular outflow tract obstruction.

Palpation

Thrill is a palpable murmur (Check over the four valve areas and suprasternal notch).

Apex beat: (4th – 5th intercostal space, mid-clavicular line): Not palpable in some normal infants, plump children and dextrocardia.

Place your hand over the chest with the fingertips in the anterior axillary line. The maximum lateral impulse is found with one fingertip. Define its position by counting down the ribs starting at the sternal angle which corresponds to the second intercostal space.

A forceful apex or displacement of the apex to the left suggests left ventricular hypertrophy or lung disease distorting the mediastinum.

Parasternal heave: Place your palm over the lower half of the sternum, a heaving sensation indicates right ventricular hypertrophy.

Liver: hepatomegaly suggests heart failure.

Ankle edema: peripheral edema and raised JVP are rare in children.

Capillary refill: poor skin perfusion is a sign of shock. Apply moderate pressure with your finger on a warm periphery for 5 seconds and watch for the color to return. The normal capillary refill time is 2 seconds. Volume depletion or hypotension can delay capillary refill for more than three seconds.

Percussion

Cardiac border percussion is rarely helpful in children.

Auscultation

Use both the bell and diaphragm of the stethoscope. The bell is particularly important to pick up low-pitched murmurs, S3 and gallop rhythm. Listen in inspiration and expiration. Listen with the child lying down and sitting up. Turn the child on the left side as some murmurs change position.

Heart Sounds

- Splitting of second sound is usually easily heard and is normal.
- Fixed splitting of second heart sound in atrial septal defects.
- Third heart sound in mitral area is normal in young children.
- Gallop rhythm (S4) in heart failure or restrictive cardiomyopathy, ejection clicks in aortic stenosis and pulmonary stenosis.

Murmurs

- Timing – systolic / diastolic / continuous
- Duration – mid-systolic (ejection) / pansystolic
- Loudness – does not correlate with severity.

Systolic murmurs graded:

1 Difficult to hear
2 Soft and variable in nature.
3 Easily heard, no thrill
4 Loud with thrill
5 Very loud
6 Heard without a stethoscope

- Site of maximal intensity – mitral / pulmonary / aortic / tricuspid areas
- Radiation:

- To neck in aortic stenosis

- To axilla in VSD, mitral regurgitation, and tricuspid regurgitation
- To back in coarctation of the aorta or pulmonary stenosis.

Murmurs are a common finding in infants and children and do not always signifies heart disease.

Features suggesting a murmur is significant:
○ Conducted all over the precordium ○ Loud ○ Thrill (equals grade 4-6 murmur) ○ Any diastolic murmur ○ Accompanied by other abnormal cardiac signs

Features of heart failure in infants
Poor feeding / failure to thrive Sweating Tachypnea Tachycardia Gallop rhythm Hepatomegaly Cardiomegaly

Femoral Pulses

In coarctation of the aorta:
Decreased volume or may be impalpable in infants
Brachiofemoral delay in older children

Blood Pressure

Indications
Must be closely monitored:

- If critically ill

- If there is renal or cardiac disease or diabetes mellitus
- If receiving drug therapy which may cause hypertension, e.g. corticosteroids.

It is not measured often enough in children.

Technique

When measured with a sphygmomanometer:

- Show the child that there is a balloon in the cuff and demonstrate how it is blown up.
- Use largest cuff which fits comfortably, covering at least two-thirds of the upper arm.
- Add 20-30 mm Hg to previously measured number to know the maximum inflation level (MIL).
- Apply the diaphragm of the stethoscope over the brachial artery, just below but not touching the cuff or tubing.
- Close the valve of the pump.
- Inflate the cuff rapidly to the MIL previously determined.
- Open the valve slightly and maintain a constant rate of deflation at approximately 2mm per second.
- Listen throughout the entire range of deflation until 10mm Hg below the level of the diastolic reading
- The child must be relaxed and not crying.
- Systolic pressure is the easiest to determine in young children and clinically the most useful (korotkoff sounds phase 1).
- Diastolic pressure is when the sound become muffled (korotkoff sounds phase 4). May not be possible to discern in young children.

Measurement

Blood pressure must be interpreted according to a centile chart. Blood pressure is increased by tall stature and obesity. Charts relating blood pressure to height are available and preferable; for convenience, charts relating blood pressure to age are often used. An abnormally high reading must be repeated, with the child relaxed, on at least three separate occasions.

The normal systolic blood pressure of an infant is about 60 to 80 mmHg in both the arm and the leg.

Normal Blood Pressure In Children 50th To 90th Percentiles

Age	Systolic Pressure, mm Hg	Diastolic Pressure, mm Hg
Birth, 3 kg	50-70	25-45
Neonate, 96 hours	60-90	20-60
Infant, 6 mo	87-105	53-66
Toddler, 3 years	95-105	53-66
School age, 7 y	97-112	57-71
Adolescent, 15 y	112-128	66-88

The median (50 percentile) systolic blood pressure for children older than 1 year may be approximated by the following formula: 90 mmHg + (2 x age in years).
The lower limit (5th percentile) of systolic blood pressure can be estimated with this formula: 70 mmHg + (2 x age in years).

Normally the systolic pressure may decrease by 10 mmHg during inspiration; a decrease of more than 20 mmHg of systolic pressure during inspiration is called **pulsus paradoxus**, which can occur in **cardiac tamponade, constrictive pericarditis, tension pneumothorax, severe asthma, or emphysema.**

The Abdomen

Associated Signs

Examine:

- The eyes for signs of jaundice and anemia
- The tongue for coating and color
- The fingers for clubbing
- Spider nevi, edema, wasted buttocks

Inspection

The abdomen is protuberant in normal toddlers and young children. The abdominal wall muscles must be relaxed for palpation. In upright position abdominal protrusion is often related to exaggerated lordosis. Abdominal respiration is normal up to school age.

Generalized abdominal distension is most often explained by 5 'F's:

- **F**at
- **F**luid (ascites – uncommon in children, most often from nephrotic syndrome)
- **F**eces (constipation)
- **F**latus (malabsorption, intestinal obstruction)
- **F**etus (not to be forgotten after puberty)

Occasionally, it is caused by a grossly enlarged liver and/or spleen or muscle hypotonia.

Causes of localized abdominal distension are:
Upper abdomen: Gastric dilatation from pyloric stenosis, hepato/splenomegaly
Lower abdomen: Distended bladder, masses

Other signs:

- Dilated veins, abdominal striae
- Operative scars
- Visible peristalsis – from pyloric stenosis, intestinal obstruction
- Hernia
- Umbilicus

Are the buttocks normally rounded, or wasted as in malabsorption, e.g. celiac disease or malnutrition

Palpation

Wash and warm your hands, explain, relax the child and keep the parent close. First ask if it hurts.
Palpate in a systematic fashion – liver, spleen, kidneys, and bladder through four abdominal quadrants.
Ask about tenderness. Watch the child's face for grimacing as you palpate. A young child may become more cooperative if you palpate first with his hand or by putting your hand on top of his hand.

On examining the abdomen

- Inspect first, palpate later.
- Superficial palpation first, deep palpation later.
- Guarding is unimpressive in children.
- Silent abdomen – serious!

- Immobile abdomen – serious!

> The normal liver edge may be 1-2 cm below the right costal margin in infants and young children. The spleen may be 1-2 cm below the left costal margin in infants.

Liver

- Palpate from right iliac fossa
- Locate edge with tips or side of finger
- Consistency may be soft or firm
- Surface (smooth or nodular)
- Tenderness
- Measure (in cm) extension below costal margin in MCL. It is useful to percuss the upper edge for liver dullness and palpate the lower edge and express total liver size in cm rather than its level below costal margin.

Spleen

- Palpate from right iliac fossa and in infants from left iliac fossa
- Consistency and surface
- Edge is usually soft
- Unable to get above it
- Notch occasionally palpable if markedly enlarged
- Moves on respiration (ask the child to take a deep breath)
- Measure size below costal margin (in cm) in mid-clavicular line

If uncertain whether it is palpable:
Use bimanual approach to palpate spleen
Turn child onto right side.
A palpable spleen is at least twice its normal size

Huge spleen may be associated with kala-azar, malaria, Gaucher disease, and CML.

Kidneys

These are not usually palpable beyond the neonatal period unless enlarged or the abdominal muscles are hypotonic. On examination:

- Palpate bimanually, place one hand on the loin and one on the abdomen
- They move on respiration
- One can get above them

Tenderness implies inflammation
Unilateral enlargement may be due to: Wilm's tumor, hydronephrosis, renal vein thrombosis,and multicystic dysplasia.
Bilateral enlargement**:** Polycystic disease, bilateral obstructive uropathy, or congenital nephrotic syndrome.

Masses
(Position, size, consistency, shape, motility, ability to get below the tumor)

Percussion

- Liver – dullness delineates upper and lower border. Record span.
- Spleen – dullness delineates lower border.
- Ascites – shifting dullness. Percuss from most resonant spot to most dull spot.

Demonstration of Ascites:

- Ascites may be obvious on inspection. The abdomen is distended.
- The umbilicus may be reverted.
- There are obvious pressure marks on the skin, the skin looks edematous.
- The flanks are full.

There are two methods to elicit signs of free fluid in abdominal cavity:

- **Fluid thrill:** with the child supine, have a third person place the edge of the hand vertically on the midline of the abdominal wall. The examiner places the palm of the hand on one side and taps with the fingers on the opposite flank. One can feel a fluid wave produced by the tap.
- **Shifting dullness:** one should percuss from resonant (above) to dullness (below). If there is definite dullness in the flank, the child should be rolled on to one side for 30-60 seconds and a change to resonant percussion note sought.

To detect very small amount of fluid, place the patient in a knee-chest position and percuss over the periumbilical area. Normally this area should not be dull on percussion.

Auscultation

Not very useful in 'routine' examination, but important in 'acute abdomen':

- Increased bowel sounds – intestinal obstruction, acute diarrhea

- Reduced or absent bowel sounds – paralytic ileus, peritonitis.

Rectal Examination:

- Not part of routine examination.
- Unpleasant and disliked by children.
- Look at the anus for fissures or signs of trauma. Lubricate the tip of your index finger and press it flat against the edge of the anus before insertion. Use your little finger for infants.
- Its usefulness in the 'acute abdomen' (e.g. appendicitis) is debatable in children, as they have a thin abdominal wall and so tenderness and masses can be identified on palpation of the abdomen.
- If intussusception is suspected, the mass may be palpable and stool looking like red currant jam may be revealed on rectal examination.

Genito - urinary System

Genital Area:

Genital area is examined routinely in young children, but in older children and teenagers, this is done only if relevant. Is there an inguinal hernia or a perineal rash?

In males:

- Is the penis of normal size? Enlargement may occur in congenital adrenal hyperplasia (large penis with normal size testes). True micropenis is rare, the commonest explanation of small penis is normal penis buried in fat.

- Is the urethral orifice at the normal position on the tip of the glans? If not, is there epispadias (dorsal opening) or hypospadias (ventral opening).
- Is the scrotum well developed?
- Is there any scrotal swelling (hydrocele or hernia)? Under developed scrotum suggests undescended testes.
- Are the testes palpable? With one hand over the inguinal region, palpate with the other hand. Record if the testis is descended, retractile or impalpable.

In females:

- Do the external genitalia look normal?
- Does the anus look normal?
- Any evidence of fissure?

NERVOUS SYSTEM

Brief Neurological Screen

A quick neurological and developmental overview should be performed in all children. When doing this:

- Use common sense to avoid unnecessary examination.
- Adapt it to the child's age.
- Take into account the parent's account of his developmental milestones.

Watch him play, draw or write. Are his manipulative skills normal? Can he walk, run, climb, hop, or skip? Are his language skills and speech satisfactory? Are his social interactions appropriate? Does his vision and hearing appear to be normal?

In infants, assess primarily by observation:

- Observe posture and movements of the limbs.
- When picking them up, note their tone. The limbs and body may feel normal, floppy or stiff. Head control may be poor, with abnormal head lag on pulling to sitting.

Most children are neurologically intact and do not require formal neurological examination of reflexes, tone, etc. More detailed neurological assessment is performed only if indicated.

More Detailed Neurological Examination:

Appearance

- Awareness
- Position in bed
- Response to handling
- Activity
- Orientation

Behavior & state of consciousness

Alertness, interest, memory for events, hyper excitability, unresponsiveness, drowsiness, semiconscious, unconscious

Higher nervous activities

Intelligence, speech, language.

Abnormal Movement

The commonest is ***choreo-athetosis***: writhing movements of the limbs often with facial grimacing.

Sudden ***jerking movements*** may be due to myoclonic epilepsy or infantile spasms.

Abnormal posturing

In comatose child: **Decorticate posturing**; adduction of upper arms, flexion of lower arms, wrist and fingers, extension of lower extremities.

In **decerebrate posturing**; adduction of the upper arms, extension and pronation of the lower arms, with extension of the lower extremities.

Gait

Observe walking and running: normal walking is with a heel-toe gait. A toe-heel pattern of walking suggests pyramidal tract (corticospinal) dysfunction, particularly hemiplagia and diplegia. If you are unsure whether a gait is heel-toe or toe-heel, look at the pattern of shoe wear. The pattern also seen in foot drop (as in a superficial peroneal nerve lesion) or a tight tendo-Achilles (as in a muscle disorder, such as Duchenne's muscular dystrophy), but can be seen intermittently in some normal children.

A broad-based gait may be due to an immature gait or secondary to a cerebellar disorder (ataxia).

Waddling is seen in spastic diplegia, Duchenne or congenital dislocation of the hips.

Observe standing from lying down supine. Children up to 3 years of age will turn prone in order to stand because of poor pelvic muscle fixation; if they continue beyond this age, it suggests neuromuscular weakness (e.g. Duchenne's muscular dystrophy) or low tone due to a central (brain) cause.

The need to turn prone to rise or, later, as weakness progress, to push off the ground with straightened arms and then climb up the legs is known as **Gowers' sign**.

Cranial Nerves

These can usually be tested formally from 4 years of age, then experience is required:

I Olfactory nerve: Need not be tested in routine practice. Can be done by recognizing the smell of a hidden mint sweet.

II Optic nerve:

Visual acuity: determined according to age.

Visual field: Young infants by moving an object & see the fixation
Older children by confrontation
After 6 years by perimetry

Color vision

Pupillary & accommodation reflex

Fundus : Optic disc
Retina
Blood vessel
Macula

III, IV, VI Oculomotor, trochlear, and abducens nerves:

Full eye movement through horizontal and vertical planes.
All muscles of the eye are supplied by the third cranial nerve except superior oblique by the fourth, and lateral rectus by the sixth (SO4 LR6)

Ptosis

Pupil (size, shape, reaction to light)

V Trigeminal nerve:

Motor: Clench teeth (palpate the masseter muscle) and waggle jaw from side to side against resistance.

Sensory: Provides sensation to face and divided into the ophthalmic, maxillary and mandibular divisions.
Test light touch and pain to these areas.

VII Facial nerve:
Motor: Close eye tight, smile and show teeth.
Sensory: Taste of anterior 2/3 of tongue.

VIII Auditory nerve:
Cochlear hearing: ask parents, although unilateral deafness could be missed this way. If in doubt, needs formal assessment in a suitable environment.
Young infant (cup & spoon or rattle form behind)
Older children (audiometry)
Tuning fork (Rinne's & Weber test)
Vestibular – Suspected in a child with vertigo, staggering & vomiting specially if associated with labyrinthine nystagmus. confirmed by caloric testing with cold water or rotation of the child while he is held upright under the arms of examiner, if vestibular function are intact this result in ocular deviation to the direction of rotation .

IX Glosso-pharyngeal nerve: Levator palati – saying 'aagh'.

X Vagus nerve: Recurrent laryngeal nerve - listen for hoarseness or stridor.

XI Accessory nerve: Trapezius and sternomastoid power – shrug shoulders and turn head against resistance.

XII Hypoglossal nerve: Put out tongue and waggle it from side to side. If paresis: the tongue tip deviates toward the affected side with atrophy and fibrillation

Motor Examination

Coordination: (Cerebellar signs). Assess this by:

- Asking the child to build one brick upon another or using a peg-board.
- Asking the child to hold his arms out straight, close his eyes, and observe for drift or tremor.
- Finger-nose testing (use teddy's nose to reach out and touch if necessary). Intention tremor is characteristic of damage to the posterior lobe of the cerebellum.
- Rapid alternating movements of hands and fingers (the impairment is called Dysdiadochokineses.
- Touching tip of each finger with thumb.
- Asking the child to walk heel-toe, jump and hop.
- Romberg's sign: ask the child to stand with the feet together and eyes open and then closed. Positive test when there is loss of postural sensation and unsteadiness when the eyes are closed.
- Speech: a child with a cerebellar lesion may have a halting, jerking dysarthria.
- Nystagmus: an involuntary rapid movement of the eye and is a sign of cerebellar, vestibular or brain stem dysfunction.

Muscle tone

Muscle bulk:

- Wasting may be secondary to cerebral palsy (upper motor neuron lesions), meningomyelocele or a muscle disorder or from previous poliomyelitis (lower motor lesion).
- Increased bulk of calf muscle may indicate Duchenne's muscular dystrophy.

Tone in limbs:

- Best assessed by taking the weight of the whole limb and then bending and extending it around a single joint. Testing is easiest at the knee and ankle joints. Assess for the range of movements as well as the general feel of it.
- Increased tone in adductors and internal rotators of the hips, clonus at the ankles or increased tone on pronation of the forearms at rest is usually the result of pyramidal dysfunction.
- The posture of the limbs may give a clue as to the underlying tone, e.g. scissoring of the legs, pronated forearms from increased tone.

Truncal tone:

- In pyramidal tract disorders, the trunk and head tend to arch backwards (extensor posturing).
- In muscle disease and some central brain disorders, the trunk may be hypotonic. The child feels floppy to handle and cannot support the trunk in sitting.

Head lag:

- This is best tested by pulling the child up by the arms from the supine position. Head control is gradually achieved by 4 months of age. Look at the back to see how straight it is held.

Ventral suspension:

- This is useful in a baby less than 3 months old. Put your hand under the baby's abdomen and lift him off the couch. A hypotonic baby will droop over your hand.

Axillary suspension:

- Pick up the baby under the arms and test weight bearing. The floppy baby tends to slip through the examiner's hands like a rag doll. The hypertonic baby

may demonstrate scissoring. Babies generally start weight bearing when they are 5 months old.

Positions:

- Prone position: are the head and shoulders raised? Depends on age.
- Supine position: a hypotonic baby lies in a frog's leg position. A hypertonic baby may have a retracted neck (opisthotonos) with scissoring of the legs.

Power

Difficult to test in babies. Watch for antigravity movements and note motor function.

From 6 months onwards, watch the pattern of mobility and gait.

From the age of 4 years, power can be tested formally.

If the child can cooperate, test opposing muscle groups in both the arms and the legs. Ask the child to do the following against resistance.

Upper limbs

- Arms out to the side (C5)
- Bend your elbows (C5,C6)
- Push out straight (C7)
- Squeeze fingers (C8,T1)
- Hold the fingers out straight (radial nerve, C7)
- Spread fingers apart (ulnar nerve)

Lower limbs

- Lift up your leg (L1,2)
- Bend your knee (L5,S1,2)
- Straighten your leg (L3,4)
- Bend your foot down (S1)
- Cock up your foot (L4,5)

Reflexes

Test with the child in a relaxed position.

Brisk reflexes may reflect anxiety in the child or a pyramidal disorder.

Absent reflexes may be due to a neuromuscular problem or a lesion within the spinal cord, but may also be due to inexpert examination technique.

Children will reinforce reflexes if asked (clench their teeth hard or grasp their hands and pull apart).

Reflex Innervations

Deep tendon reflexes:	
Biceps reflex	C_5, C_6
Supinator	C_5, C_6
Triceps reflex	C_6 to C_8
Knee reflexes	L_2 to L_4
Ankle reflexes	S_1, S_2
Babinski sign	L_4 to S_1
Superficial reflexes:	
Abdominal reflexes	T_8 to T_{12}
Cremasteric reflex	L_1, L_2
Anal reflex	S_3 to S_5

Plantar Responses

Use your thumb nail to stroke the lateral border of the sole of the foot firmly from the heel to the little toe. They are unreliable under 1 year of age. Up going plantar responses (positive Babinski) beyond 1 year suggest pyramidal dysfunction (upper motor neuron lesion).

Clonus: Grasp the foot and sharply dorsiflex it.

Meningeal Irritation

Nuchal rigidity: marked resistance to movements of the head in any direction suggests meningeal irritation, as from CNS infections, bleeding, and tumors. In infancy and early childhood this is more reliable than **Brudzinski's or Kernig's sign**.

Tripod position: when meningeal irritation is present, the child assumes the tripod position and is unable to assume a full upright position to perform the chin-to-chest maneuver.

Sensory Examination

Testing the ability to withdraw to tickle is usually adequate as a screening test. If loss of sensation is likely, more detailed sensory testing is performed.

Compare one side with the other and ask the child to close eyes.

- Light touch : using cotton wool
- Pain : with a blunt needle
- Temperature
- Proprioception: (Position sense) grasps the distal phalanx of the toe or thumb, move it up and down and ask which position it is.

Musculoskeletal System

Presentation of bone and joint disorders include limb pain, unwillingness to use limb, limp, joint or muscle pain, joint swelling and muscle wasting, scoliosis, and DDH.

Inspect for – swelling from a joint effusion (loss of joint outline) or synovial thickening. Signs of inflammation (redness, hotness), pain on movement, loss of function, muscle wasting above and below any swollen joints.

Palpate for – heat (comparing joints), tenderness, fluctuation of effusion, mobility.

Movements – Test active movement (by asking the child to mimic your movements) before passive movements (by moving the joint through its normal range of movement) in order not to hurt the child. Explain movements in child-friendly words. Observe the child face for any sign of pain. Record joint movement in degrees.

Scoliosis – lateral bending of spine and associated rotation of vertebral bodies; lateral curvature of > 10 degrees indicates scoliosis.

Effusion:

This is most likely in the knee. Look for ***bulge sign*** by milking fluid in the medial aspect of the knee in to the lateral side. Then firmly strike the lateral side of the knee downwards to push the fluid back in to the medial compartment. You will see a bulge of fluid.

If the effusion is large, then use the ***patella tap sign***. Press firmly on the supra-patella pouch with one hand to empty any fluid. Then

with the other hand push firmly downwards on the patella. If fluid is present in the knee then the patella will "bounce".

Bowing of the legs (genu varum): may be normal up to 18 months. Let the child stand, with the medial malleoli touch each other, measure the distance between the two condyles, it should be less than 5cm.
Knock knee (genu valgum): with the child standing, and the medial condyles touch each other, the distance between two medial malleoli is less than 5cm which seen normally from 2-5 years.

Internal tibial torsion (in-toeing) and external tibial torsion (out-toeing) are normal until the child is walking independently.

Sings of Developmental Dysplasia of the Hip in older child:
Limitation of abduction in affected side, asymmetric gluteal folds (may be normal), limping, shortening of the affected side, positive trendelenburg sign (when the child stand on the affected side, the normal side drops), the knees are at different levels when the hips are flexed, and the child is in supine position (called the Galeazzi sign, or Allis sign), excessive lordosis and klisic test positive. The Klisic test is performed by placing the index finger on the anterior superior iliac spine and the middle finger on the greater trochanter; an imaginary line between these two points should point toward or above the umbilicus. The line will pass below the umbilicus if the hip is dislocated.

Skin

- Colour
- Consistency & turgor
- Distribution & type of the lesion (Macular , Papular , Pustular ,vesicular , patechial , ecchymotic , oozing , scaly , exfoliative , abraded , erythematous or pigmented)
- Body & scalp hair & nails
- Pubertal changes

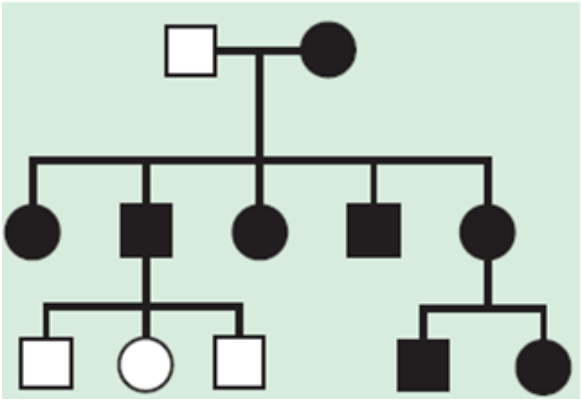
OSCE TIPS

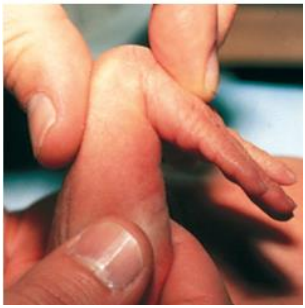
- Don't panic. Be philosophical about your exams. Put them into perspective. And remember that as long as you do your bit, you are statistically very unlikely to fail.
- Read the instructions carefully and stick to them. Sometimes it's just possible to have revised so much that you no longer "see" the instructions and just fire out the bullet points like an automatic gun. If you forget the instructions , ask to read the instructions again.
- Quickly survey the cubicle for the equipment and materials provided. You can be sure that items such as hand disinfectant, a tendon hammer, a sharps bin, or a box of tissues are not just random objects that the examiner later plans to take home.
- First impressions count. You never get a second chance to make a good first impression. As much of your future career depends on it, make sure that you get off to an early start.
- Don't let the examiners put you off or hold you back. If they are being difficult, that's their problem, not yours. Or at least, it's every one's problem, not yours.
- Be genuine. This is easier said than done, but then even actors are people. By convincing yourself that the OSCE stations are real situations, you are much more likely to score highly with the actors, if only by ~remembering" to treat them like real patients.
- Keep to lime but do not appear rushed. If you don't finish by the first bell, simply tell the examiner what else needs to be said or done, or tell him indirectly by telling the patient, e.g. "Can we make another appointment to give us more time to go through your treatment options.Then summarise and conclude.

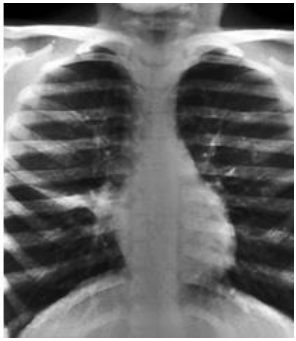
- Be nice to the patient. Have I already said this? Introduce yourself, shake hands, smile, even joke if it seems appropriate - it makes life easier for everyone, including yourself. Remember to explain everything to the patient as you go along, to ask him about pain before you touch him. and to thank him on the second bell.
- Finally, remember to practise, practise, and practise. look at the bright side of things: at least you're not going to be alone, and there are going to be plenty ofopportunities for good conversations, good laughs. and good meals.

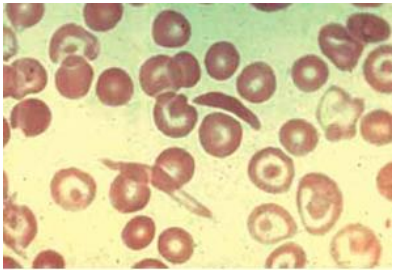
CHAPTER 2

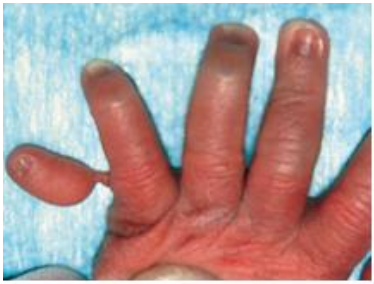
SLIDES







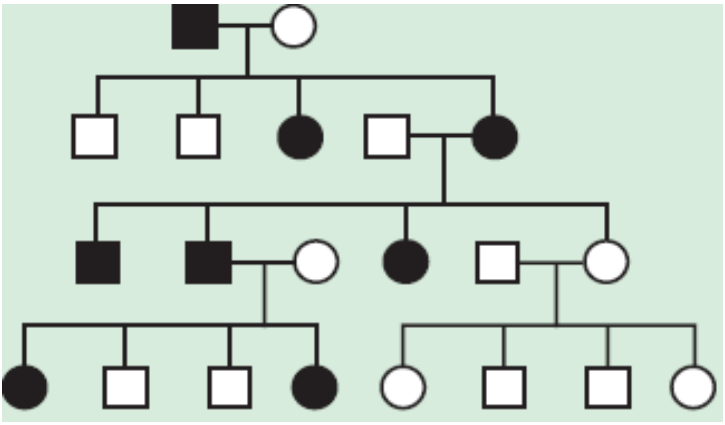




2.1 PEDIGREE QUESTIONS

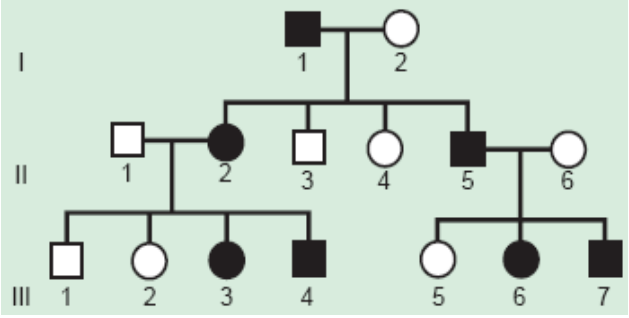
PEDIGREE QUESTION 1

1. Describe the pedigree.
2.What is the mode of inheritance?
3. Give 4 examples.



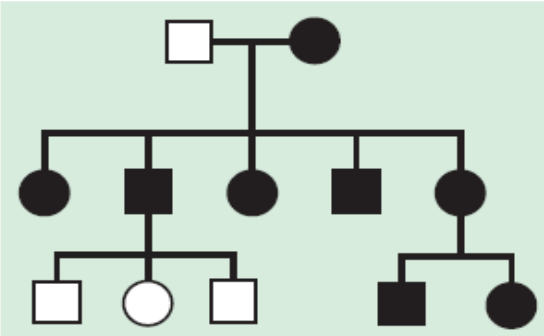
PEDIGREE QUESTION 2

1. What is the pattern of inheritance?
2. Name three conditions with similar pattern of inheritance.



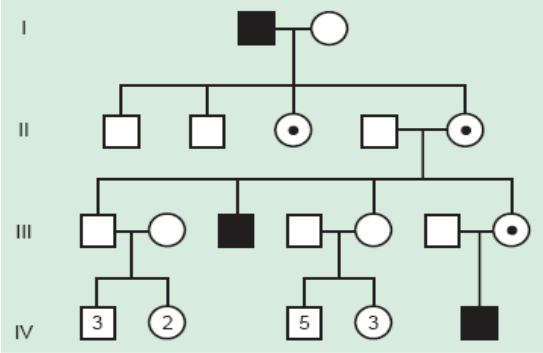
PEDIGREE QUESTION 3

1. Identify the pattern of inheritance in the given pedigree with explanation.
2. Explain the mechanism of this inheritance.
3. Give 2 examples of this pattern of inheritance.



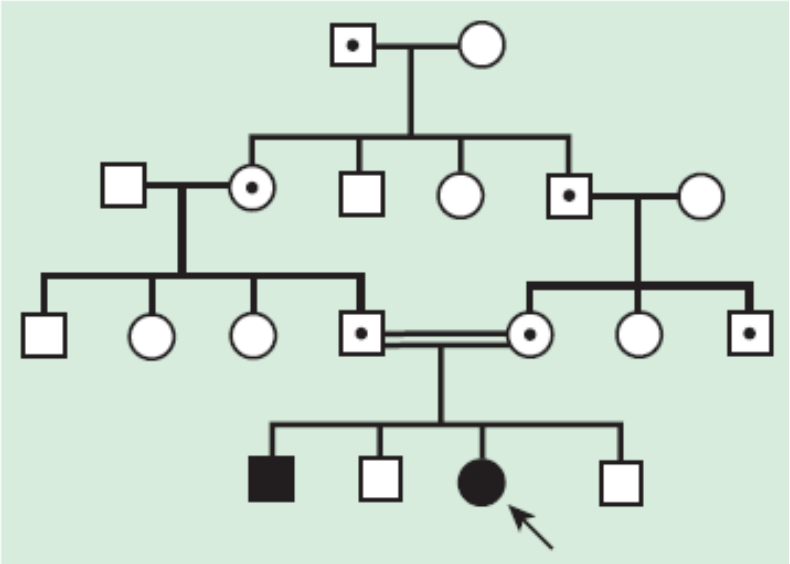
PEDIGREE QUESTION 4

1. Identify the pattern of inheritance.
2. Name three conditions with similar inheritance.
3. What is the risk of getting affected in each pregnancy?



PEDIGREE QUESTION 5

1. What type of inheritance is shown?
2. What is the risk of recurrence in the next pregnancy?
3. Give 4 examples for this type of inheritance?



2.1 PEDIGREE ANSWERS

PEDIGREE ANSWER 1

1. 3 generation pedigree chart showing
   - All daughters of the affected males have the disease
   - Sons of the affected males are normal
   - Affected females affect ½ of the males and ½ of the daughters
2. X- linked dominant inheritance
3.
   - Hypophosphatemic rickets (Vit.D resistant)
   - Incontinentia pigmenti
   - Oro facial digital syndrome
   - Rett syndrome

PEDIGREE ANSWER 2

1. Autosomal dominant.
2. Neurofibromatosis type 1, polycystic kidney disease, tuberous sclerosis,hereditary spherocytosis, Marfans syndrome, osteogenesis imperfecta.

PEDIGREE ANSWER 3

1. Mitochondrial inheritance. All affected females have offspring who suffer from the disease. Affected males do not transmit the disease.
2. Mitochondrial DNA present in the ovum transmits the characteristics to the offspring. Such DNA is not present in the sperm.

3. MELAS (myopathy, encephalopathy, lactic acidosis, and strokelike episodes), MERRF (myoclonic epilepsy associated with ragged red fibers), and Kearns-Sayre syndrome (ophthalmoplegia, pigmentary retinopathy, and cardiomyopathy)

PEDIGREE ANSWER 4

1. X-linked recessive.
2. Hemophilia, color blindness, G6PD deficiency, Duchenne musculardystrophy, Menkes kinky hair disease, adrenoleukodystrophy.
3. The risk is 50% for male child in each pregnancy.

PEDIGREE ANSWER 5

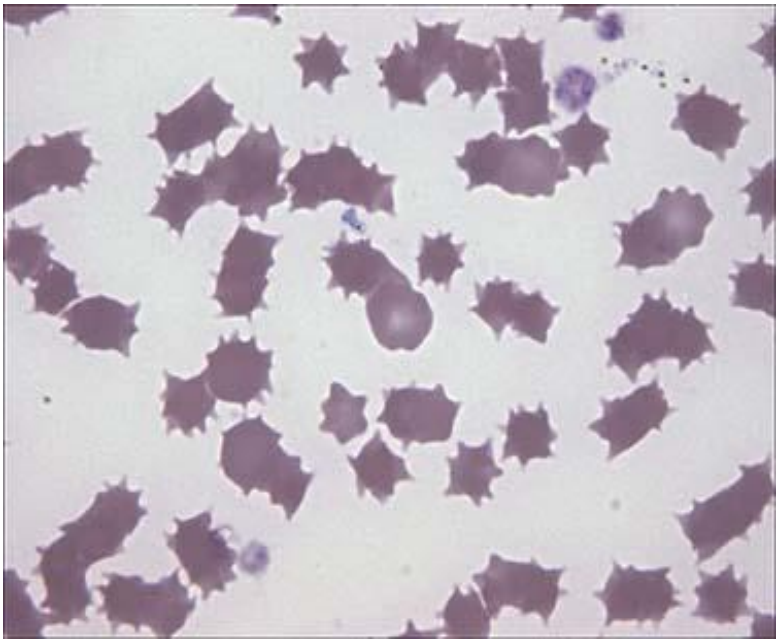
1. Autosomal recessive.
2. 25%.
3. Niemann-Pick disease, cystic fibrosis, Tay-Sachs disease, familial dysautonomia, Canavan disease, glycogen storage disease type 1A, maple syrup urine disease, Fanconi anemia type C, Bloom syndrome

2.2 HEMATOLOGY QUESTIONS

HEMATOLOGY QUESTION 1

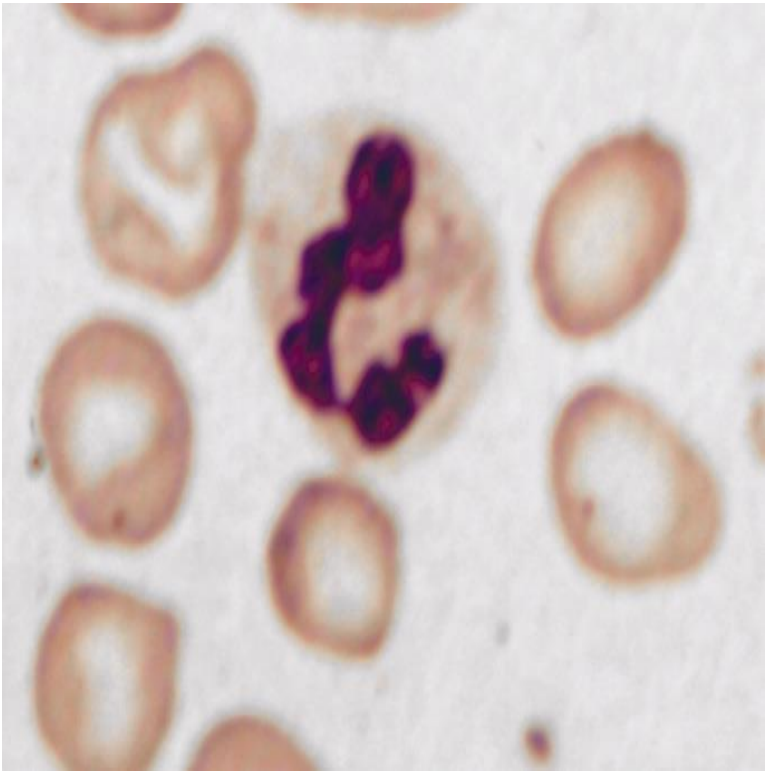
A 2- year- old child is presented with failure to thrive, chronic diarrhea, ataxia and the peripheral smear is shown below.

1. Identify the peripheral smear.
2. What is the diagnosis?
3. What other organ usually involved?



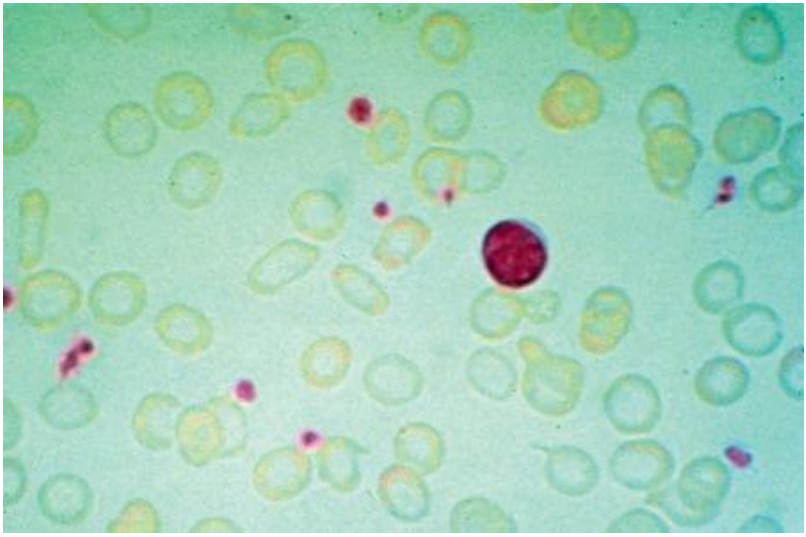
HEMATOLOGY QUESTION 2

1. Describe the blood film finding.
2. What other findings you expect to see in this film?
3. What other abnormal biochemical findings you may see in this patient?



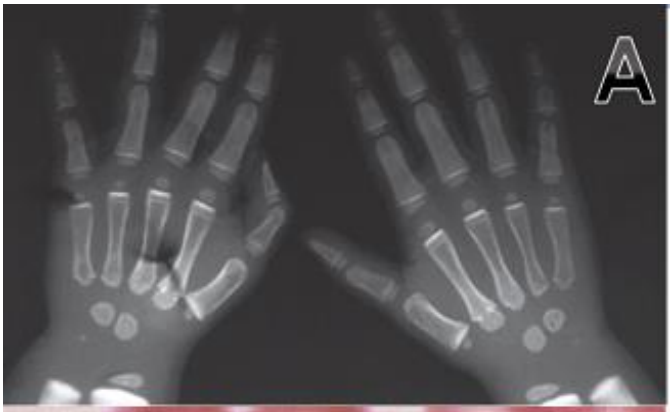
HEMATOLOGY QUESTION 3

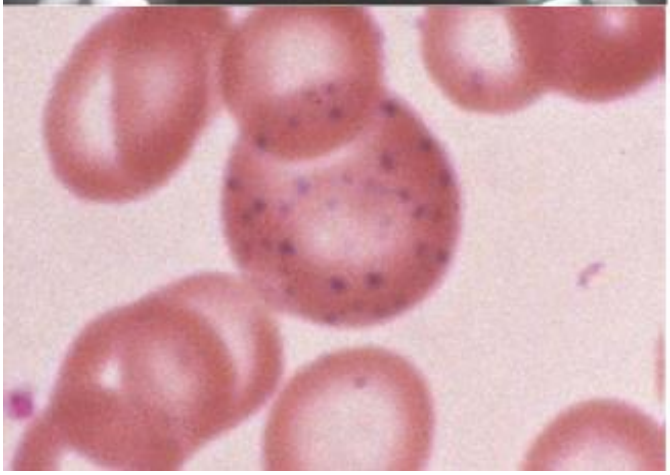
1. What are the findings in this peripheral blood smear?
2. What is the most likely diagnosis?
3. What is the most sensitive and excellent indicator of the disease?



HEMATOLOGY QUESTION 4

An 18-month-old child presented with hypochromic microcytic anemia with no response to iron therapy.
1-what are the findings in these 2 images?
2-what is the most likely diagnosis?

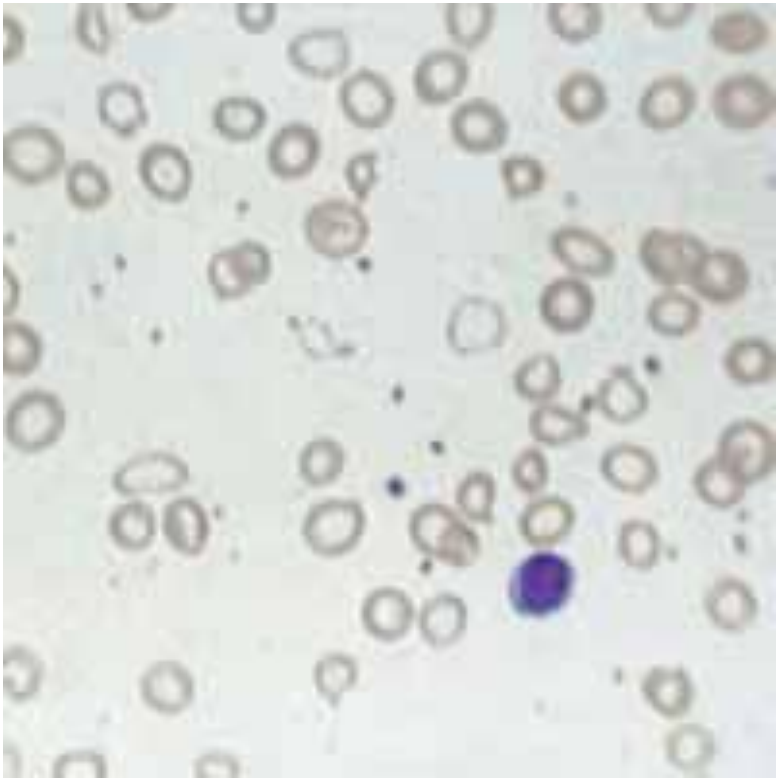




HEMATOLOGY QUESTION 5

Study the peripheral smear shown below and answer the following questions.

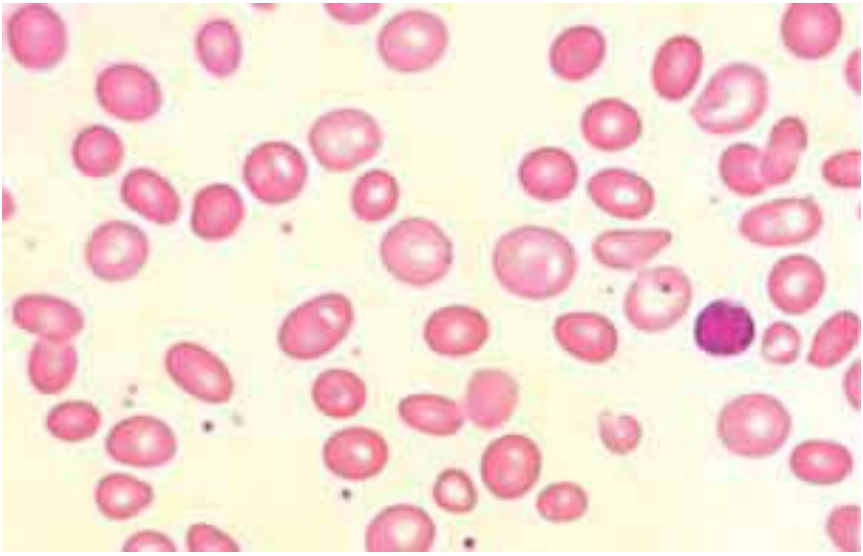
1. Comment on this smear on all the 3 cell lines.
2. Mention at least 3 differentials for this smear.
3. What is the diagnostic test for confirmation?



HEMATOLOGY QUESTION 6

Study the smear shown below and answer the following questions.

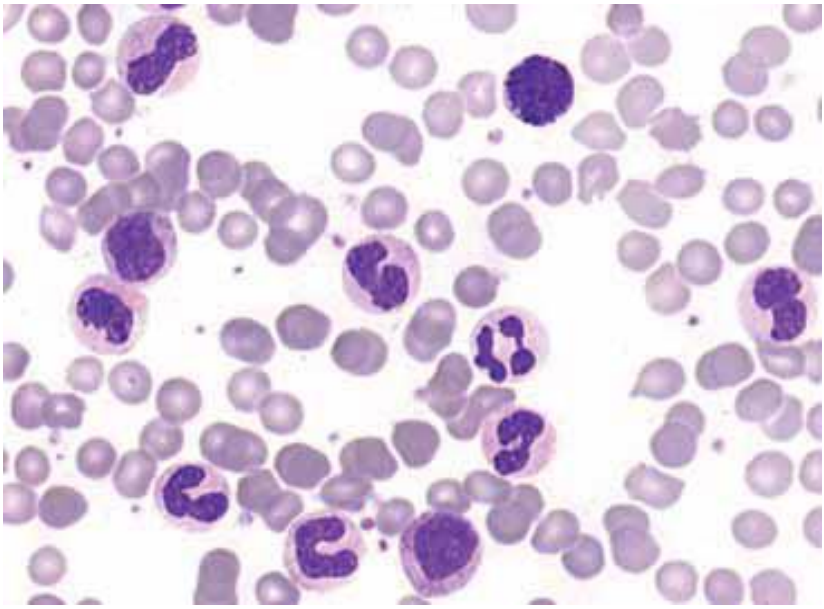
1. Identify the abnormality shown on the peripheral smear.
2. Name four causes for this condition?
3. Name one drug which can cause this condition?



HEMATOLOGY QUESTION 7

Study the smear below and answer the given questions.

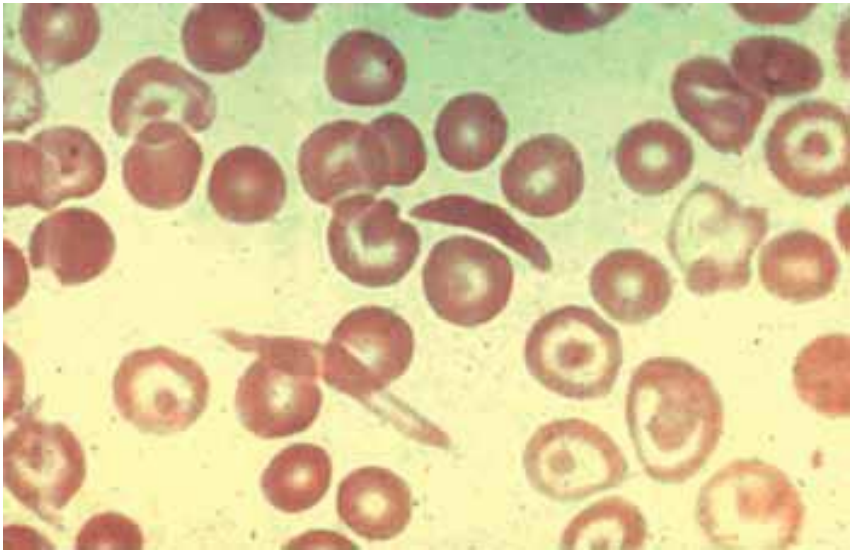
1. What are your findings on this smear?
2. What is the average half-life of neutrophil in circulation?
3. Mention 3 drugs that can cause neutropenia.



HEMATOLOGY QUESTION 8

Study the smear below and answer the given questions.

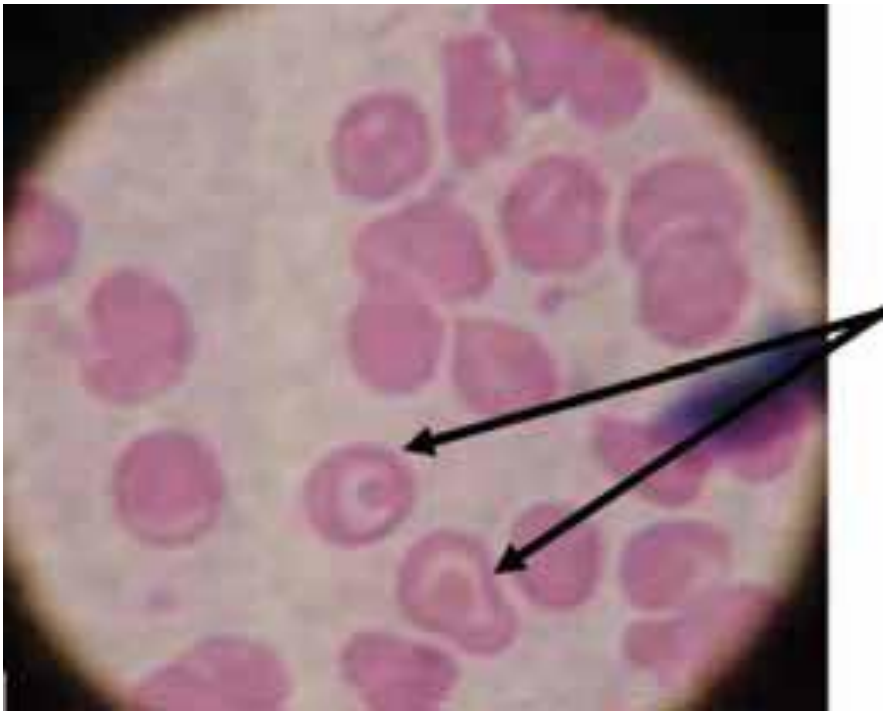
1. What are your findings on this smear?
2. What is the mutational change that leads to this?
3. Which viral infection posseses a unique threat for patients with this disease?



HEMATOLOGY QUESTION 9

Study the photomicrograph and answer the questions.

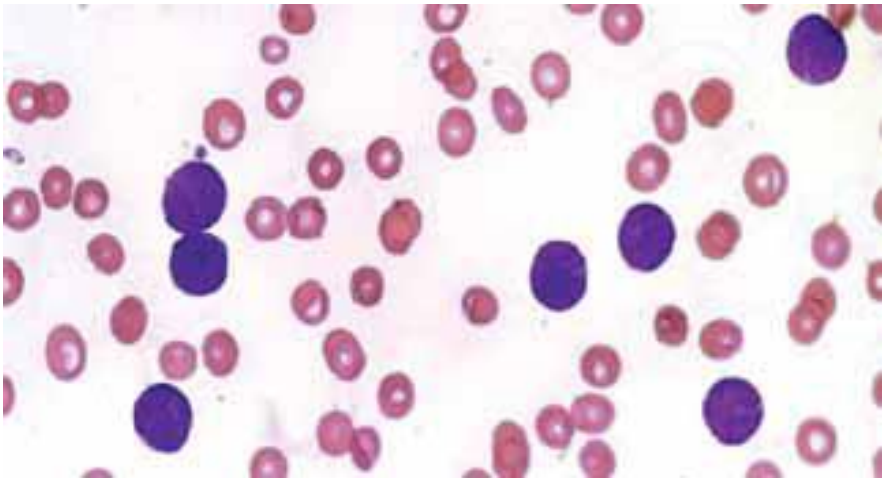
1. Identify the abnormality on peripheral smear.
2. Name 4 conditions where these cells can be seen.



HEMATOLOGY QUESTION 10

Study the smear shown below and answer the following questions.

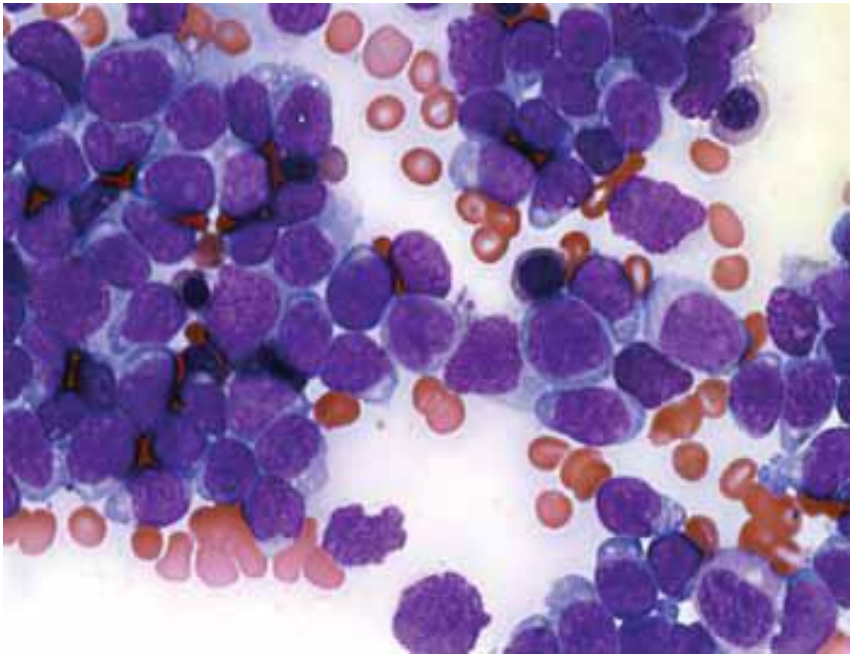
1. What is your diagnosis based on the smear shown below?
2. What other test would you like to do to confirm your diagnosis?
3. What possible differential diagnosis can you think of?
4. Can there be skin involvement in this condition? What is it known as?



HEMATOLOGY QUESTION 11

Study the smear below and answer the given questions.

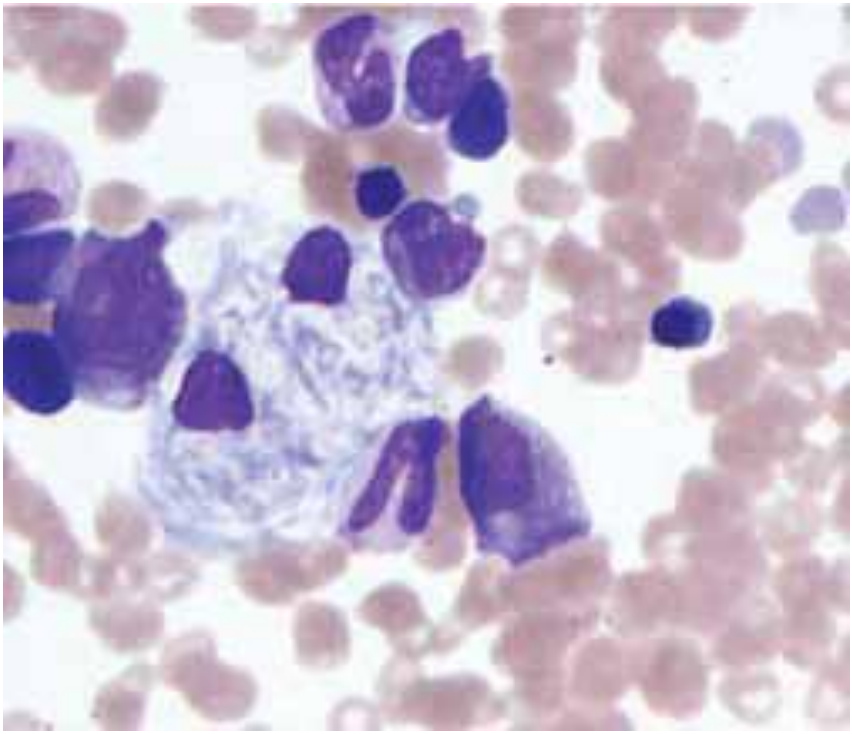
1. What are your findings on this smear?
2. What is your most probable diagnosis?
3. Name four diseases in which this condition can occur.
4. Which viral infection has been associated with this condition?



HEMATOLOGY QUESTION 12

A bone marrow aspirate of an 18-month-old child with features of delayed milestones, muscle hypertonia, recurrent aspiration pneumonia and hepatosplenomegaly is shown below.

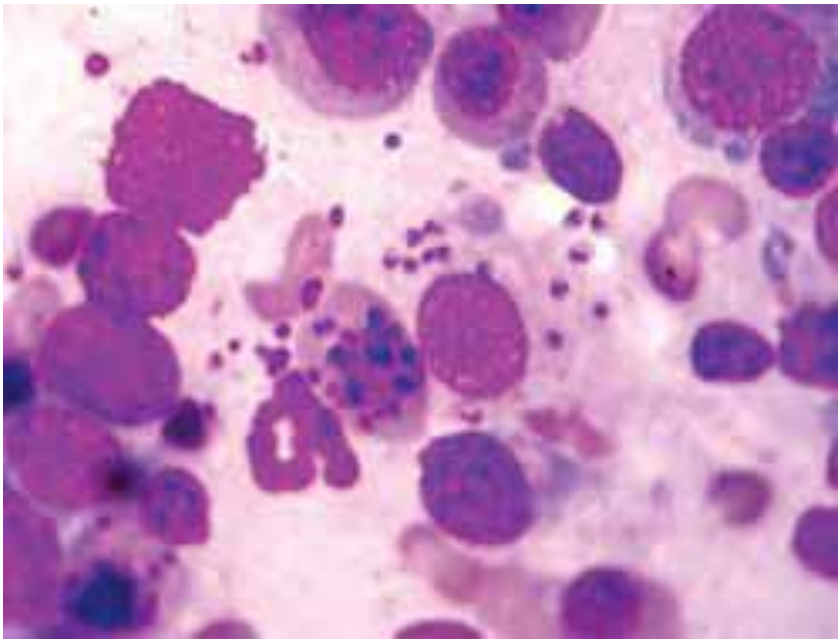
1. Describe the findings seen on the smear.
2. Give 2 clinical differential diagnoses for this.
3. What management strategy is advised in such a case?



HEMATOLOGY QUESTION 13

A bone marrow aspiration was done to a 2-year-old child with prolonged fever, splenomegaly, and pancytopenia.

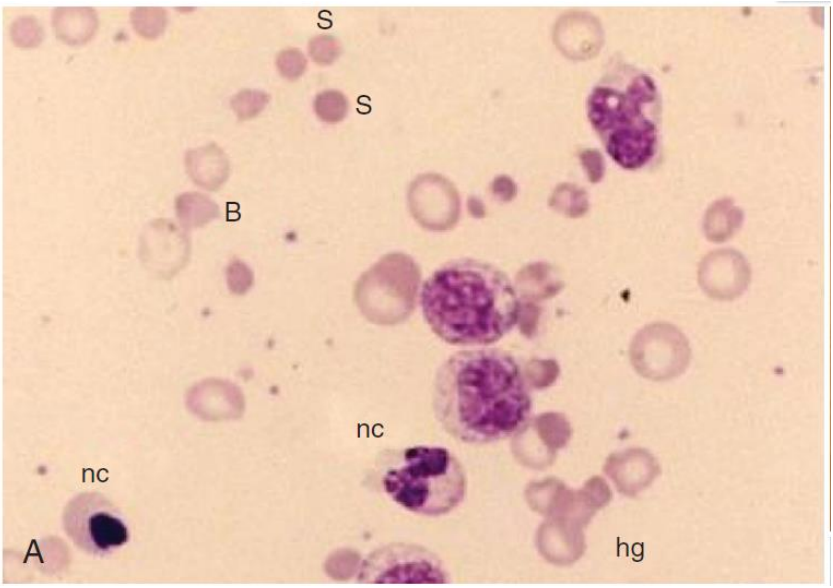
1. Describe the findings on smear and give the diagnosis.
2. Name the first line drug for the condition. Write the dose, route of administration and duration.
3. Name two other drugs for this condition.



HEMATOLOGY QUESTION 14

A mother observed, within 6 hours, that the urine of her child is discolored. It is reported as “passing blood instead of water”. At about the same time jaundice became obvious.

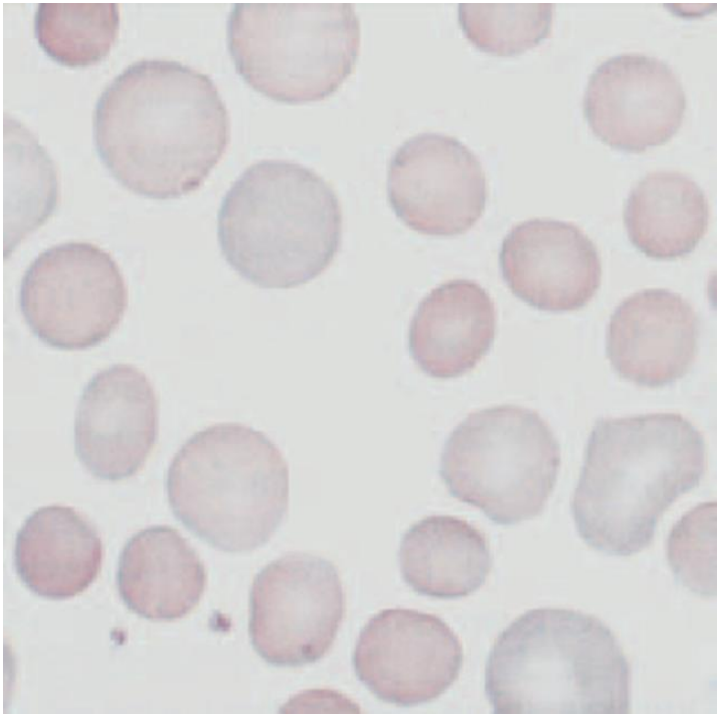
1. Mention 5 abnormal morphologic findings in the child peripheral smear.
2. What is the most likely cause?



HEMATOLOGY QUESTION 15

A 9-year-old boy shows mild pallor with elevated MCHC, RDW and normal MCV.

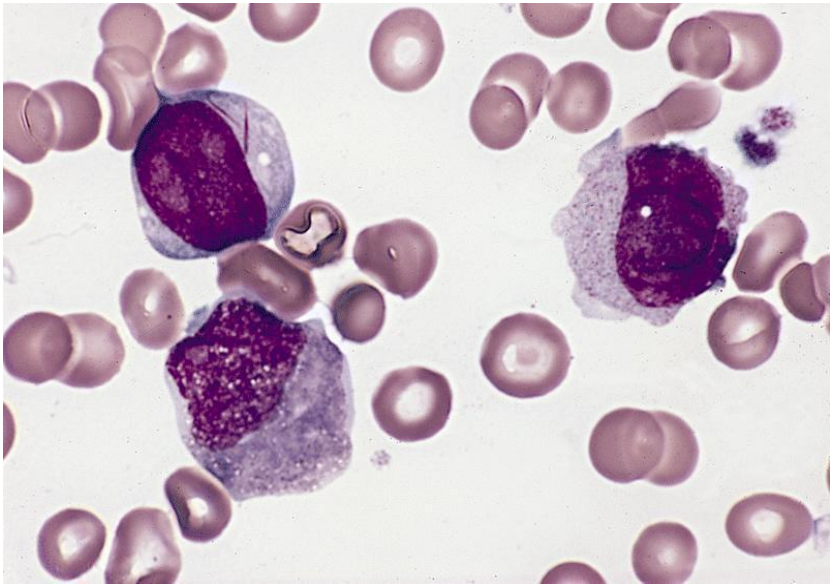
1. What is the diagnosis?
2. Interpret the findings of MCHC, RDW, and MCV.
3. Enumerate the causes of high MCHC.



HEMATOLOGY QUESTION 16

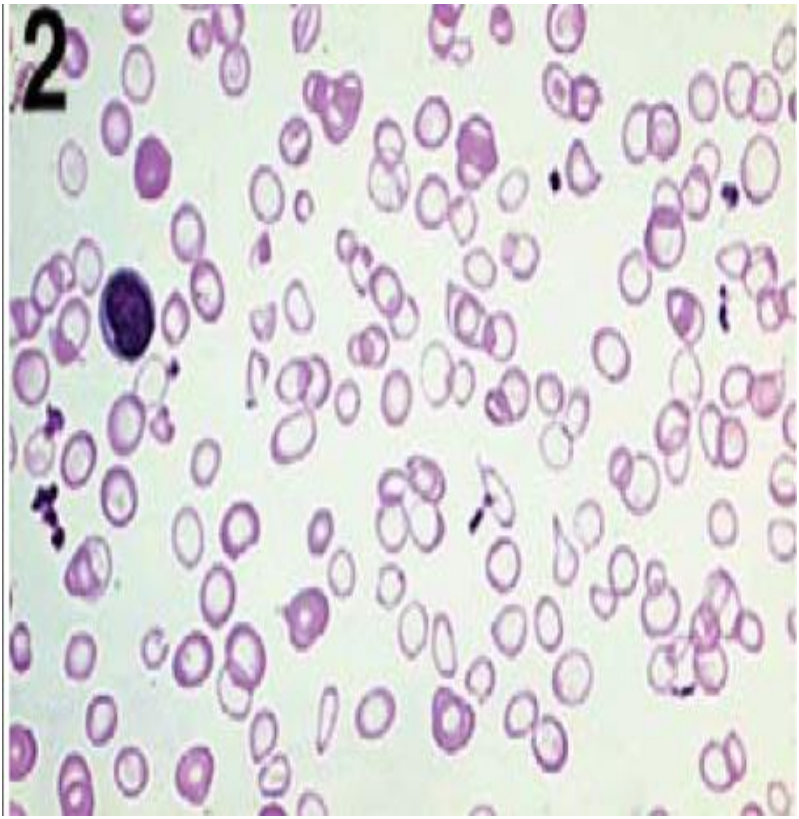
The smear of a 13-year-old girl with bleeding and hepatosplenomegaly.

1. Identify the slide
2. Mention two points of identification
3. What known predisposing (risk) factors of the disease?



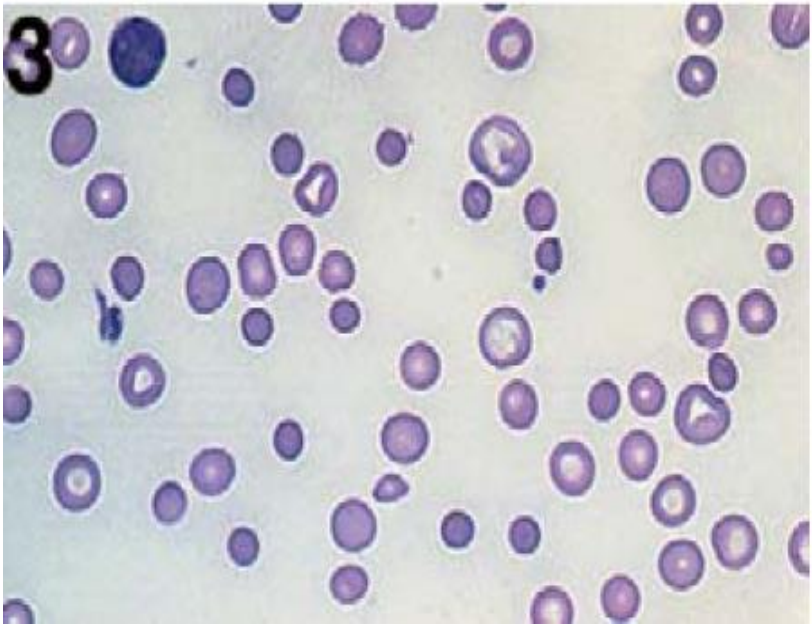
HEMATOLOGY QUESTION 17

1. Describe the findings in this blood smear.
2. Mention 3 investigations helpful in diagnosis.



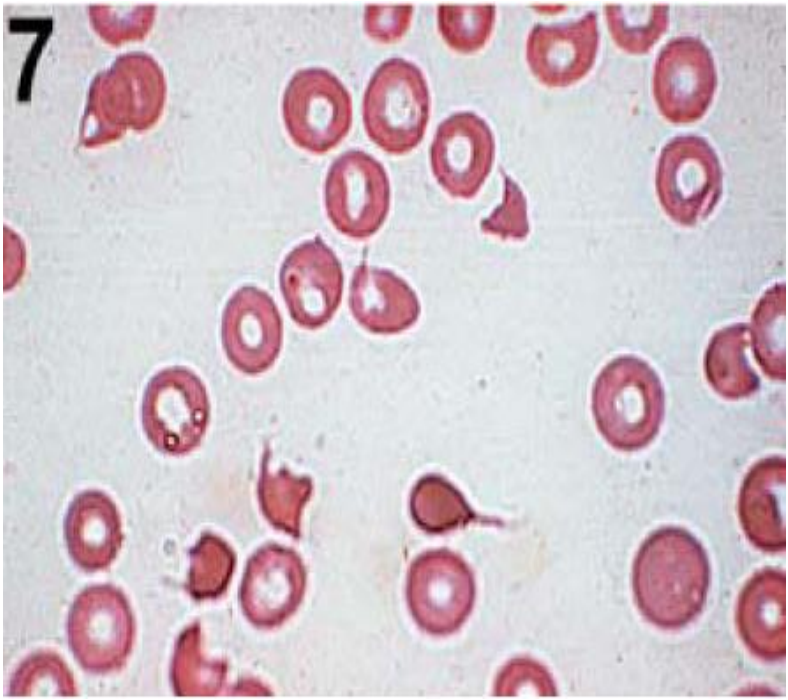
HEMATOLOGY QUESTION 18

1. What is your finding?
2. Mention 4 conditions for this finding.



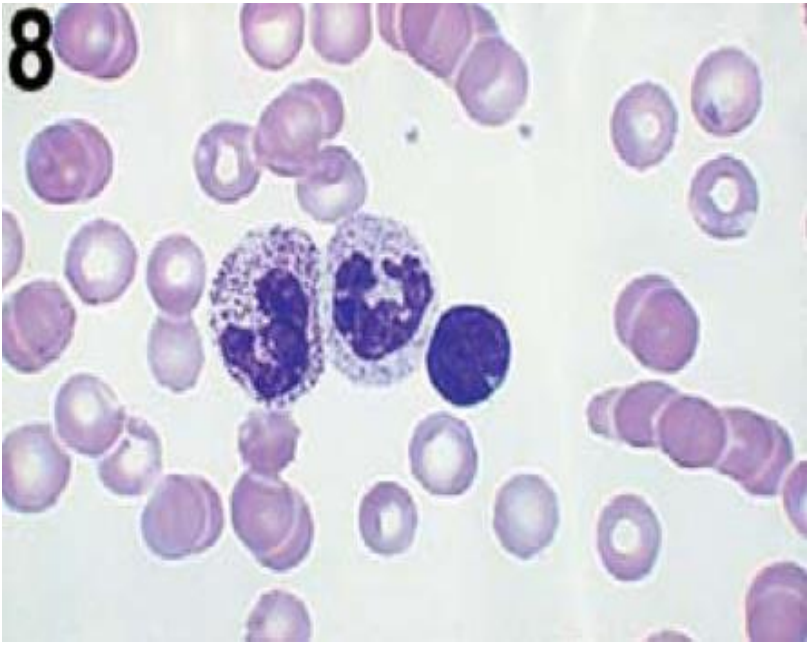
HEMATOLOGY QUESTION 19

1. What are the findings in this film?
2. What are differential diagnoses?



HEMATOLOGY QUESTION 20

1. What is your finding?
2. Mention 2 conditions for this finding.



2.2 HEMATOLOGY ANSWERS

HEMATOLOGY ANSWER 1

1. Acanthocytosis
2. Abetalipoproteinemia
3. Eye (Retinitis pigmentosa)

HEMATOLOGY ANSWER 2

1. Hypersegmented neutrophil
2. Anemia. Neutropenia, and thrombocytopenia
3. Abnormal biochemical findings include increased levels of lactate dehydrogenase, bilirubin, and iron in serum, as well as increased transferrin saturation, which reflects “ineffective erythropoiesis.” Serum cholesterol, lipid, and immunoglobulin levels may be decreased.

HEMATOLOGY ANSWER 3

1. The hypochromia is marked with many microcytic erythrocytes, elliptocytic (“cigar-forms”) red cells with variation in red cell size.
2. Iron-deficiency anemia
3. Reticulocyte hemoglobin content (CHr) (pg). In infants and young children <27.5, in adults ≤28.0

HEMATOLOGY ANSWER 4

1. A- There is marked metaphyseal sclerotic line
   B- Hypochromic microcytic anemia with basophilic stippling
2. Lead intoxication

HEMATOLOGY ANSWER 5

1. Microcytic Hypochromic anemia with few target cells and tear drop cells. WBC and platelets appear normal.
2. Iron deficiency anemia; thalassemia; sideroblastic anemia, lead poisoning.
3. • Serum iron/TIBC
   • Hemoglobin electrophoresis
   • Bone marrow study

HEMATOLOGY ANSWER 6

1. Macrocytic anemia
2. • Folic acid deficiency (nutritional)
   • Vitamin B12 deficiency (nutritional)
   • Pernicious anemia
   • Malabsorption disorders
   • Surgical resection of bowel
3. Anticonvulsants—phenytoin, phenobarbitone, methorexate, pyrimethamine

HEMATOLOGY ANSWER 7

1. Band cell—Immature neutrophil
2. 6 hours
3. Phenothiazines, sulfonamides, anticonvulsants, penicillins, and aminopyrine

HEMATOLOGY ANSWER 8

1. Sickle cell anemia
2. Hemoglobin S (Hb S) is the result of a single base pair change, thymine for adenine, at the 6th codon of the β-globin gene. This change encodes valine instead of glutamine in the 6th position in the β-globin molecule
3. Human parvovirus B_{19}

HEMATOLOGY ANSWER 9

1. Target cell
2. Thalassemia., Hemoglobinopathies—Hb AC or CC, Hb SS, SC, S-thal., Liver disease., Postsplenectomy or hyposplenic states., Severe iron deficiency., HbE (hetro and homozygous)., Abetalipoprotenemia

HEMATOLOGY ANSWER 10

1. Acute leukemia
2. Bone marrow aspirate and biopsy
3. ALL and AML
4. Yes; chloroma

HEMATOLOGY ANSWER 11

1. Blasts seen—most likely lymphoblasts
2. ALL
3. Down syndrome, Bloom syndrome, ataxia-telangiectasia, and Fanconi's syndrome
4. Epstein-Barr viral infections

HEMATOLOGY ANSWER 12

1. Two macrophages are shown which have a fibrillar, crumpled appearing cytoplasm and eccentric nuclei, consistent with Gaucher cells. The other hematopoietic elements present are normal.
2. Niemann Pick disease, MPS, granulocytic leukemia and myeloma.
3. Enzyme replacement (acid beta glucosidase) 60 units/kg, IV on alternate week and then monthly maintenance, bone marrow transplant.

HEMATOLOGY ANSWER 13

1. Leishmania donovani. Amastigote form of Leishmania donovani present inside macrophages in the bone marrow.
2. Sodium stibogluconate IM/IV 20 mg/kg/day for 30 days.
3. Pentamidine isethionate, amphotericin B, miltefosine.

HEMATOLOGY ANSWER 14

1. Acute hemolytic anemia characterized by marked morphologic abnormalities of RBCs with anisocytosis, polychromasia, bizarre poikilocytes, “bite cells,” and “hemighosts.” Note the nucleated red blood cell and polymorphonuclear leukocytosis with a marked shift to the left.
2. Favism

HEMATOLOGY ANSWER 15

1. Hereditary spherocytosis HS.
2. Large polychromatic red cells (reticulocytes) with small spherocytes result in normal MCV. The MCHC is a measure of

cellular hydration status. A high value (>35 g/dL) is characteristic of spherocytosis and a low value is commonly associated with iron deficiency (less than 30%). Variation in cell size and shape is reflected by an increased RDW.
C. The MCHC is only raised in hereditary spherocytosis, hereditary xerocytosis, hereditary pyropoikilocytosis, SS anemia, and cold agglutinin disease.

HEMATOLOGY ANSWER 16

1. Acute myeloid leukemia (AML)
2. Large immature cells, two or more nucleoli, Auer rods; a distinctive rod like red staining structures seen in the cytoplasm of myeloid cells.
3. It has an increased incidence in Down's syndrome, Fanconi anaemia, Diamond-Blackfan anaemia, Kostmann syndrome and Bloom syndrome.
It also occurs in children treated for a previous leukemia, with a peak incidence within 10 years of the initial malignancy. This may be related to alkylating agents, agents that inhibit DNA repair, or radiation therapy.
Patients with AML can present with any or all of the findings associated with marrow failure in acute lymphoblastic leukemia (ALL). In addition, patients with AML present with signs and symptoms that are uncommon in ALL, including: subcutaneous nodules, infiltration of the gingiva (especially in M4 and M5 subtypes), signs and laboratory findings of DIC (especially indicative of acute promyelocytic leukemia M3), and discrete masses, known as chloromas (or granulocytic sarcomas).
Auer rods can be seen in myeloid neoplasms ranging from AML to myelodysplastic syndrome, but not in normal or non-neoplastic reactive states.

HEMATOLOGY ANSWER 17

1. Hypochromic microcytic, anisocytosis, poiklocytosis,and target cells.
2. RDW >13, high serum ferritin, low serum iron, & high iron binding capacity

HEMATOLOGY ANSWER 18

1. Spherocytosis. Microspherocytes a hallmark (densely stained RBCs with no central pallor).
2. The major alternative considerations when large numbers of spherocytes are seen on the blood film are isoimmune and autoimmune hemolysis. Rare causes of spherocytosis include thermal injury, clostridial septicemia with exotoxemia, and Wilson disease, each of which may present as transient hemolytic anemia

HEMATOLOGY ANSWER 19

1-RBC fragments, anisocytosis, polychromasia, decreased platelets.
2-Damage may be microvascular, when RBCs are sheared by fibrin in the capillaries during intravascular coagulation or when renovascular disease accompanies hemolytic-uremic syndrome or thrombotic thrombocytopenic purpura. Larger vessels may be involved in Kasabach-Merritt syndrome (giant hemangioma and thrombocytopenia; or when a replacement heart valve is poorly epithelialized. cells are destroyed as quickly as those produced by the patient.

HEMATOLOGY ANSWER 20

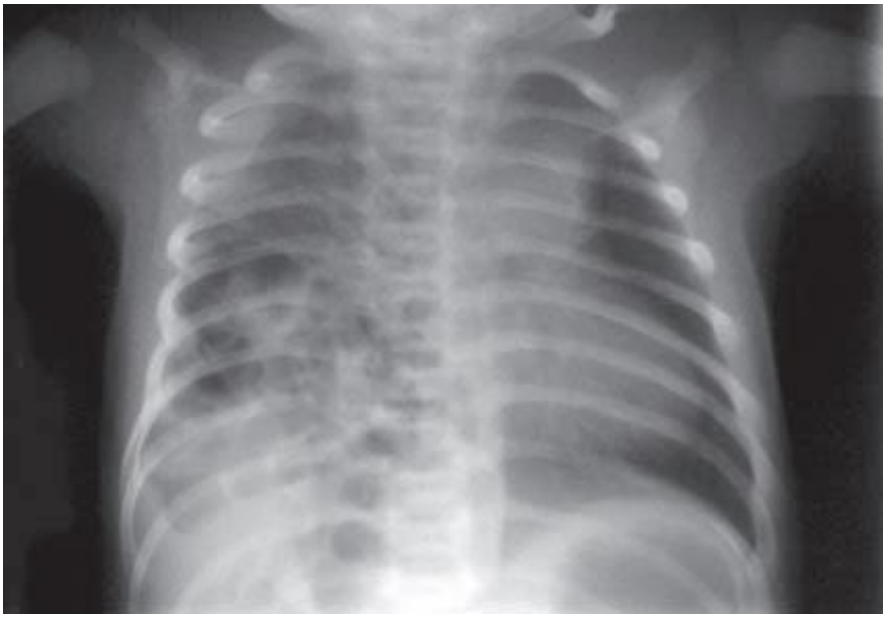
1- Toxic granulations. Prominent dark blue primary granules.
2- Commonly seen with infection and other toxic states, such as Kawasaki disease.

2.3 RADIOLOGY QUESTIONS

RADIOLOGY QUESTION 1

A term baby is noted to be grunting shortly after birth. The baby is tachypnoeic and there is marked recession. The following chest X-ray has been obtained.

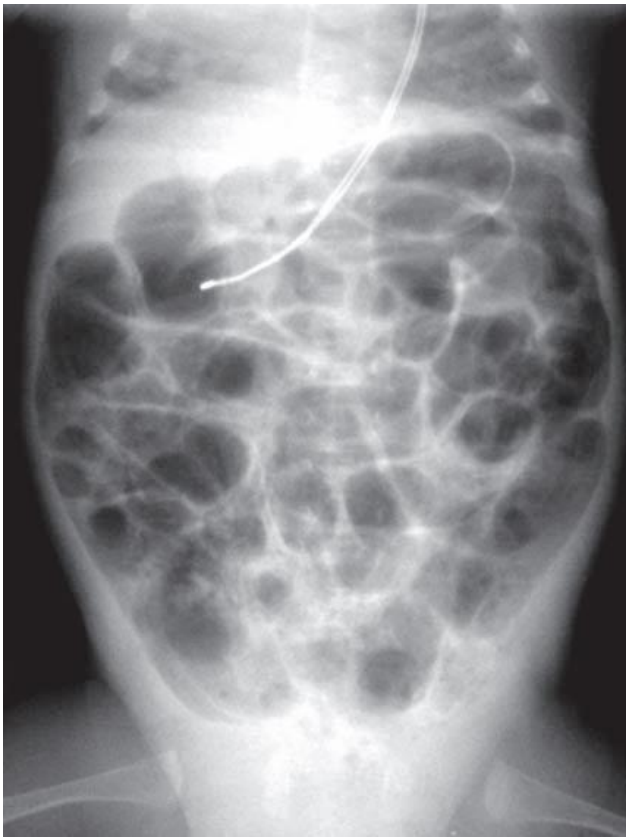
1. Describe the abnormalities on the X-ray.
2. What is the diagnosis?
3. What is the management?



RADIOLOGY QUESTION 2

A 28 week baby is 10 days old. Abdominal distension has been noted and the following X-ray is obtained.

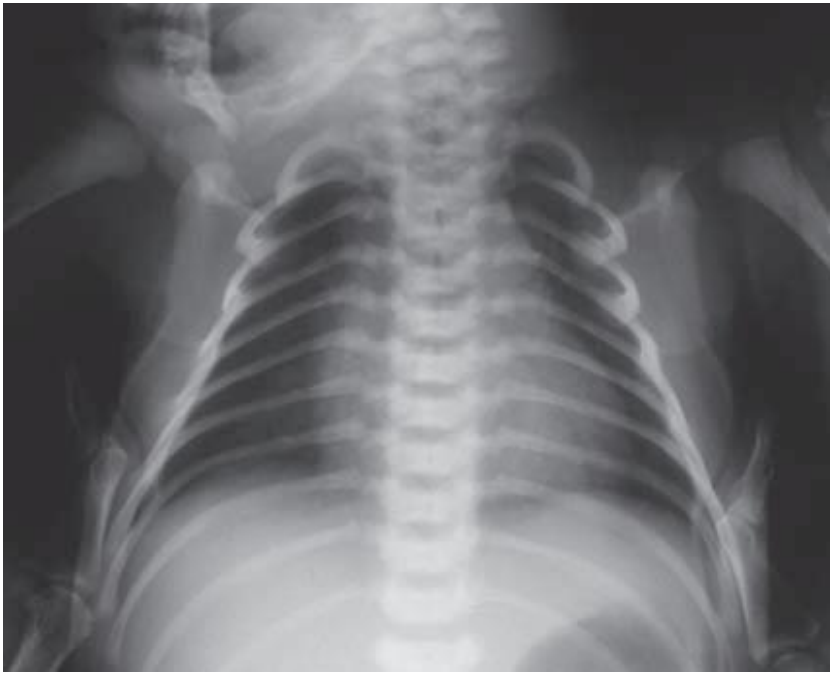
1. Describe the abnormalities on the X-ray.
2. What is the diagnosis?



RADIOLOGY QUESTION 3

A term baby is noted to have a degree of frontal bossing, as does his mother. A chest X-ray is performed.

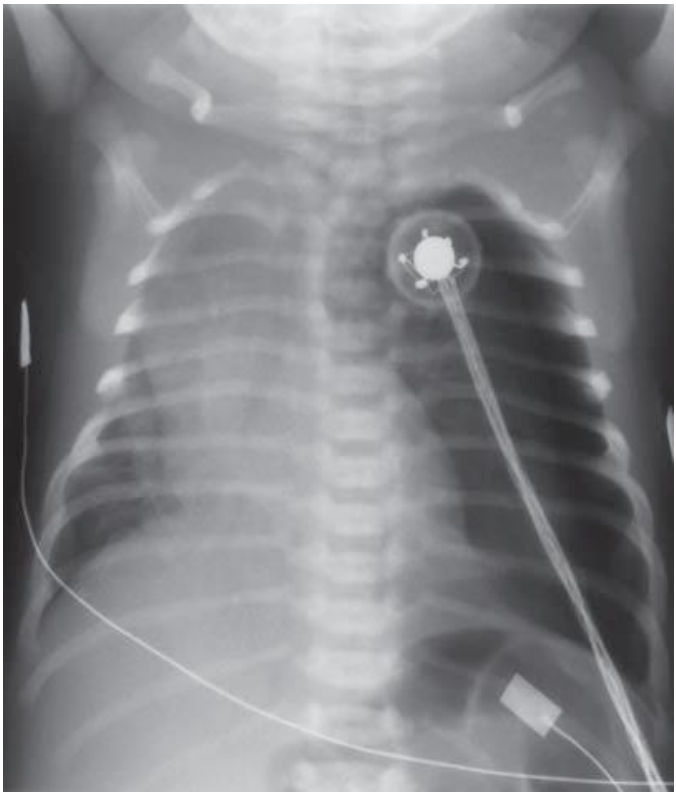
1. Describe the abnormalities on the X-ray.
2. What is the diagnosis?
3. What is the inheritance of this condition?



RADIOLOGY QUESTION 4

A 29 week gestation baby has been on CPAP for moderate respiratory distress and has been stable in 35% oxygen. He is active and has been noted to have quite marked intercostal recession on occasion. He suddenly deteriorates with persistent recession and an increase in oxygen requirements to 95%. A chest-ray is taken.

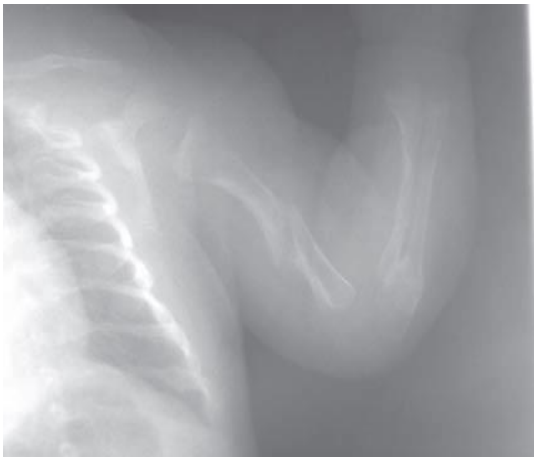
1. Describe the abnormalities on the X-ray.
2. What is the management of the baby?

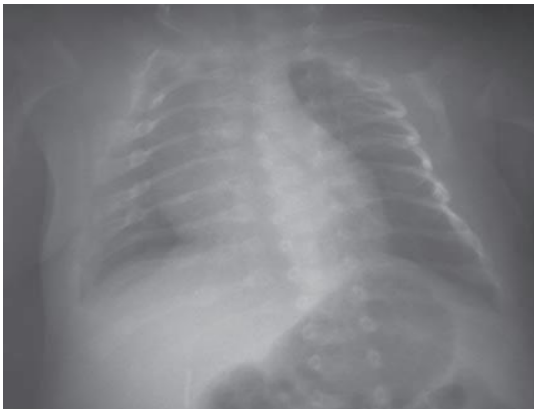


RADIOLOGY QUESTION 5

A term baby is thought to have an absent Moro reflex and limited movement of the arm. An X-ray is taken. In view of these changes a chest X-ray is then performed.

1. Describe the abnormalities on the arm X-ray.
2. Describe the abnormalities on the chest X-ray.
3. What is the most likely diagnosis?
4. What management would you consider?

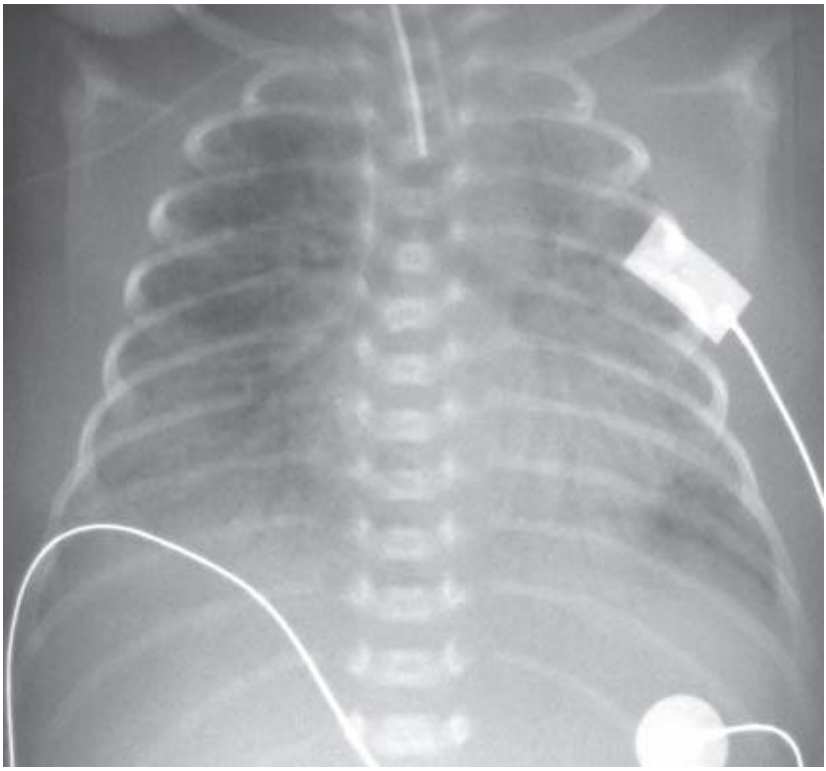




RADIOLOGY QUESTION 6

A baby is born at 26 weeks and requires ventilation from birth. Surfactant was given on delivery suite. Ventilation has steadily increased and the baby is in 95% oxygen at pressures of 28/6 at 24 hours of age. Blood gases are poor. A chest X-ray is performed.

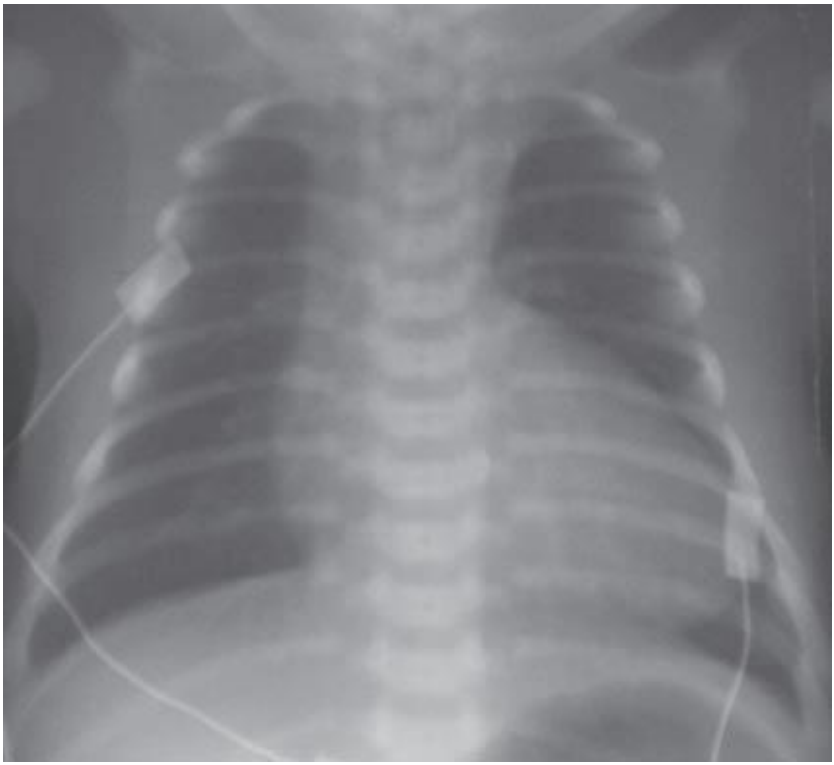
1. What abnormalities are there?
2. What is the most likely diagnosis?
3. What treatment would you consider?



RADIOLOGY QUESTION 7

A term baby becomes cyanosed 6 hours after birth. Increasing the inspired oxygen concentration only partially treats this. On examination the chest is clear and there are no abnormal sounds. A chest X-ray is obtained.

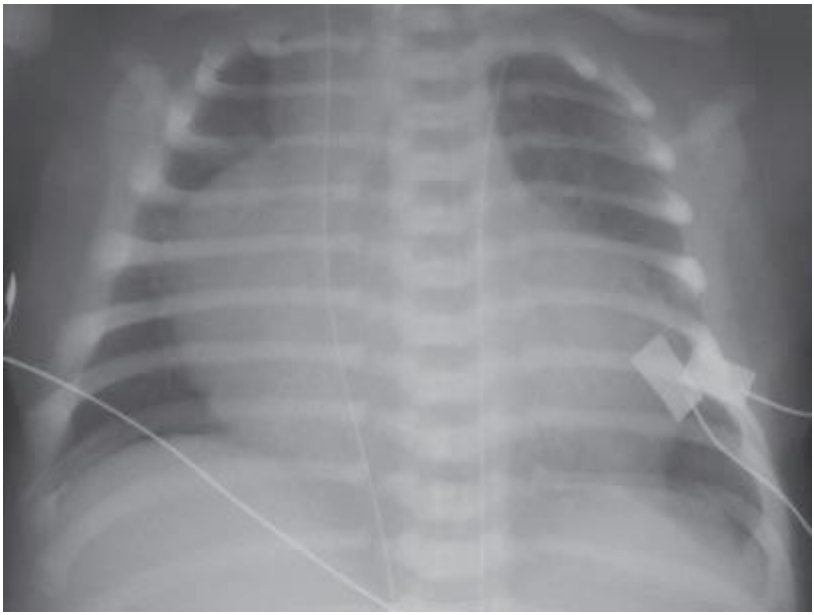
1. Describe the chest X-ray.
2. What is your diagnosis?
3. What will you do next?



RADIOLOGY QUESTION 8

A term infant is born to a mother who is known to have insulin dependent diabetes. He is grunting from birth and oxygen saturations are poor. A chest X-ray is obtained.

1. Describe the X-ray.
2. What is your diagnosis?
3. What will you do next?

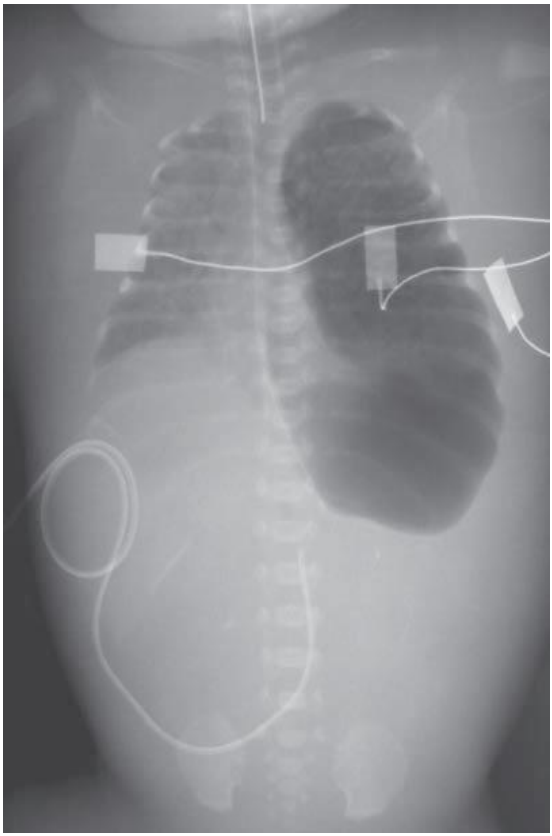


RADIOLOGY QUESTION 9

A 25 week gestation infant has required ventilation from birth and has needed high pressures. She is now 2 weeks old and there has been a sudden deterioration.

The cause is not obvious on examination and a chest and abdominal X-ray is requested.

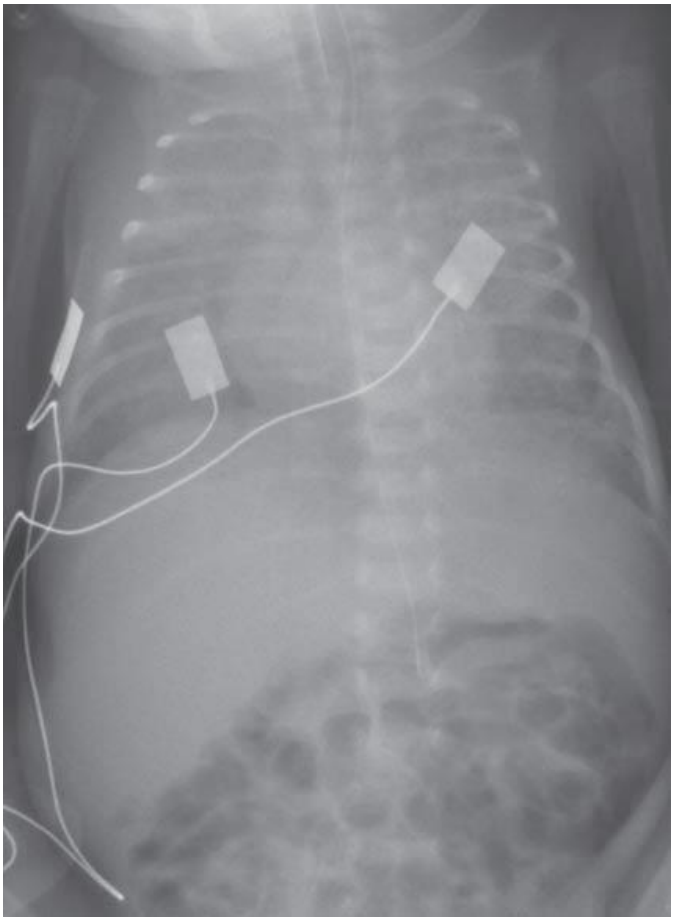
1. What does the X-ray show?
2. Why was this not detected on examination?
3. What action will you take?



RADIOLOGY QUESTION 10

A 36 week gestation infant has been born and is in poor condition. She is very growth retarded and there is a widespread petechial rash. An X-ray is taken at 6 hours of age.

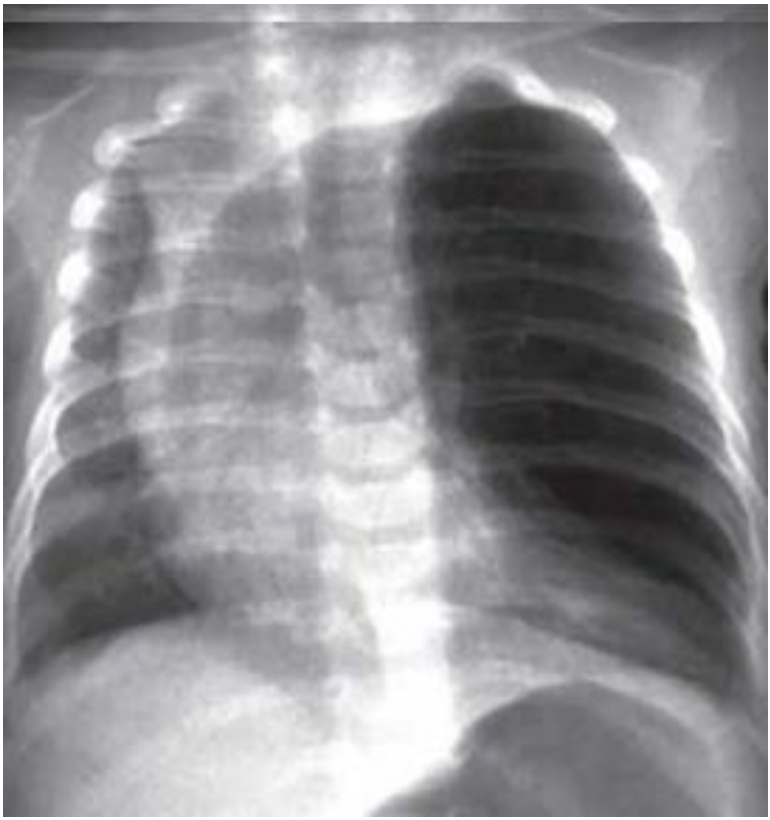
1. What does the X-ray show?
2. How might these appearances link with the clinical history?
3. What treatment would you consider?



RADIOLOGY QUESTION 11

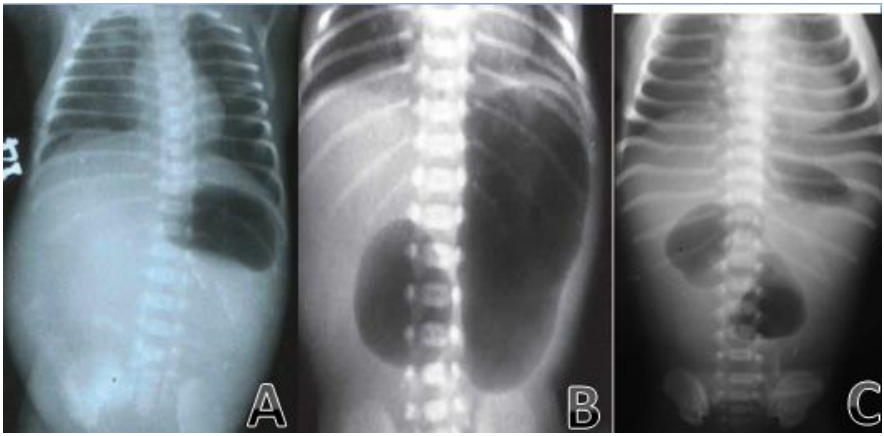
Given below is the chest X-ray of a 6-week-old male infant. The infant has been having persistent tachypnea since birth.
Study the X-ray and answer the questions.

1. List 3 positive findings on chest X-ray.
2. What is the diagnosis in this X-ray?
3. What is the most common site of involvement in the above diagnosis?



RADIOLOGY QUESTION 12

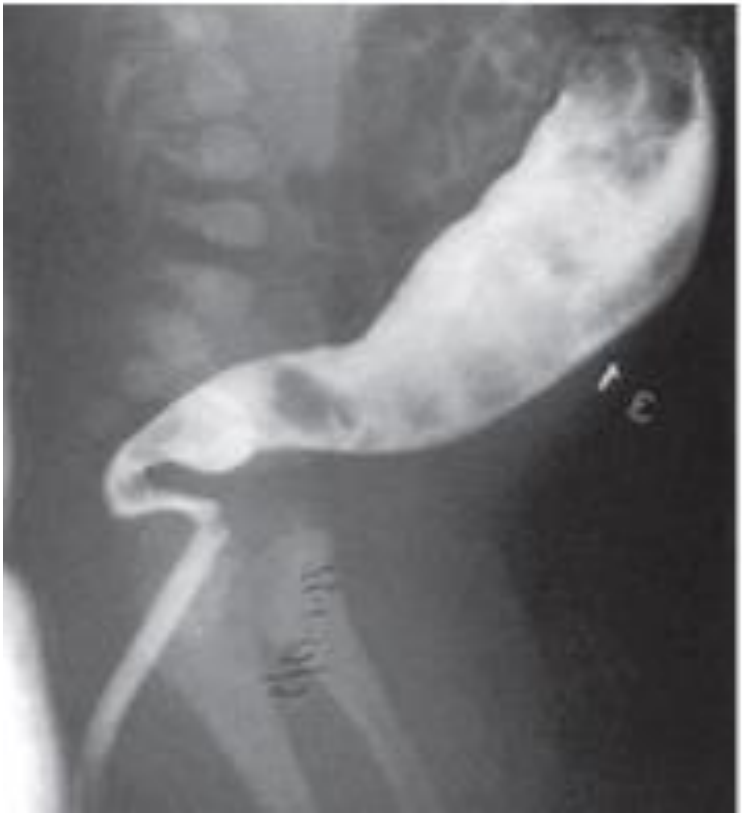
1. Name the findings seen in A, B, C.
2. What is the diagnosis for these conditions?



RADIOLOGY QUESTION 13

Given below is the X-ray of a male infant who is presented with abdominal distention.

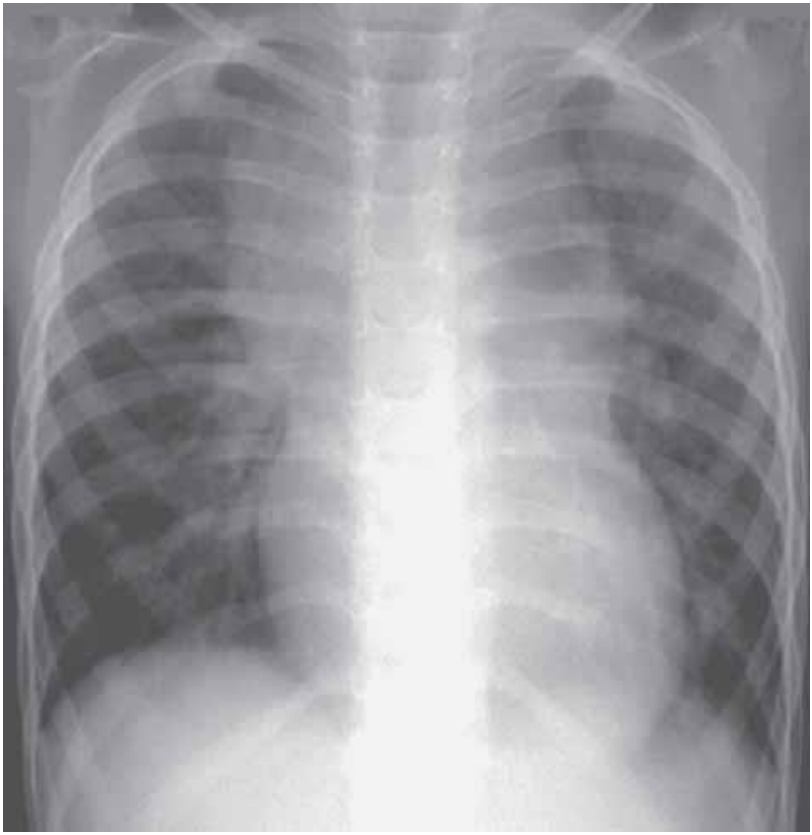
1. Name the abnormality seen.
2. What is the likely diagnosis?



RADIOLOGY QUESTION 14

Identify the cardiac disease on the basis of the chest X-ray.

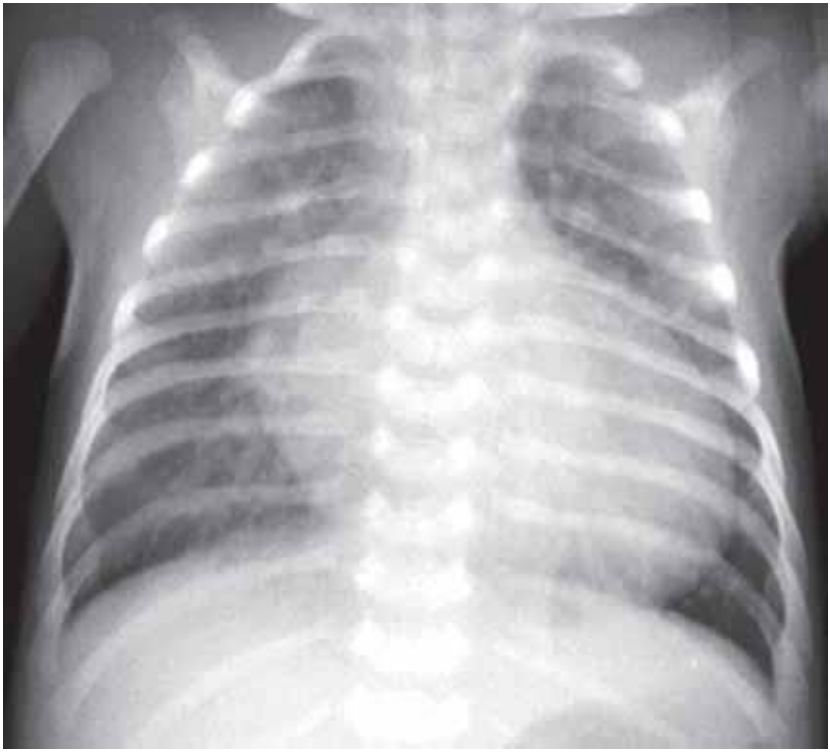
1. What is the diagnosis?
2. What is the name given to this typical chest X-ray presentation?
3. What is the clinical presentation of the infant with this diagnosis?



RADIOLOGY QUESTION 15

Identify the cardiac disease on the basis of the chest X-ray in this neonate.

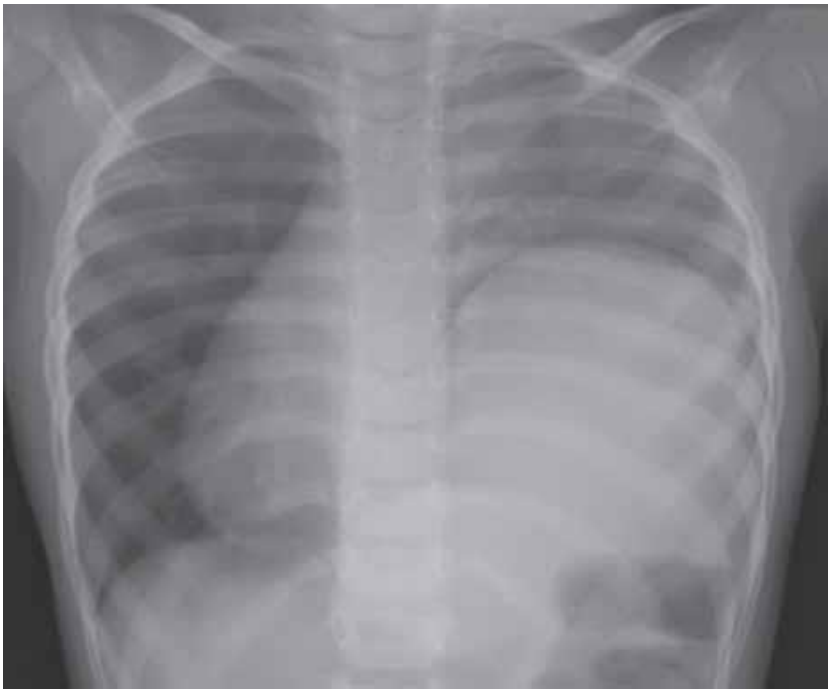
1. What is the diagnosis?
2. What is the name given to this typical chest X-ray presentation?
3. Name the drug used in this neonate soon after birth



RADIOLOGY QUESTION 16

This 12-year-old presents in pediatric OPD with respiratory distress of one day duration. He was reviewed in the OPD two days back with complaint of cough and cold and was diagnosed to have viral URI.

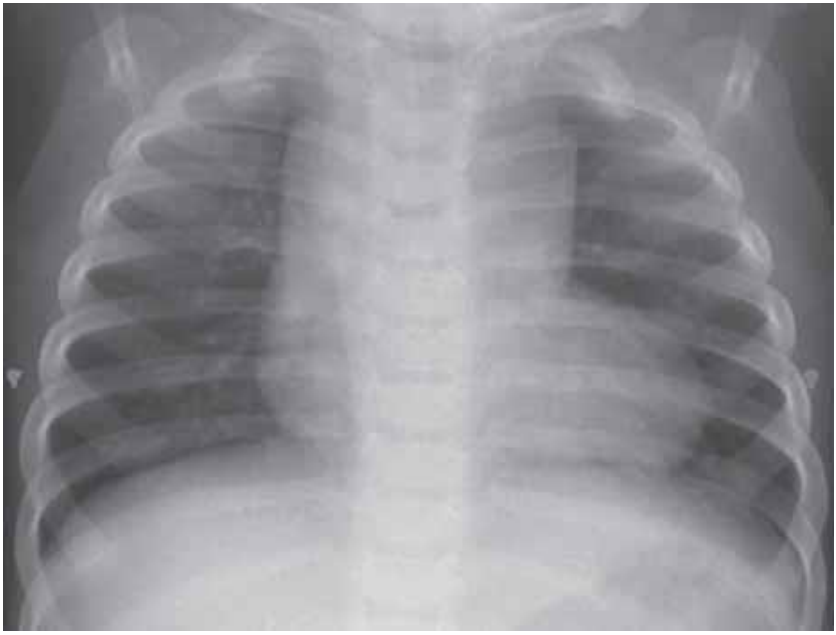
1. What is the most likely diagnosis?
2. How would you confirm the diagnosis?



RADIOLOGY QUESTION 17

Identify the cardiac disease on the basis of the chest X-ray.

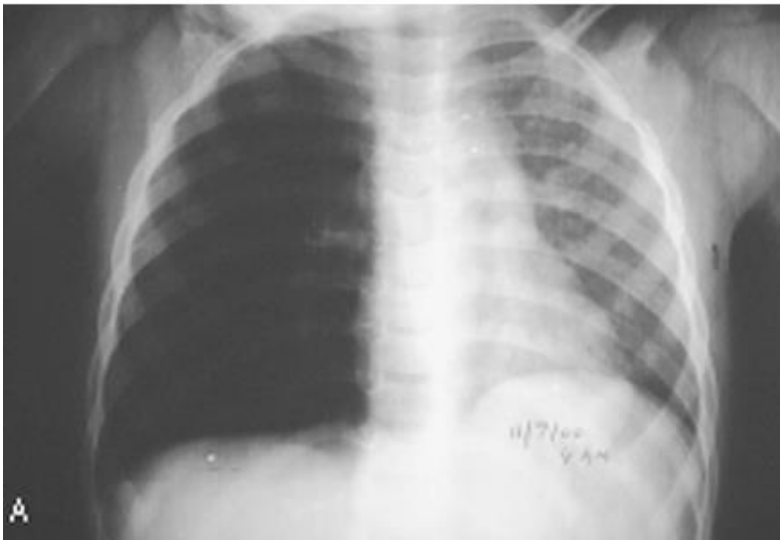
1. What is the diagnosis?
2. What is the name given to this typical chest X-ray presentation?
3. List two most common neurological complications associated with disease.



RADIOLOGY QUESTION 18

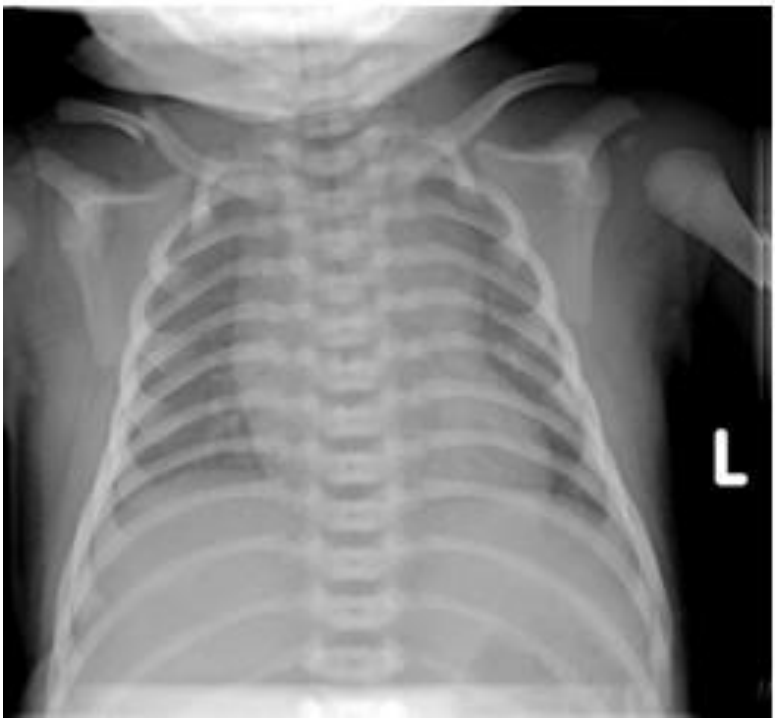
This 2.5-year-old child presented with a history of coughing and a first episode of wheezing. He had tachypnea (RR 40/min) with mild retractions, wheezing, and diminished breath sounds on the right side.

1. What are the x-ray findings?
2. What is the most likely cause?
3. Treatment?



RADIOLOGY QUESTION 19

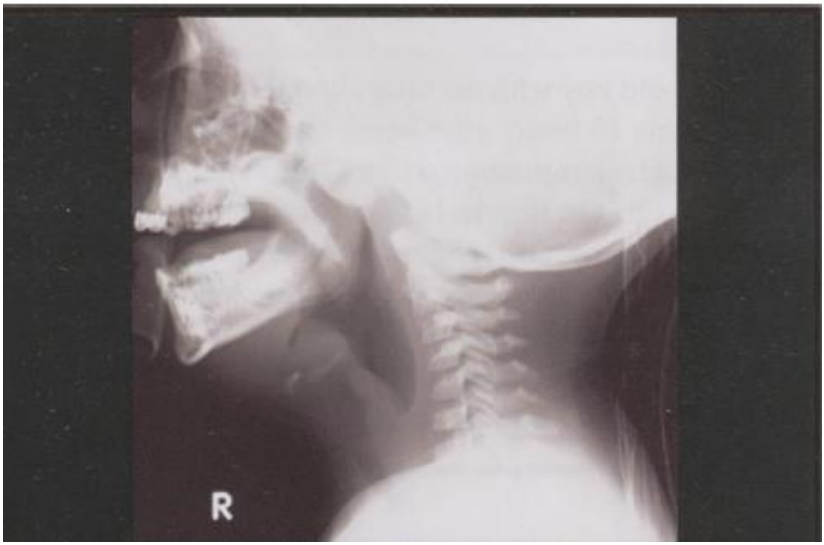
1. What abnormality you see?
2. How it is presented?



RADIOLOGY QUESTION 20

A previously healthy, 3-year-old girl developed a high fever and has trouble breathing since this morning. On physical examination, the child appears "toxic" and is leaning forward in her mother's lap. Her temperature is 40.0°C, heart rate is 138 beats/min, respiratory rate is 37 breaths/min, blood pressure is 96/62 mm Hg, and oxygen saturation on room air is 94% by pulse oximetry.

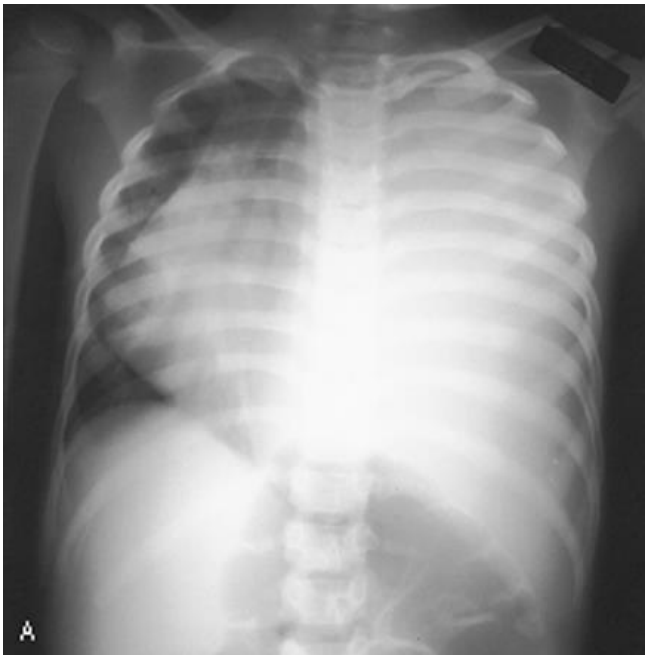
1. What is the X-ray finding?
2. What is the most likely diagnosis?
3. How you manage such a case?



RADIOLOGY QUESTION 21

A frontal view of the chest of a 6-year-old boy, who is presented with high fever, respiratory distress, and hypoxia. He had an infected varicella lesion on his ear.

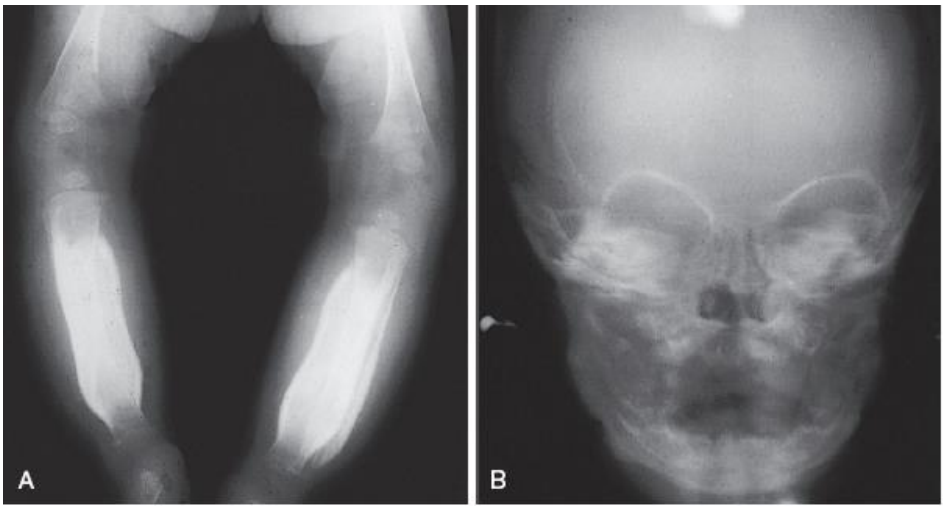
1. What are the CXR findings?
2. What is the most likely diagnosis?
3. What is your immediate management?



RADIOLOGY QUESTION 22

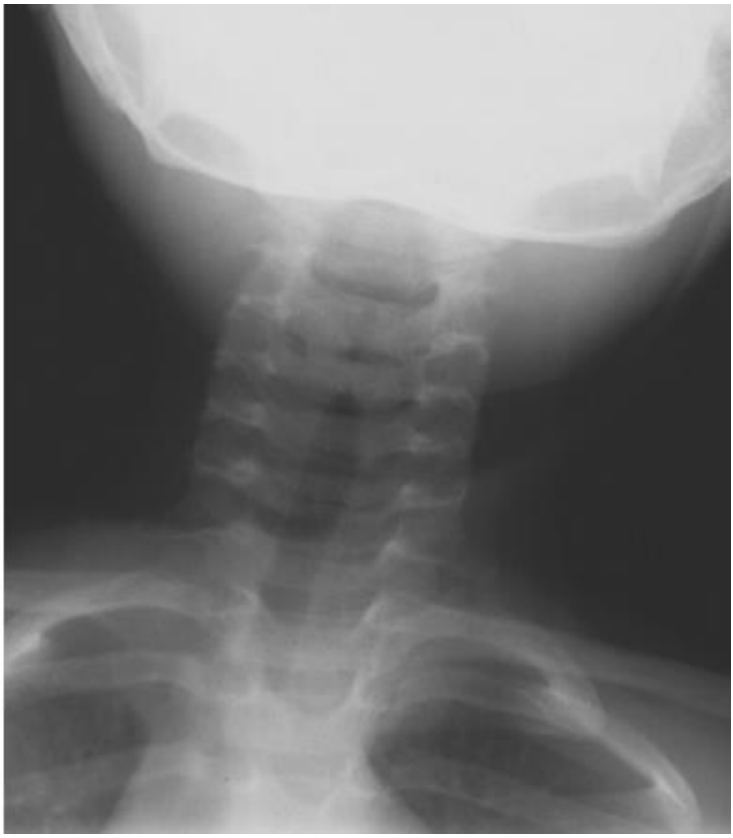
A 6-month-old infant presented with fever, anorexia, and marked irritability. The skin overlying the shin and mandible is neither warm nor discolored. There is no soft tissue swelling, and palpation reveals bony-hard thickening below the subcutaneous tissues, which are adherent to the underlying bone.

1. What are the x-ray findings in A and B?
2. What is the most likely diagnosis?



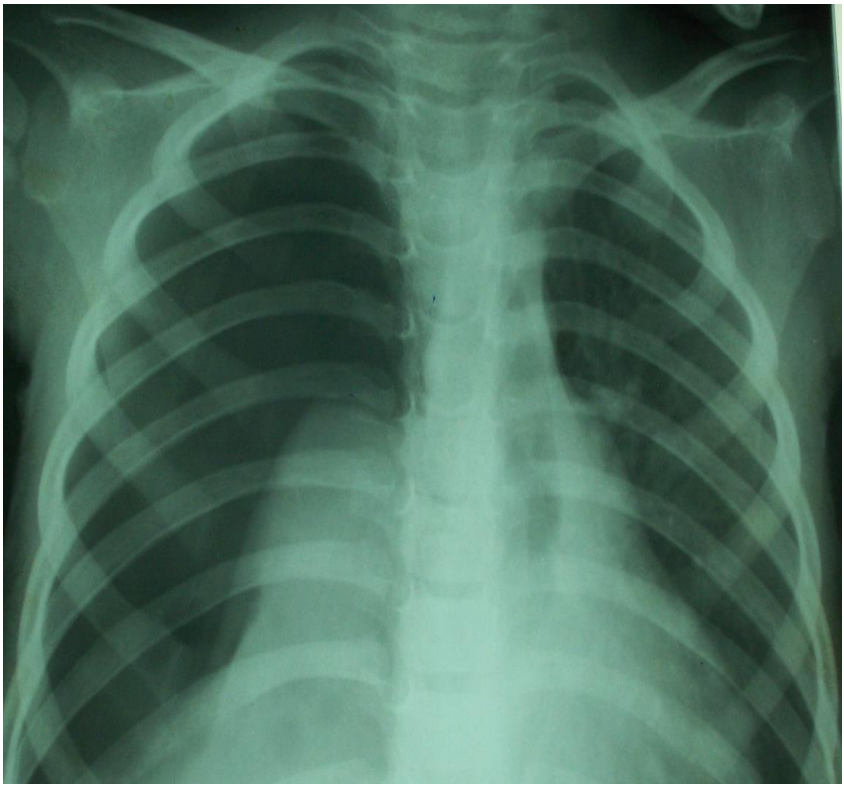
RADIOLOGY QUESTION 23

1. What is the x-ray finding?
2. What is the most likely diagnosis?
3. What are the Indications for hospitalization?



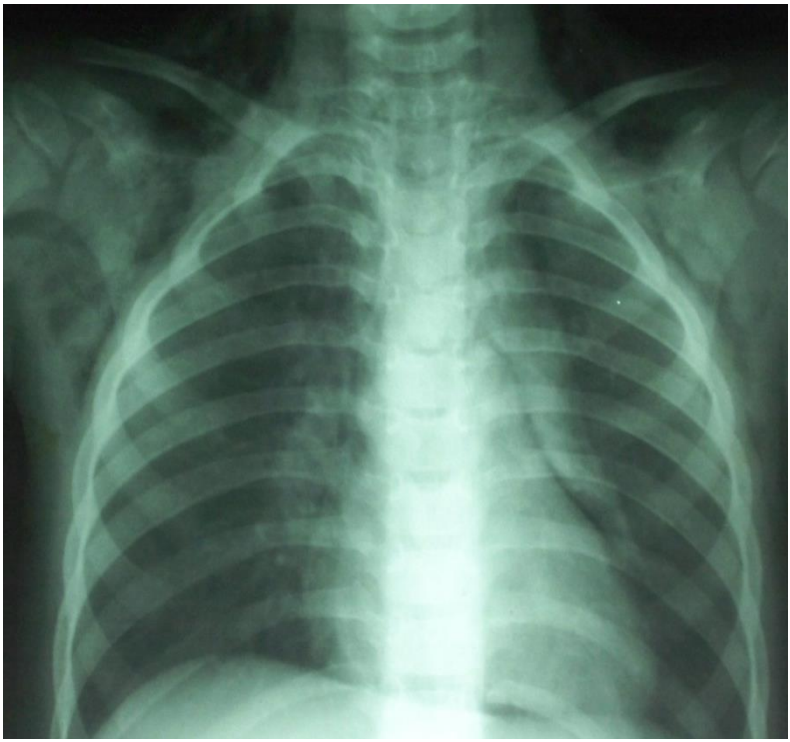
RADIOLOGY QUESTION 24

1. Mention the x-ray finding.
2. What is your diagnosis?
3. What urgent treatment is needed?



RADIOLOGY QUESTION 25

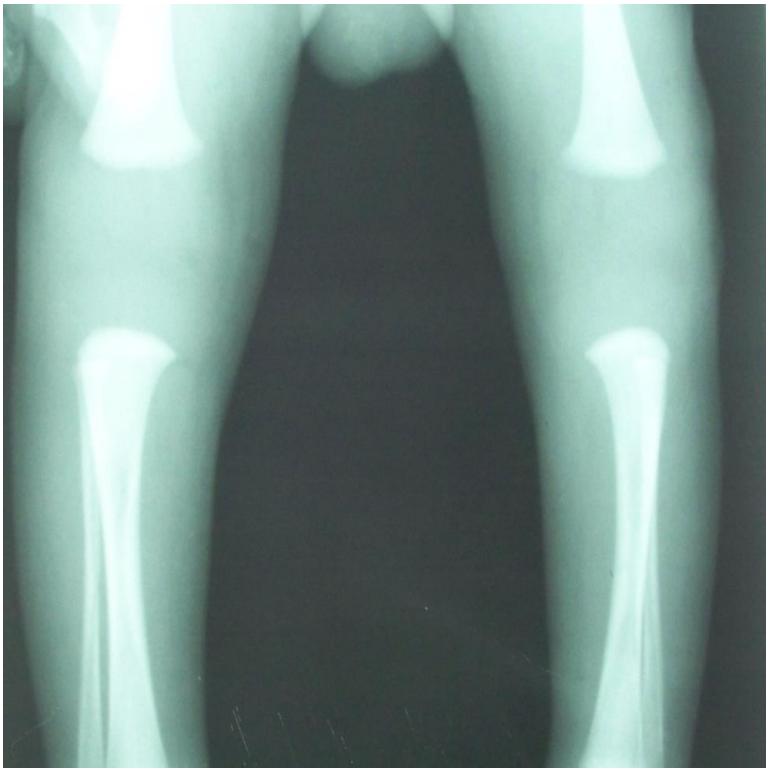
1. What is your finding?
2. What is your diagnosis?



RADIOLOGY QUESTION 26

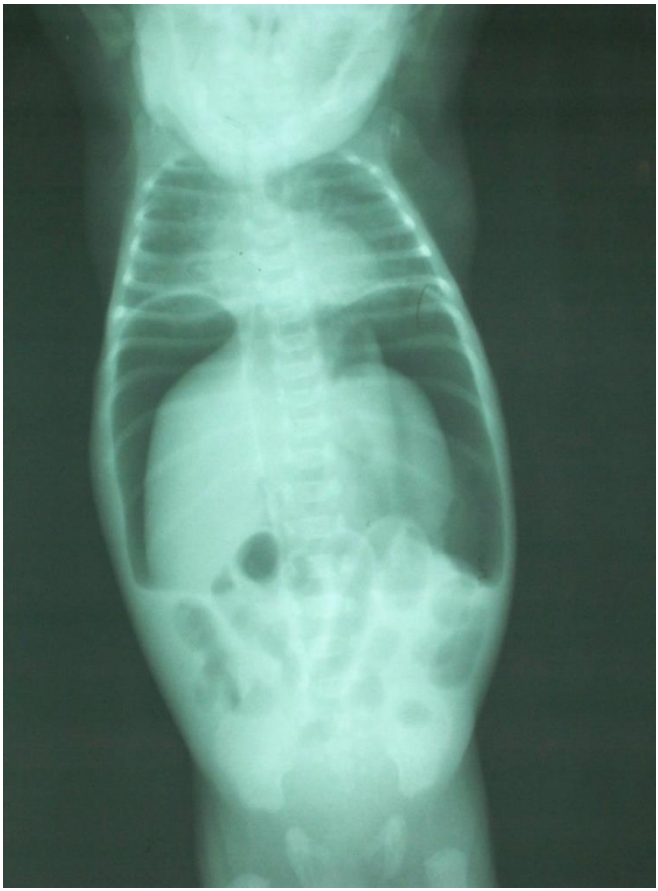
A 20- day-old fullterm neonate with prolonged jaundice

1. Why this x-ray is ordered?
2. Mention single lab. finding to confirm your diagnosis?



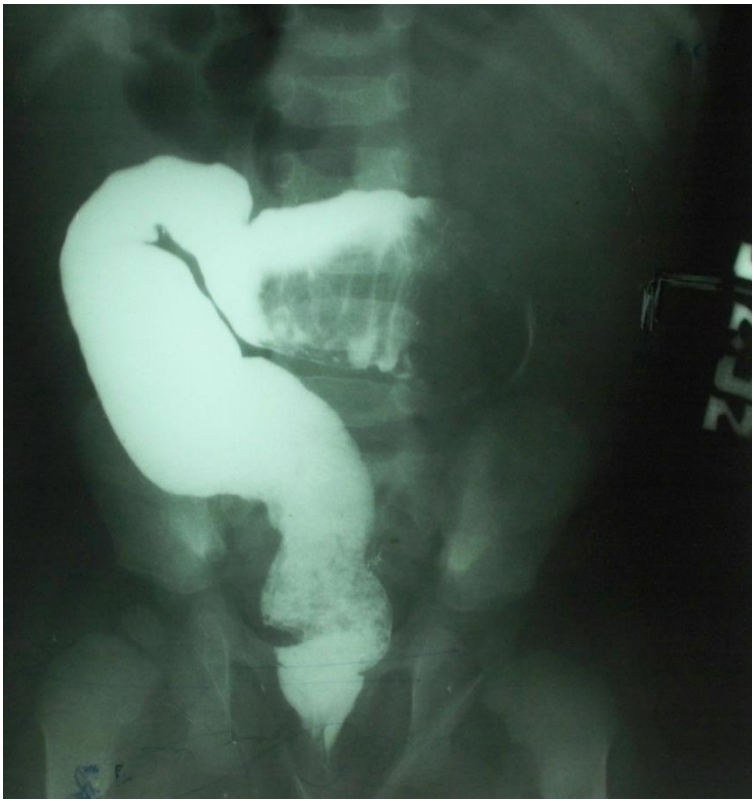
RADIOLOGY QUESTION 27

1. What you see in this film?
2. What is your diagnosis?
3. What is the most likely cause in this preterm newborn?



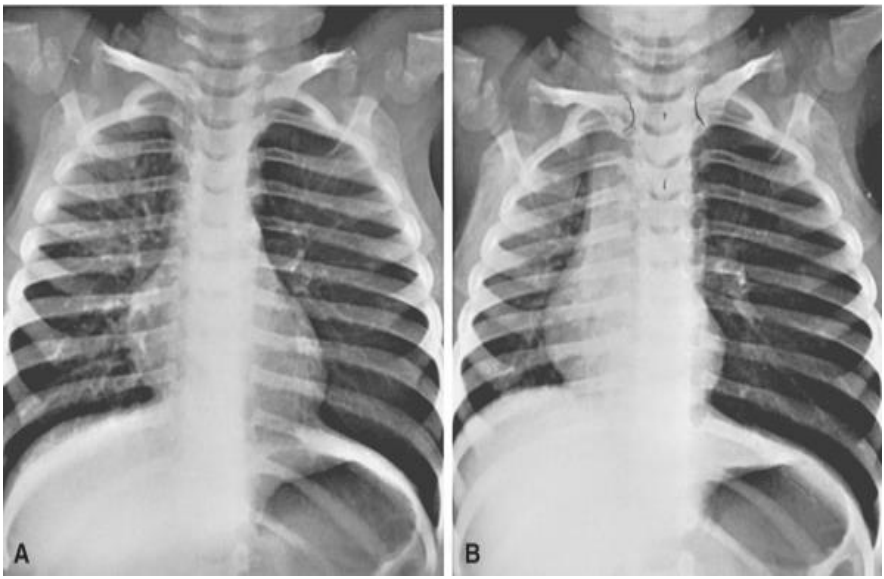
RADIOLOGY QUESTION 28

1. What is the type of x-ray?
2. What abnormal findings are seen?
3. What is the diagnosis?
4. What is your treatment?



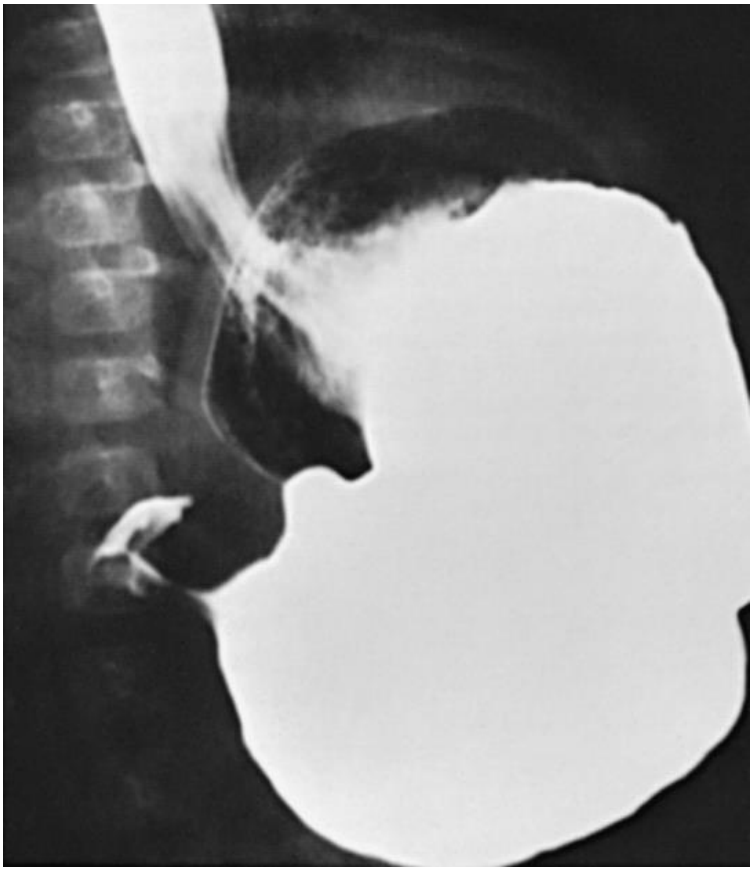
RADIOLOGY QUESTION 29

1. What is the difference between A & B CXR?
2. What is the most likely cause?



RADIOLOGY QUESTION 30

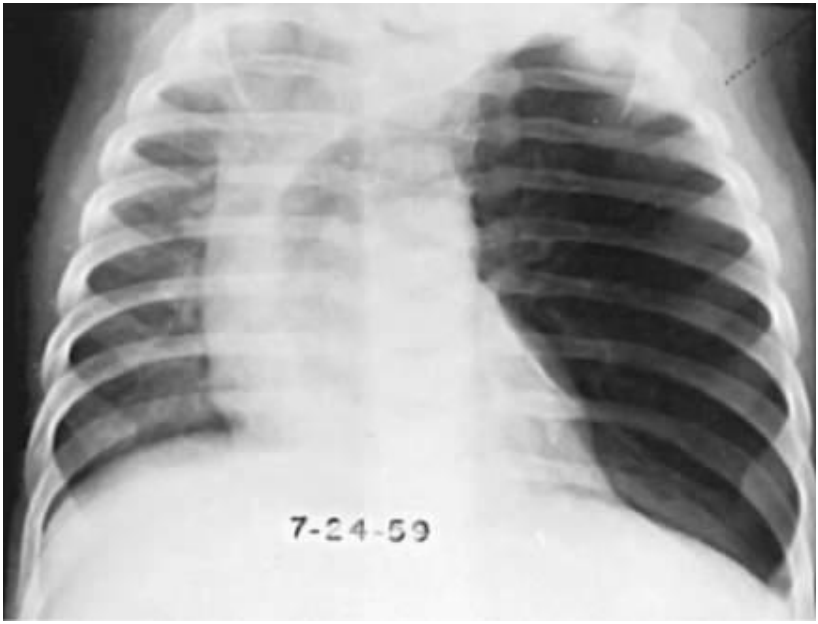
1. Describe the x-ray finding & diagnosis?
2. Write down his expected ABG, and how he is resuscitated?



RADIOLOGY QUESTION 31

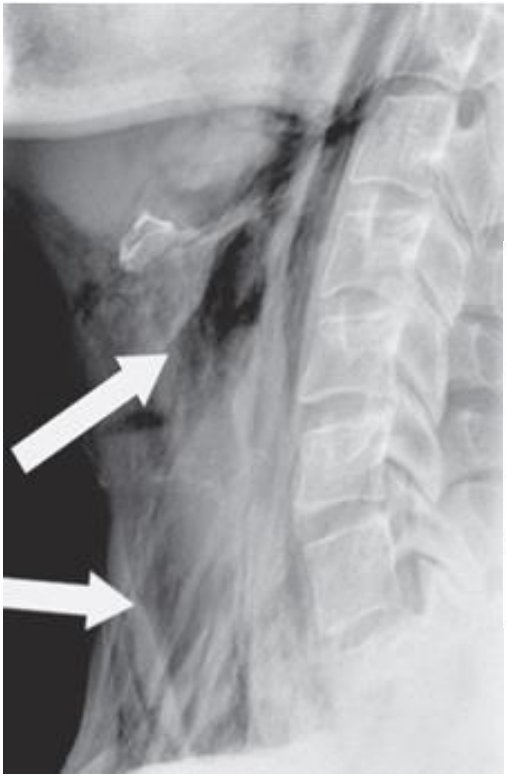
A newborn presented with tachypnea, dyspnea, and wheeze with poor air entry on left side.

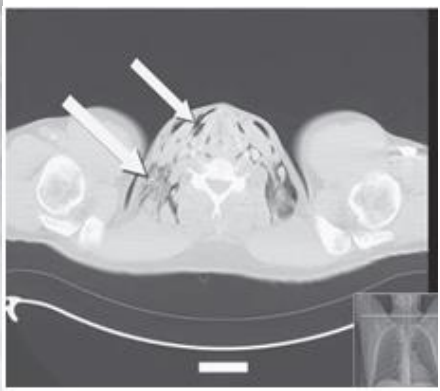
1. Describe the x-ray findings.
2. What is the most likely diagnosis?
3. What are the identifiable causes for this disease?



RADIOLOGY QUESTION 32

1. What are the findings in these 2 images?
2. What are the findings on clinical examination?
3. How you manage such a case?



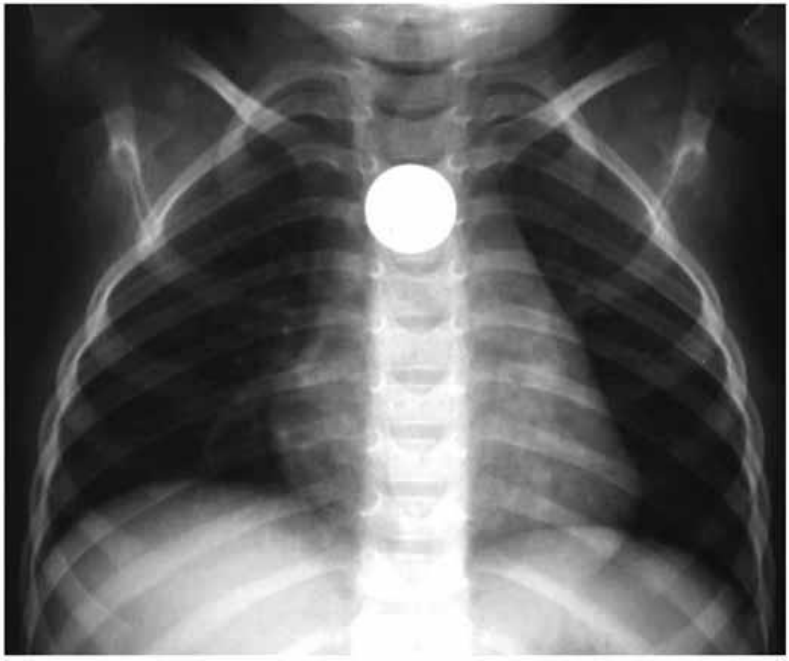


RADIOLOGY QUESTION 33

A 25-month-old female presents to the emergency department with an episode of hemoptysis. The child has had a 3- to 4-week history of coughing and wheezing. Lungs have good aeration with mild wheezing; there is a dry cough, but the remainder of the exam. is normal.

The following X-ray is obtained.

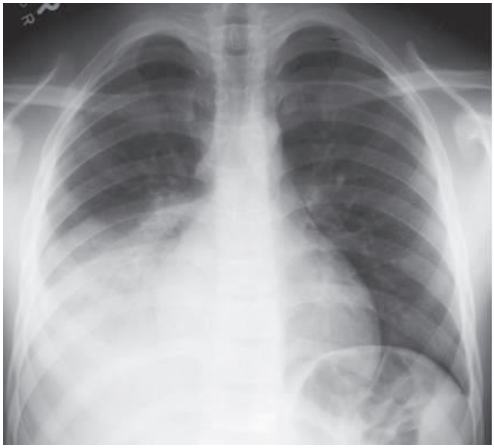
1. What is your interpretation of this X-ray?
2. What complications you expect?
3. What is your management?

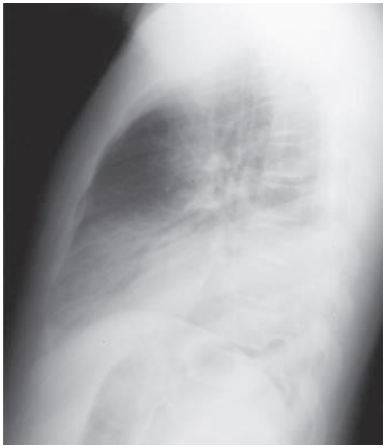


RADIOLOGY QUESTION 34

A 14-yr-old boy with cough and fever.

1. Describe the x-ray finding.
2. What is the most likely organism?
3. What are the indications for admission in this patient?





2.3 RADIOLOGY ANSWERS

RADIOLOGY ANSWER 1

1. A. The heart is displaced to the left of the chest.
   B. There are bowel loops visible in the chest cavity on the right.
2. Right-sided diaphragmatic hernia. These are much less common than left-sided diaphragmatic hernias. The baby is not ventilated (no endotracheal tube visible on CXR) and this therefore suggests that this defect was not recognized antenatally. The optimal management for these babies is intubation and ventilation immediately after birth avoiding lung inflation using a mask.
3. This baby should be ventilated to prevent the bowel from distending any more with swallowed air. A pediatric surgical opinion should be sought.

RADIOLOGY ANSWER 2

1. i. There is a nasogastric tube in situ.
   ii. The bowel loops are dilated.
   iii. The bowel wall is thickened.
   iv. There is no air in the rectum.
   v. There is widespread intramural gas.
2. The diagnosis is necrotising enterocolitis.

RADIOLOGY ANSWER 3

1. The clavicles are absent.
2. Cleidocranial dysostosis. In this condition, the clavicle is either hypoplastic or absent and the ribs are short. The anterior fontanelle often closes late and there may be delayed eruption of teeth. There can be bossing of the forehead.

3. Autosomal dominant. It results from a mutation in the CBFA1 gene, which controls a key transcription factor in osteoblast differentiation.

RADIOLOGY ANSWER 4

1. i. Large tension pneumothorax on the left.
   ii. Mediastinal shift to the right with tracheal deviation.
   iii. Transcutaneous oxygen electrode on left upper chest.
   iv. Surprisingly the infant is not intubated.
2. i. Immediate drainage of the pneumothorax.
   ii. Intubation and ventilation is very likely to be needed.

RADIOLOGY ANSWER 5

1. i. The X-ray shows a fracture of the left humerus.
   ii. There is marked osteopenia of all bones, especially marked in the bones of the forearm.
2. i. Marked rotation of the film.
   ii. There is thinning of the ribs with what are almost certainly fractures with callous formation.
   iii. Osteopenia of all bones.
3. Osteogenesis imperfecta.
4. Pamidronate infusions have been used to improve bone density and reduce the risk of further fractures. Such management should only be undertaken in specialist centers as general experience of this management is extremely limited.

RADIOLOGY ANSWER 6

1. i. There is widespread opacification throughout both lung fields.
   ii. There are clear air bronchograms on both sides.

iii. The heart border is not clearly defined.
iv. The costophrenic and cardiophrenic angles are not clearly visualised.
v. There is an endotracheal tube.

2. Respiratory distress syndrome is the most likely diagnosis.
3. Surfactant should be given if the dose has not been repeated since birth. Ventilatory requirements are high and some centers would consider high frequency oscillatory ventilation at this point. If this is not available ventilation will probably need to be adjusted to improve the blood gases.

RADIOLOGY ANSWER 7

1. i. The heart shape is ovoid (egg-shaped).
ii. The upper mediastinum is narrow.
iii. The lung fields appear normal.
2. Transposition of the great arteries.
3. The diagnosis should be confirmed by echocardiography. A prostaglandin infusion should be started and the case should be discussed with the nearest pediatric cardiac centre as soon as possible.

RADIOLOGY ANSWER 8

1.

- The heart is much larger than normal.
- The lung fields appear well aerated.
- UAC on the left – very high (probably – this cannot be confirmed to be the UAC until the abdomen is X-rayed and the caudal loop is seen).
- UVC on the right, very high (position confirmation needed as above).

2. A diabetic cardiomyopathy is the most likely diagnosis. Although septal hypertrophy is the best described association, biventricular hypertrophy may develop with significant and serious reduction in stroke volume.
3.

- Reposition the lines.
- Echocardiography.
- Seek expert advice if haemodynamically unstable.

RADIOLOGY ANSWER 9

1. i. There is an endotracheal tube that is slightly high.
ii. There is a central venous line with the tip at the thoracic inlet.
iii. There is an umbilical venous line with a very low tip.
iv. There is a large amount of oedema, very obvious on the sides of the chest.
v. The lungs show dense shadowing and there may be some parenchymal cysts compatible with pulmonary interstitial emphysema.
vi. There is a left tension pneumothorax with mediastinal shift to the right.
2. Although a pneumothorax of this size should be easily detected by transillumination the oedema around the chest will have resulted in a diffuse brightness that may well have concealed the pneumothorax.
3. A chest drain must be inserted immediately.

RADIOLOGY ANSWER 10

1. i. There is an endotracheal tube, the tip of which is too high.
ii. There is a nasogastric tube.
iii. There is patchy opacification of both lungs.

iv. There is enlargement of both liver and spleen.

2. The combination of growth retardation, a petechial rash and hepatosplenomegaly is highly suggestive of a congenital infection. Cytomegalovirus is the most likely candidate. A pneumonitis may develop with CMV infection although it is rarely present at birth and most commonly associated with perinatally acquired infection.

3. i. Blood needs to be sent for CMV testing.

ii. Further investigations should look for other evidence of CMV damage– an echocardiogram to look for congenital heart defects and cerebral ultrasound, CT or MRI to look for intracranial calcification and evidence of lissencephaly or polymicrogyria that may occur with early infection.

iii. If the diagnosis is confirmed, treatment with anti-CMV chemotherapy should be considered. There is some encouraging information on the use of ganciclovir.

RADIOLOGY ANSWER 11

1. Hyperinflation of the left upper lobe, paucity of vascular markings of the left upper lobe, mediastinal shift to the right, atelectasis of the left lower lobe, flattening of the left hemidiaphragm.
2. Congenital lobar emphysema
3. Left upper lobe.

RADIOLOGY ANSWER 12

1. A- Single bubble
   B- Double bubble
   C- Triple bubble
2. A- Pyloric atresia
   B- Duodenal atresia

C- Jejunal atresia

RADIOLOGY ANSWER 13

1. This barium enema demonstrates a tapered transition zone to a normal-caliber colon.
2. Hirschsprung disease.

RADIOLOGY ANSWER 14

1. Supracardiac TAPVD.
2. “Snowman sign”.
3. Mild cyanosis, cardiac failure, recurrent chest infection, pulmonary hypertension.

RADIOLOGY ANSWER 15

1. Transposition of great arteries.
2. Egg on side appearance.
3. Prostaglandin E_1.

RADIOLOGY ANSWER 16

1. Eventration of the diaphragm.
2. CT Chest.

RADIOLOGY ANSWER 17

1. Tetrology of Fallot.
2. “Coeur en sabot”- boot shaped heart.
3. Cerebral thrombosis,and brain abscess.

RADIOLOGY ANSWER 18

1. Frontal chest radiograph showing unilateral hyperinflation of the right lung with a slight mediastinal shift to the left. Flattening of the right hemidiaphragm is also seen.
2. Radiolucent foreign body aspiration
3. Rigid bronchoscopy

RADIOLOGY ANSWER 19

1. Clavicle fracture
2. A palpable mass over the right clavicle

RADIOLOGY ANSWER 20

1. Lateral radiograph of the neck: there is enlargement of the epiglottis giving the "thumb sign.
2. Epiglottitis
3. Direct examination of the airway under anesthesia (with the availability of personnel who can perform a tracheostomy if needed) is the preferred management for suspected cases of epiglottis. Airway management is critical and, therefore, invasive procedures such as blood draws, throat culture, obtaining vascular access, or intramuscular administration of medications should be deferred until the airway is properly secured; agitation of the child can result in respiratory collapse because of airway obstruction.

RADIOLOGY ANSWER 21

1. Complete opacification of the left lung field and a mediastinal shift to the right.

2. Empyema
3. Chest tube insertion and antibiotics.

RADIOLOGY ANSWER 22

1. **A,** Intense periosteal reaction and cortical thickening are seen in the lower extremities.
   B, Mandibular involvement has resulted in dramatic thickening.
2. Caffey disease.

RADIOLOGY ANSWER 23

1. Anteroposterior radiograph of the neck showing typical steeple sign (subglottic narrowing).
2. Viral croup (Laryngotracheobronchitis).
3. Indications for hospitalization include:

- Persistent or worsening signs of respiratory distress despite therapy
- Signs of impending or frank respiratory failure or compensated respiratory failure
- Stridor at rest
- Unreliable caretaker
- Poor oral fluid intake

RADIOLOGY ANSWER 24

1. Air in the right pleura, collapsed right lung, mediastinum and heart shifted to left side.
2. Right tension pneumothorax.
3. Chest tube under water seal.

RADIOLOGY ANSWER 25

1. Subcutaneous air in neck and shoulder
2. Surgical emphysema.

RADIOLOGY ANSWER 26

1. X-ray knee, absent epiphysis c/w cretinism.
2. TSH

RADIOLOGY ANSWER 27

1. Air under the diaphragm
2. Pneumoperitonium
3. Necrotizing enterocolitis

RADIOLOGY ANSWER 28

1. Barium enema
2. Coil (SPRING SIGN)
3. Intussusception
4. Surgery (reduction or resection)

RADIOLOGY ANSWER 29

1. **A,** Normal inspiratory chest radiograph in a toddler with a peanut fragment in the left main bronchus.

B, Expiratory radiograph of the same child showing the classic obstructive emphysema (air trapping) on the involved (left) side. Air leaves the normal right side, allowing the lung to deflate. The mediastinum shifts toward the unobstructed side.

2. F.B. in left bronchus.

RADIOLOGY ANSWER 30

1. Barium in the stomach of an infant with projectile vomiting. The attenuated pyloric canal is typical of congenital hypertrophic pyloric stenosis.
2. Metabolic alkalosis, hypokalemia, treated with normal saline and potassium.

RADIOLOGY ANSWER 31

1. Extension of the emphysematous lobe into the left lower lobe and its displacement of the mediastinum toward the right.
2. Congenital left upper lobe emphysema.
3. In 50% of cases, a cause of CLE can be identified. Congenital deficiency of the bronchial cartilage, external compression by aberrant vessels, bronchial stenosis, redundant bronchial mucosal flaps, and kinking of the bronchus.

RADIOLOGY ANSWER 32

1. Lateral X-ray of neck showing subcutaneous emphysema. **AND** axial section CT neck/thorax showing subcutaneous emphysema and pneumomediastinum.
2. Tenderness over the site of emphysema and a crepitant quality on palpation of the skin are classic manifestations.
3. Subcutaneous emphysema is usually a self-limited process and requires no specific treatment.

ANSWER 33

1. Esophageal foreign body.
2. Airway compromise.
   Esophageal rupture.
   Erosion into the mediastinal structures.
3. Emergent endoscopy for removal.

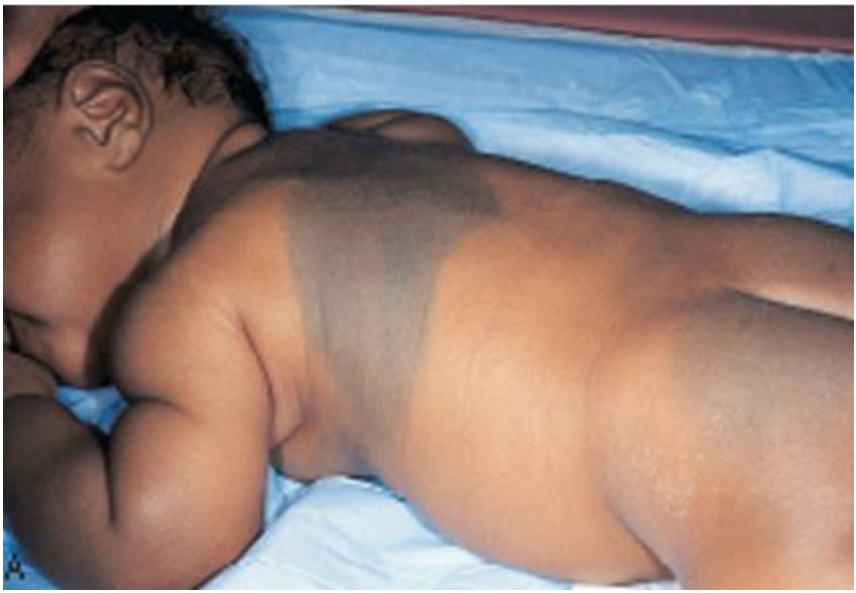
ANSWER 34

1. Consolidation in the right lower lobe.
2. S. pneumoniae.
3.
   - Immunocompromised state
   - Toxic appearance
   - Moderate to severe respiratory distress
   - Requirement for supplemental oxygen
   - Complicated pneumonia
   - Dehydration
   - Vomiting or inability to tolerate oral fluids or medications
   - No response to appropriate oral antibiotic therapy
   - Social factors (e.g., inability of caregivers to administer medications at home or follow-up appropriately)

2.4 DERMATOLOGY QUESTIONS

DERMATOLOGY QUESTION 1

1. What is the diagnosis?
2. Etiology?
3. Natural history?



DERMATOLOGY QUESTION 2

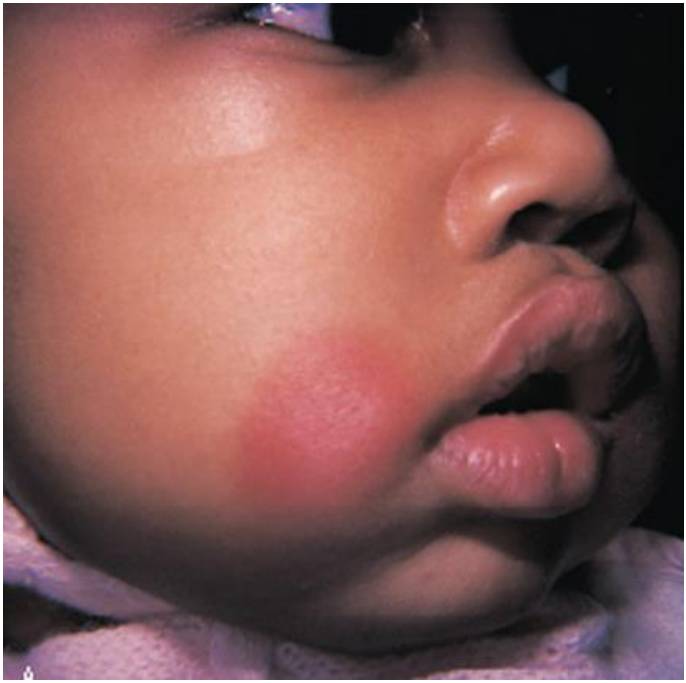
A unilateral blue-gray pigmentation with a specked appearance that was present since birth in this 4-year-old girl.

1. What is your diagnosis?
2. What is your differential diagnosis?
3. What is the fate of this lesion?

DERMATOLOGY QUESTION 3

A 13-month-old infant was referred for social service clearance and to rule out abuse by a pediatrician when this erythematous and indurated skin lesion near the corner of the mouth was seen during a well baby visit. This lesion was initially interpreted as a red bruise produced by pinching. A history of the infant sucking on an ice cube 2 days prior to appearance of this lesion was subsequently obtained.

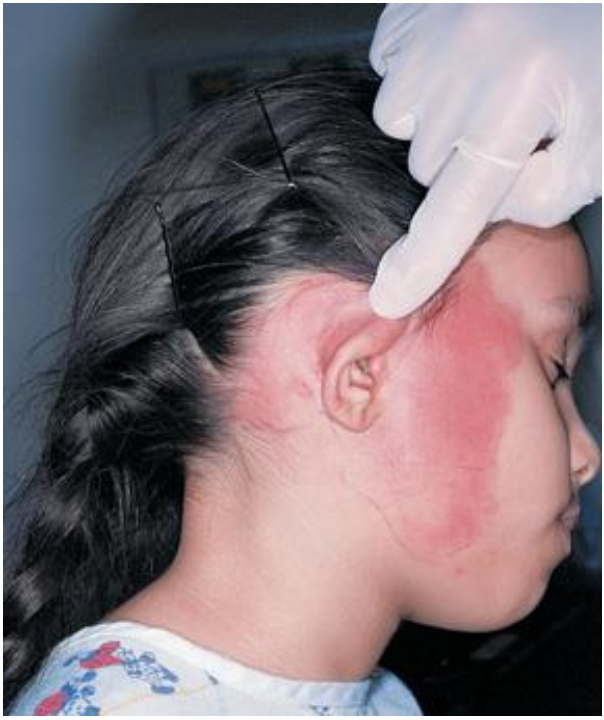
1. What are your diagnosis and its etiology?
2. How you manage such a lesion?
3. What is the prognosis?



DERMATOLOGY QUESTION 4

A rapidly spreading, tender, salmon-colored rash accompanied by high fever was seen on the face of this 8-year-old girl. She had scratch marks on her cheek

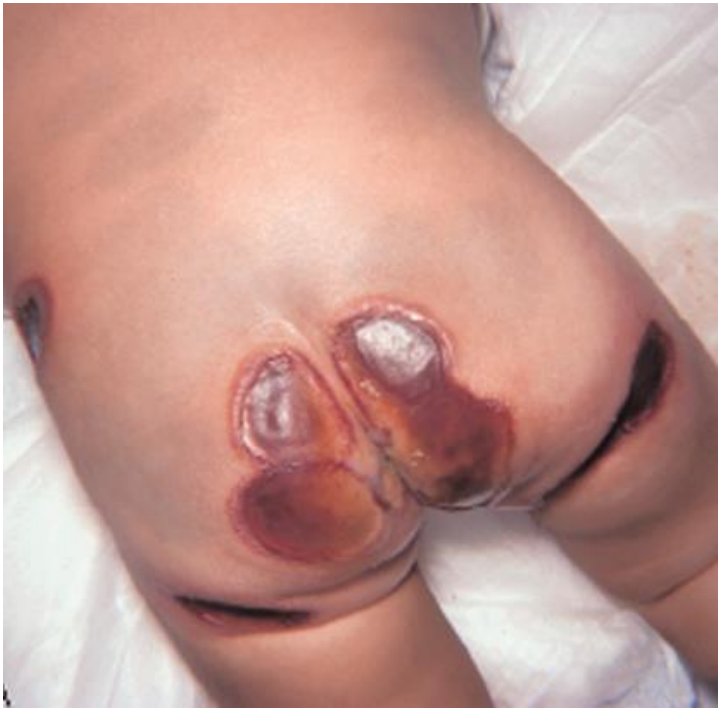
1. What is the diagnosis?
2. Etiology?
3. Differential diagnosis?



DERMATOLOGY QUESTION 5

Purpuric macular lesions involving the perineum, buttocks, and trunk in a 7-month-old severely malnourished infant who was fed only diluted soy formula. Patient presented in septic shock with severe anemia, neutropenia, thrombocytopenia, and hypoalbuminemia.

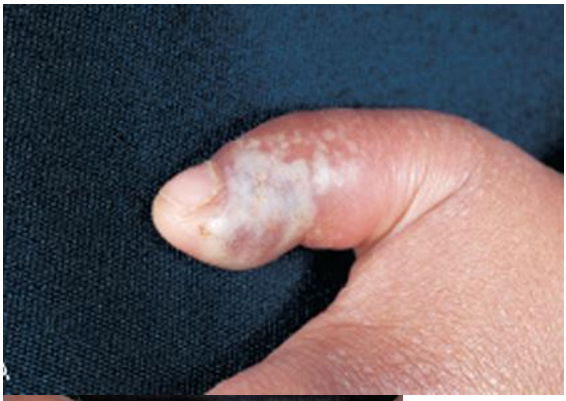
1. What is the diagnosis?
2. Etiology?
3. Second most commonly affected area after gluteal region?

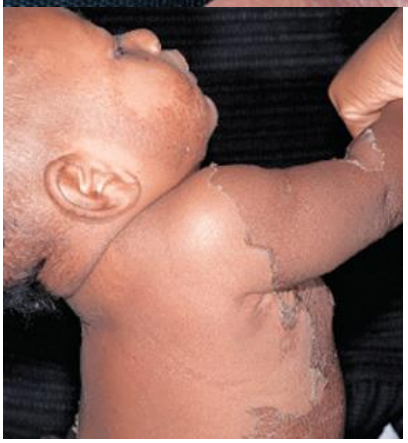


DERMATOLOGY QUESTION 6

A 15-month-old infant presented with pustular lesions with cellulitis on the thumb. He also had fever and generalized scarlatiniform rash associated with skin tenderness. Subsequently he developed exfoliation in sheets, revealing a scalded-looking surface. Photographs taken on the third day after hospitalization show drying of exfoliated areas with flaky desquamation.

1. What is the diagnosis?
2. What are the complications?
3. Why the mortality is more in adults?

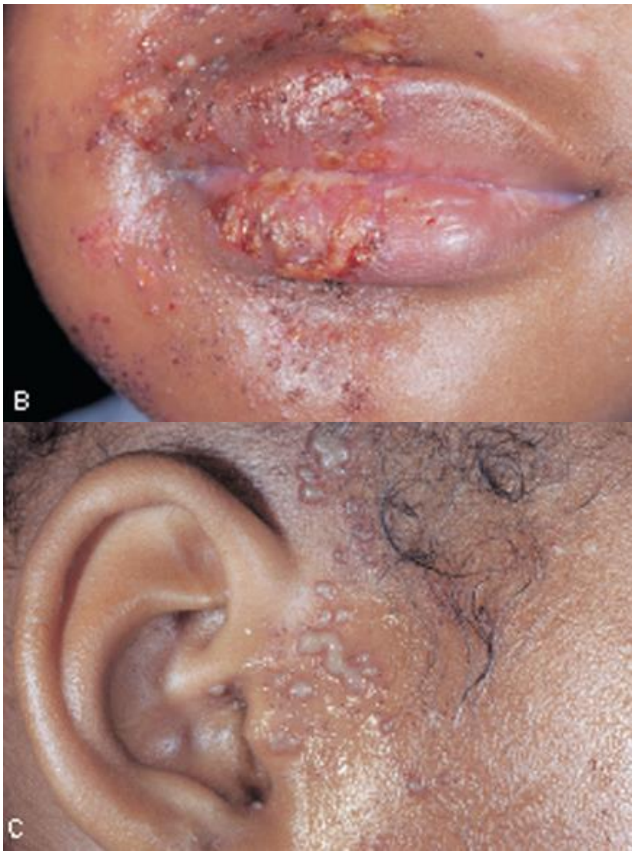




DERMATOLOGY QUESTION 7

Vesicular eruptions were present on the face, lips, and anterior two thirds of the tongue, pinna, auditory canal, and tympanic membrane of this 7-year-old girl. She did not have facial nerve palsy.

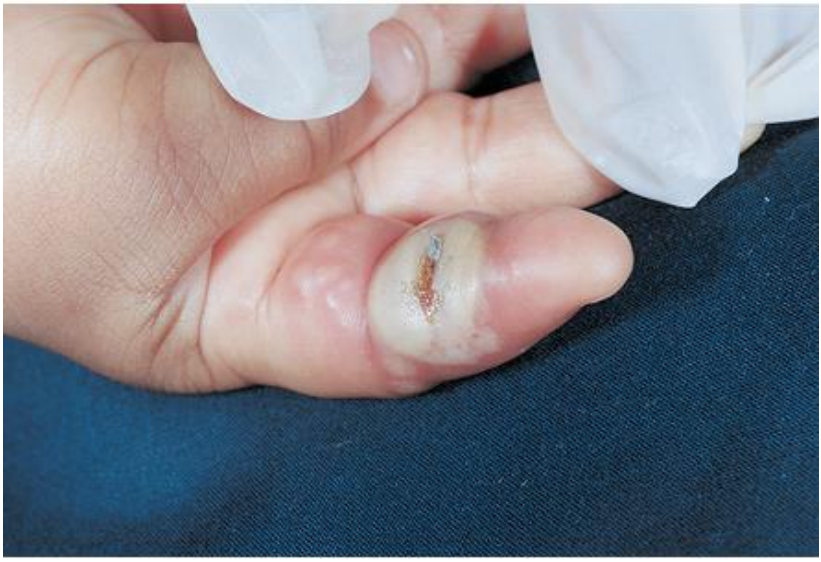
1. What is the diagnosis?
2. How much is the incubation period?
3. What is the diagnosis if there is associated ipsilateral Bell's palsy, deafness, hearing loss and, decreased taste on anterior two-thirds of tongue?



DERMATOLOGY QUESTION 8

A 4-month-old infant presenting with clusters of vesiculopustular lesions on an erythematous base on the finger. This infant's mother had "cold sores" 7 days prior to developing this rash.

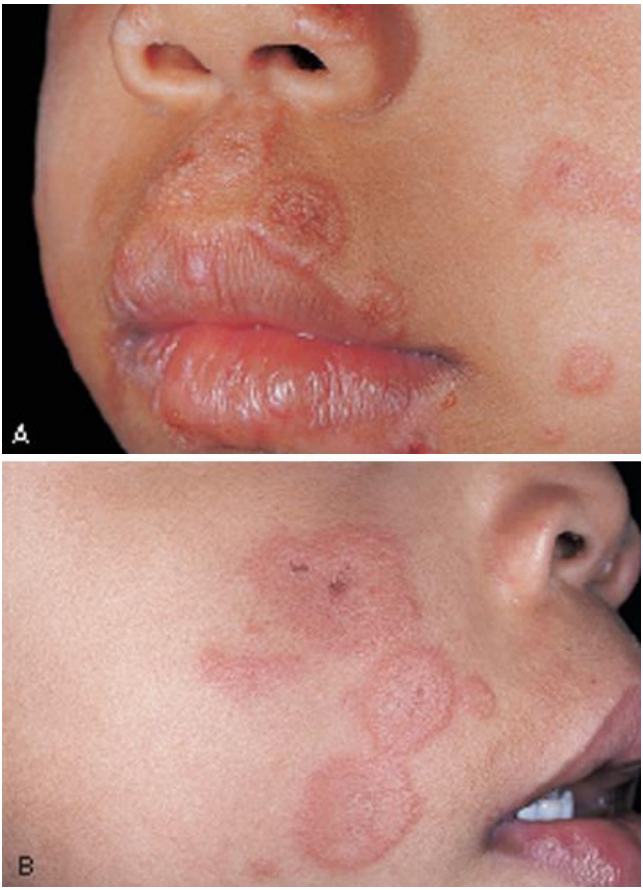
1. What is the diagnosis?
2. Etiology?
3. Diagnosis?



DERMATOLOGY QUESTION 9

This 3-year-old child had herpes simplex labialis 5 days prior to the onset of this disease.

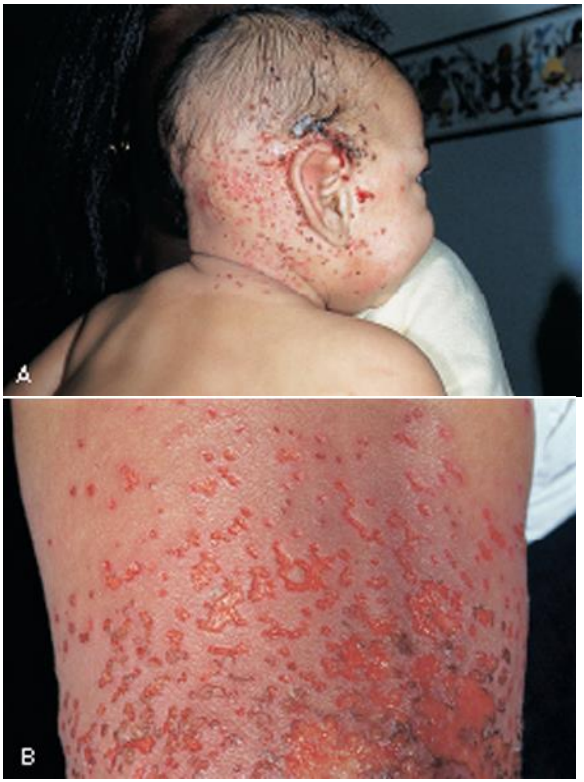
1. What is this disease?
2. What is the natural course of it?



DERMATOLOGY QUESTION 10

Widespread “punched-out” lesions on upper trunk, neck, and extremities were seen in a highly febrile 4-month-old infant with infantile eczema. The mother had cold sores 5 days prior to the appearance of this infant's rash.

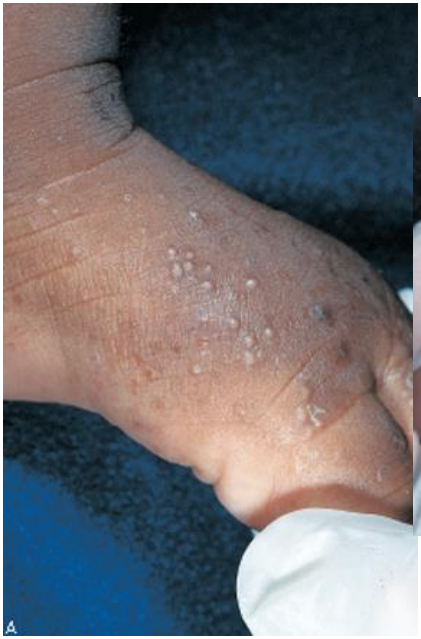
1. What is the diagnosis?
2. How is the diagnosis confirmed?
3. What are the complications?

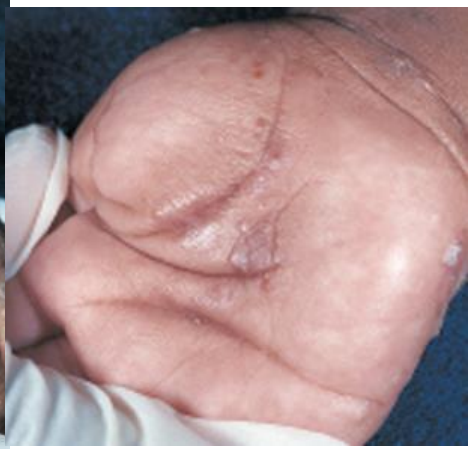


DERMATOLOGY QUESTION 11

An infant with papular and vesicular lesions on the foot and palm. The babysitter had a similar rash involving the wrist and interdigital spaces.

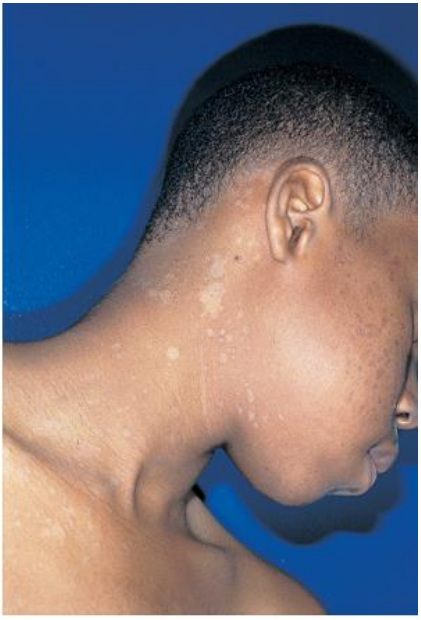
1. What is the most likely diagnosis?
2. Etiology?
3. Treatment?

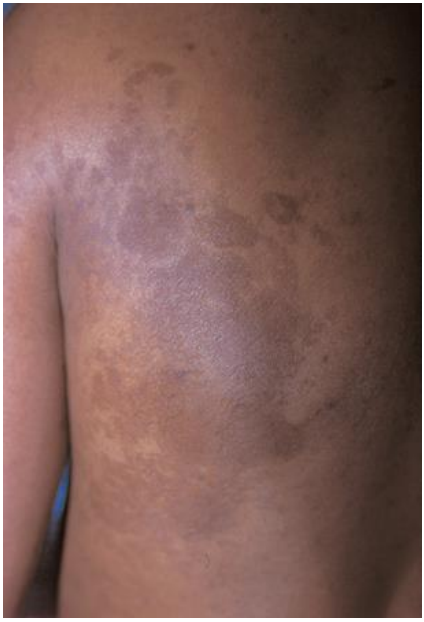




DERMATOLOGY QUESTION 12

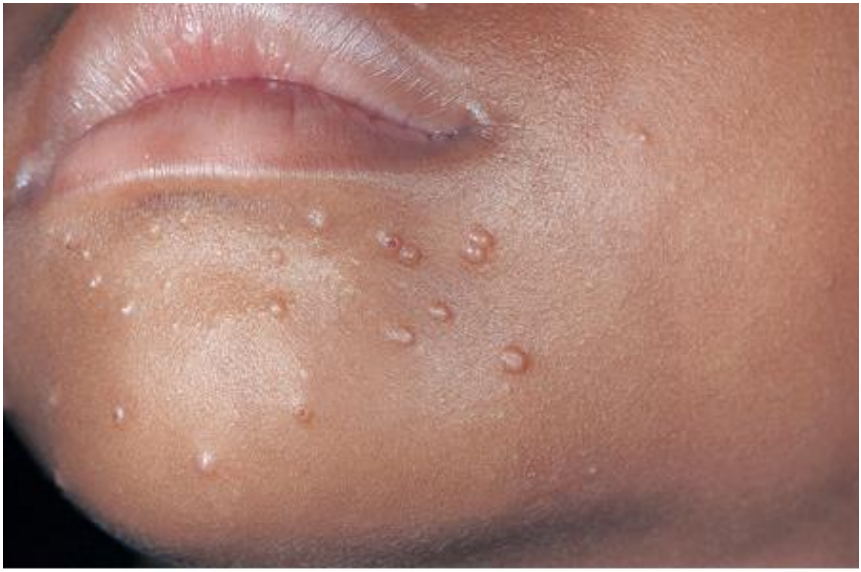
1. Define this disease and its etiology.
2. What are the predisposing factors?





DERMATOLOGY QUESTION 13

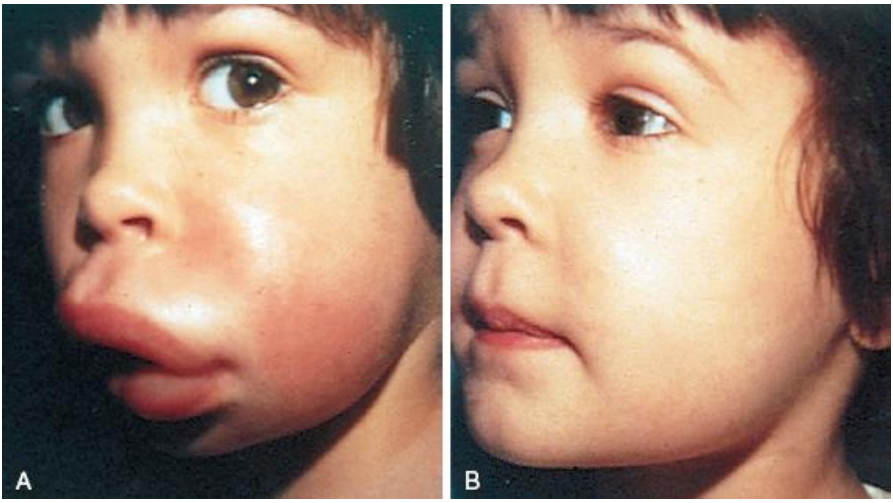
1. Define the disease and its etiology.
2. What are the predisposing conditions for disseminated lesions?



DERMATOLOGY QUESTION 14

A diffuse subcutaneous tissue swelling of the lips with normal overlying skin, onset was sudden and resolution was complete within 24 hours.

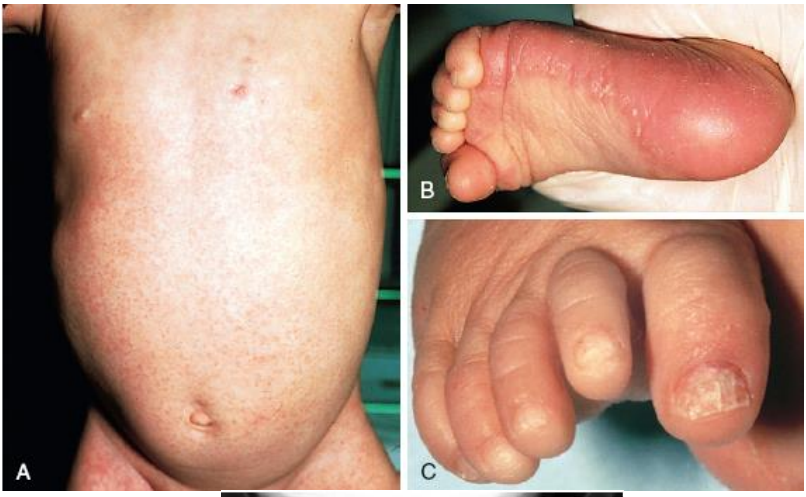
1. What is the most likely diagnosis?
2. What are the most commonly involved parts of the body?

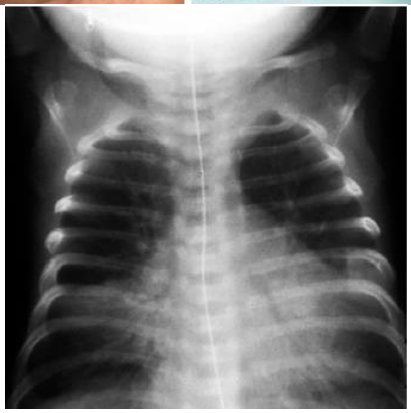


DERMATOLOGY QUESTION 15

A 6-month-old infant presented with failure to thrive, chronic diarrhea, cough, and these skin lesions

1. What are these skin lesions?
2. What are the x-ray findings?
3. What is the most likely diagnosis?
4. What is your suggested treatment?

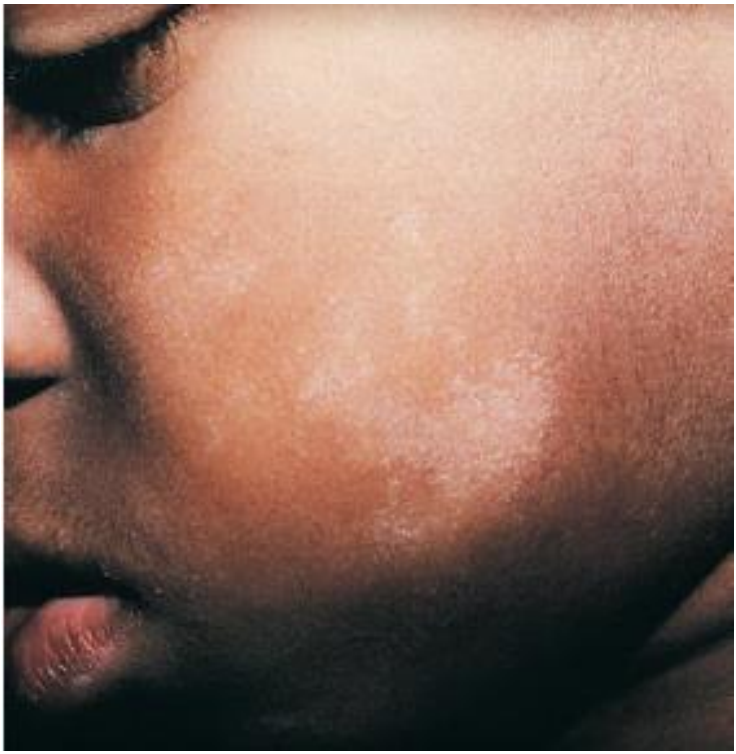




DERMATOLOGY QUESTION 16

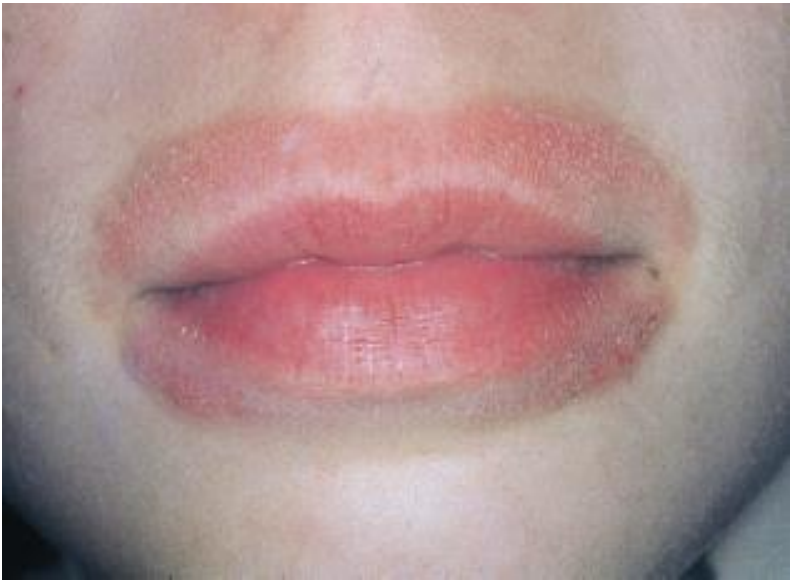
A 5-year-old child presented with poorly defined, hypopigmented, oval scaly patches on the face.

1. What are the most likely diagnosis and differential diagnosis?
2. How you manage such a case?



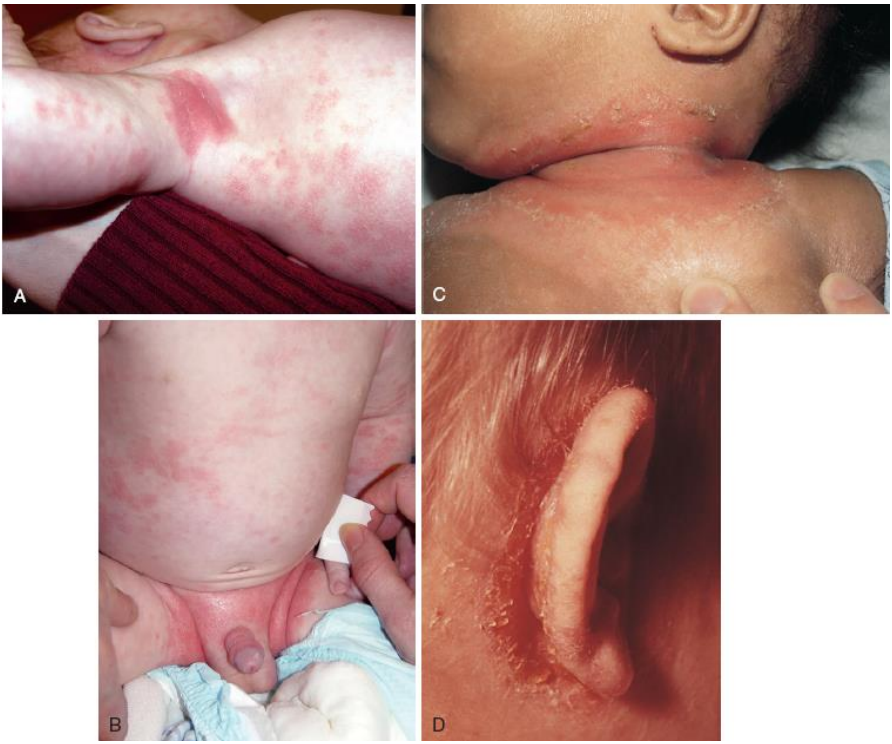
DERMATOLOGY QUESTION 17

1. What you see in this photo?
2. What is your diagnosis?



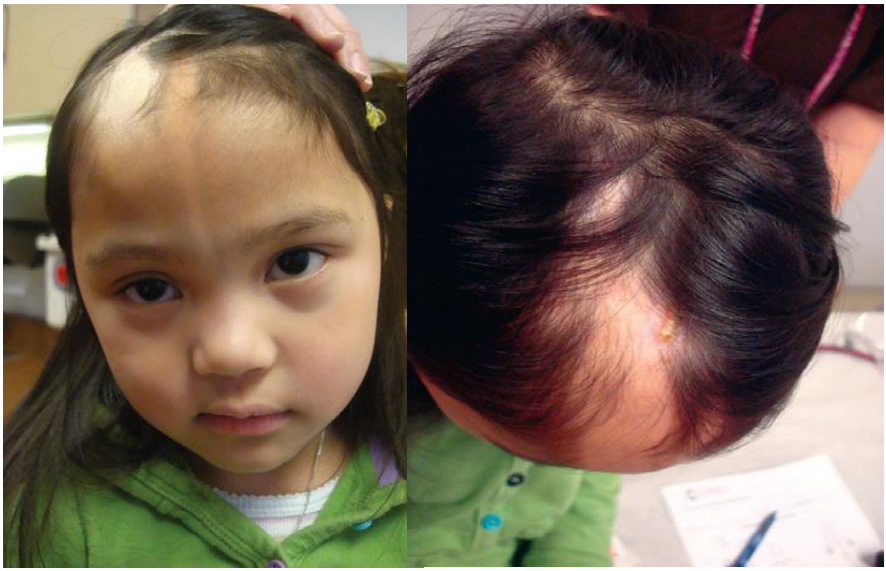
DERMATOLOGY QUESTION 18

1. What is the diagnosis?
2. Differential diagnosis?
3. How you manage such a case?



DERMATOLOGY QUESTION 19

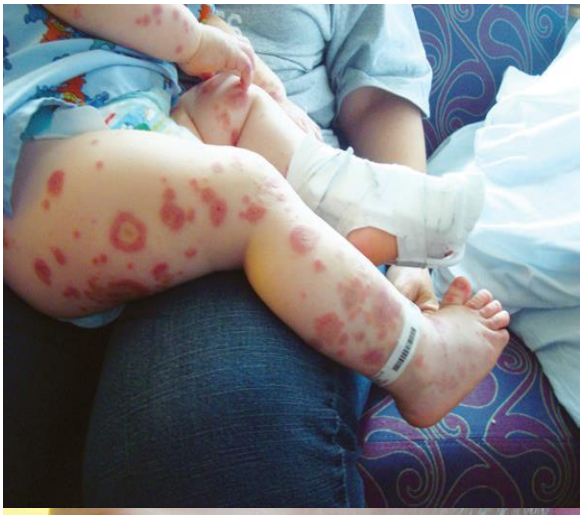
1. Describe what you see in the face and scalp.
2. What is the diagnosis?

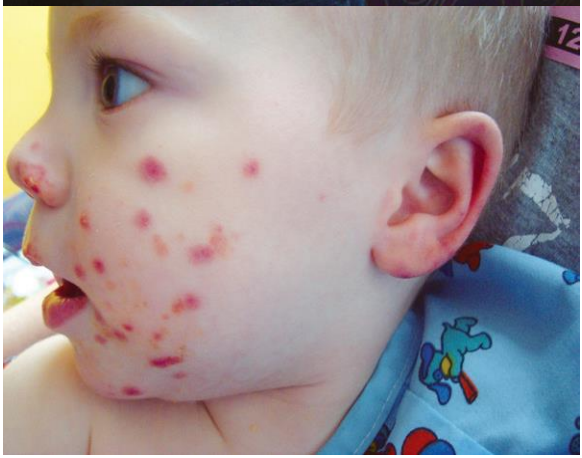


DERMATOLOGY QUESTION 20

A 15-month-old child presented with purpuric skin rash and edema.

1. What is the diagnosis?
2. What is the differential diagnosis?

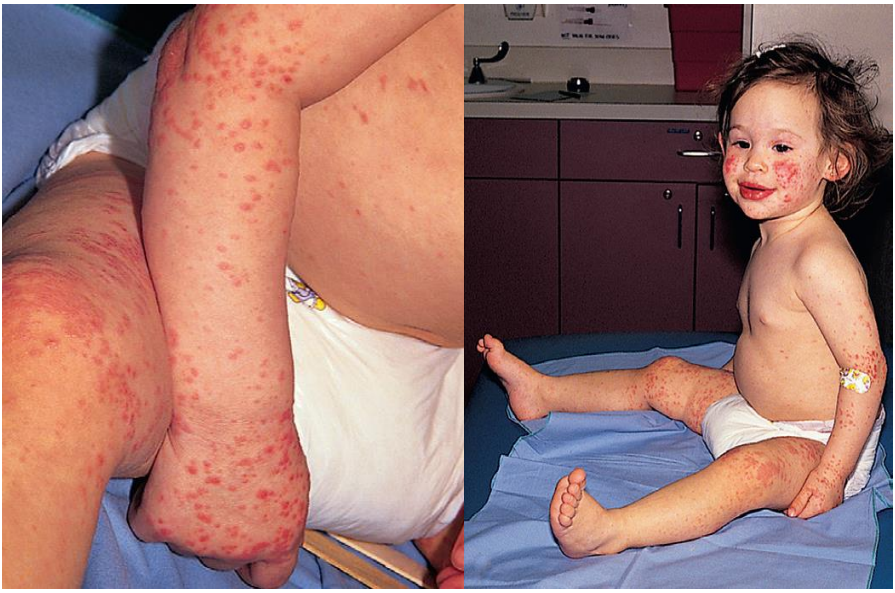




DERMATOLOGY QUESTION 21

This child presented with low-grade fever, malaise, and discrete firm lichenoid papules with flat tops.

1. What is the most likely diagnosis?
2. What laboratory studies should be done?



2.4 DERMATOLOGY ANSWERS

DERMATOLOGY ANSWER 1

1. Mongolian spots.
2. Mongolian spots are a form of dermal melanocytosis. Melanocytes, in their transit from the neural crest to epidermis during the embryonic period, become arrested in the dermis (migrational arrest). This results in ectopic melanocytes in the dermis.
3. Natural history
    - Lesion may increase in size and intensity until age 2 years
    - Lesion generally fades gradually
    - Resolves by 5 to 6 years of age in about 96% of cases
    - Persists for life in 3 to 4% of cases

DERMATOLOGY ANSWER 2

1. Nevus of Ota.
2. Mongolian spots (other forms of dermal melanocytosis).
3. These are permanent lesions (unlike the majority of Mongolian spots).

DERMATOLOGY ANSWER 3

1. Cold panniculitis, is an inflammation of the subcutaneous fat after prolonged exposure to cold.
2. Cold panniculitis is a self-limiting condition. There is no specific therapy except reassuring caregivers.
3. A-Lesion resolves spontaneously in 2 to 3 weeks without scarring
   B-Post inflammatory hyperpigmentation may persist.

C-Recurrence of lesions is common.

DERMATOLOGY ANSWER 4

1. Erysipelas is a distinct infection of the skin involving the uppermost layers of the subcutaneous tissue and cutaneous lymphatic vessels. In contrast to erysipelas, cellulitis extends more deeply into the subcutaneous tissues.
2. Erysipelas is caused by group A beta-hemolytic streptococci (GABHS) in the great majority of the cases. Rarely it is caused by groups G, C, and B streptococci.
3-

- Cellulitis
- Butterfly rash of systemic lupus erythematosus
- Necrotizing fasciitis
- Deep vein thrombosis or thrombophlebitis
- Contact dermatitis
- Giant urticaria
- Angioneurotic edema
- Erysipelas-like lesions of familial Mediterranean fever

DERMATOLOGY ANSWER 5

1&2. Ecthyma gangrenosum is a cutaneous manifestation of Pseudomonas aeruginosa septicemia.
3. Common distribution of lesions (may occur anywhere):
(1) Perineal or gluteal region (57%)
(2) Extremities (30%)
(3) Trunk (6%)
(4) Face (6%)
(5) Intertriginous areas
(6) Axilla

DERMATOLOGY ANSWER 6

1. Staphylococcal scalded skin syndrome (SSSS).
2. Complications include fluid and electrolyte losses leading to hypovolemia, faulty temperature regulation, cutaneous infection (cellulitis), pneumonia, and septicemia.
3. Overall mortality varies between 1 and 10%. Mortality in adults is about 60% despite aggressive treatment, usually because of serious underlying illness.

DERMATOLOGY ANSWER 7

1. Herpes Zoster.
2. Incubation period: unknown (impossible to determine time of reactivation of latent VZV).
3. Ramsay Hunt syndrome.

DERMATOLOGY ANSWER 8

1. Herpetic whitlow.
2. Herpetic whitlow is a cutaneous infection of the terminal phalanx of the fingers or thumb caused by herpes simplex virus (usually HSV-1 or HSV-2).
3. Diagnosis is usually made clinically. A needle aspiration of the lesion for HSV culture and Tzanck smear will confirm the diagnosis.

DERMATOLOGY ANSWER 9

1. Erythema Multiforme Minor
2. Natural course:
   - Individual lesions last about 1 week.

- The eruption may continue to appear in crops for 2 to 3 weeks.
- Duration from onset to healing: 1 to 4 weeks
- Lesions heal without scarring.

DERMATOLOGY ANSWER 10

1. Eczema herpeticum (EH) is a disseminated cutaneous herpes simplex virus (HSV) infection superimposed on a preexisting skin disorder (e.g., eczema).
2. The diagnosis of EH is usually made clinically. Diagnosis can be confirmed by Tzanck smear, HSV culture, or PCR.
3. Complications include secondary bacterial infection (Streptococcus pyogenes and Staphylococcus aureus), sepsis, and scarring.

DERMATOLOGY ANSWER 11

1&2. Scabies is a contagious skin infestation caused by the female mite Sarcoptes scabiei subsp. Hominus.
3. Permethrin 5% cream (preferred treatment)
a. Safe and effective
b. Apply from the neck down (older children and adolescents) including intertriginous and genital areas, the intergluteal cleft, and under trimmed nails.
c. Because scabies can affect the head, scalp, and neck in infants and young children, treatment of the entire head, neck, and body in this age group is required (avoid areas around the eyes and mouth).
d. Leave the medication on overnight (about 8 hours).
e. Change all the clothes and bed sheets the following morning.
f. Repeat 1 week later for best results.

g. Side effects include mild, transient burning, stinging, redness, and rash.

DERMATOLOGY ANSWER 12

1. Tinea versicolor is a superficial skin infection caused by the yeast Malassezia furfur (previously known as Pityrosporum ovale or Pityrosporum orbiculare).
2. Predisposing factors (that allow lowering the body's resistance and proliferation of the yeast) include malnutrition, burns, immunosuppressive or corticosteroid therapy, Cushing's syndrome, and pregnancy. Excess heat and humidity and oily skin or application of oils (e.g., cocoa butter, bath oil) on children leads to yeast overgrowth.

DERMATOLOGY ANSWER 13

1. Molluscum contagiosum is viral infection of the skin caused by the poxvirus molluscum contagiosum virus, and is characterized by discrete pearly white papules that are umbilicated.
2. Predisposing conditions for disseminated lesions
   - Children with atopic dermatitis (widespread involvement in areas of dermatitis)
   - Human immunodeficiency virus (HIV) infection
   - Other immunodeficiency states including leukemia

DERMATOLOGY ANSWER 14

1. Angioedema.
2. The face, hands, feet, and perineum are most commonly involved.

DERMATOLOGY ANSWER 15

1. Widespread fungal dermatitis with Candida albicans over the trunk **(A)** and foot **(B)** and nails **(C).**
2. Absent thymic shadow and bilateral pulmonary infiltrates.
3. Severe combined immunodeficiency.
4. Once the diagnosis of SCID is considered, the child must be placed in protective isolation and given appropriate supportive therapy including IgG replacement. All administered blood products must be irradiated to prevent the development of severe graft-versus-host disease, and live virus vaccines are contraindicated. These patients can be essentially cured by bone marrow transplantation. Children with SCID have been the initial recipients of gene therapy, which is curative but has led to an unexpectedly high incidence of leukemia.

DERMATOLOGY ANSWER 16

1. Pityriasis alba to be differentiated from vitiligo by Wood's lamp examination.
2. Because the disorder is usually asymptomatic and spontaneously resolves in several months to a few years, treatment is usually unnecessary, although moisturizers may help reduce surface scaling.

DERMATOLOGY ANSWER 17

1. The perioral skin is inflamed, scaly, and thickened as a result of repetitive licking of the lips.
2. Lip-licking eczema.

DERMATOLOGY ANSWER 18

1. Seborrheic dermatitis.
2. The differential diagnosis of seborrhea includes Langerhans cell histiocytosis (in which the rash is generalized, in part petechial, and usually associated with chronic draining ears and hepatosplenomegaly) and tinea corporis (in which lesions usually are more circumscribed, with an active border and central clearing). Scalp lesions may be difficult to differentiate from psoriasis.
3. The dermatitis of seborrhea is usually nonpruritic and mild in nature. Most cases respond to topical steroids, and many clear spontaneously, although residual postinflammatory hypopigmentation may persist for weeks or months thereafter. Some practitioners find that use of a topical antifungal cream or wash, as well as a low-potency topical steroid, hastens resolution. Antiseborrheic shampoos may also be helpful for patients with scalp involvement.

DERMATOLOGY ANSWER 19

1. Two linear lesions of the face and scalp with associated scalp ulceration and crust.
2. Localized scleroderma.

DERMATOLOGY ANSWER 20

1. Acute hemorrhagic edema of infancy.
2. Henoch-Schonlein Purpura.

DERMATOLOGY ANSWER 21

1. Gianotti-Crosti syndrome.
2. Liver function tests should be done, and if the results are abnormal, serologic studies for hepatitis B and EBV should be performed.

2.5 STATISTICS QUESTIONS

STATISTICS QUESTION 1

Out of 6000 children in a village, 50 cases of tuberculosis are already present. There are 10 newly diagnosed cases in a year. Two children died of tuberculosis.

1. Calculate the prevalence rate.
2. What is incidence rate?
3. What is the case fatality rate of tuberculosis in that village?

STATISTICS QUESTION 2

The height of 10 children of the same age group is given: (all in cm).

101, 98, 98, 99, 102, 101,100, 98, 101, 101

Calculate:

1. Mean
2. Mode
3. Median

STATISTICS QUESTION 3

At a camp, a new model of mass miniature radiography was used to screen for tuberculosis. Subsequently, the subjects were also subjected to CT scan of the chest to confirm whether the results were reliable or not. The results were as follows.

Screening test	**Diseased**	**Not diseased**
• **Positive**	**a (TP)**	**b (FP)**
• **Negative**	**c (FN)**	**d (TN)**

Calculate (give formulae)

1. Specificity
2. Sensitivity

STATISTICS QUESTION 4

1. Calculate the odd's ratio in the given case control study design:

Exposure (risk factor)	Disease present	Disease absent
Yes	a	b
No	c	d
Total	a + c	b + d

2. What is the significance of the term odds ratio in statistical terms?

STATISTICS QUESTION 5

You are doing a study "Is zinc better than racecadotril for diarrhea" and the results are like this.

Zinc		Racecadotril	
Improvement	Nil	Improvement	Nil
12	27	6	20

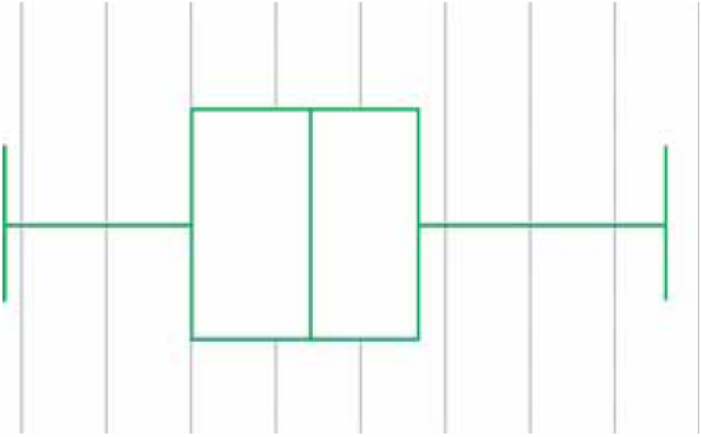
1. Calculate the relative risk.
2. What does it signify?

STATISTICS QUESTION 6

1. In an area the under 5 mortality is 5/1000 live births. Calculate the child survival index in that area.
2. What is the appropriate statistical test to compare two means?
3. What is the appropriate statistical test to compare two proportions?

STATISTICS QUESTION 7

1. What is this plot known as?
2. What is this used for?
3. Describe the plot.



STATISTICS QUESTION 8

Out of a population of 5000 children in a village, 500 cases of malnutrition already exist. There are 100 newly diagnosed cases in a year. 20 children died of malnutrition

Calculate

1. Prevalence rate.
2. Incidence rate.
3. Case fatality rate.

STATISTICS QUESTION 9

State true/false, regarding case control study design.
1. A case control study is done to generate a hypothesis.
2. A case control study requires a large number of subjects and large number of controls.
3. A case control study cannot be retrospective.
4. A case control study is an analytical study.
5. A case control study is an observational study.

STATISTICS QUESTION 10

In a hospital data, a fetal death, during the late gestation period (> 28 weeks) was found to be only 2%. Out of all the remaining live births, 3% died within 1 week. What is the perinatal mortality rate in this hospital?

2.5 STATISTICS ANSWERS

STATISTICS ANSWER 1

$$\text{Prevalence rate} = \frac{\text{No. of existing (50) +new cases (10)}}{\text{Population at risk (6000)}} \times 100 = 1\%.$$

$$\text{Incidence rate} = \frac{\text{New cases (10)}}{\text{Population at risk (6000)}} \times 1000 = 1.6$$

$$\text{Case fatality rate} = \frac{\text{Deaths (2)}}{\text{Total cases (50+10)}} \times 100 = 3.3\%$$

STATISTICS ANSWER 2

First arrange all values in ascending or descending order
98, 98, 98, 99, 100, 101, 101, 101, 101, 102
1. Mean = Sum of all/total no = 1000/10 = 100
2. Median = Middle value in ascending or descending order (100 + 101)/2 = 100.5
3. Mode = that value which is the most frequent (comes for most times) = 101

STATISTICS ANSWER 3

1. Specificity = True negative = d/ (b + d) × 100
2. Sensitivity = True positive = a/ (a + c) × 100

STATISTICS ANSWER 4

1. For case control studies, ratio of odds

$$= \frac{a/c}{b/d} = \mathbf{ad/bc}$$

2. Odds ratio is a measure of strength of association between outcome and antecedent

OR = 1 means that the risk factor has no association with the disease

OR>1 suggests risk factor associated with increased disease

OR<1 suggests risk factor protective against disease.

STATISTICS ANSWER 5

1. RR (Treatment) is $= \frac{\text{n (Exposed)}}{\text{n (Non exposed)}}$

$$= \frac{12/39}{6/26} = \mathbf{1.52}$$

2. Outcome variable is 1.52 times more in the zinc group than in the racecadotril group.

STATISTICS ANSWER 6

1. Child survival index $= \frac{1000 - \text{under 5 mortality}}{10}$

= 1000-5/10 = 99.5

2. Student't' test

3. Chi-square test

STATISTICS ANSWER 7

1. Box-and-whisker plot.
2. They display a statistical summary of a variables : median, quartiles, range and extreme values.
3. The central box represents the values from the lower to upper quartile (25 to 75 percentile). The middle line represents the median.

The horizontal line extends from the minimum to the maximum value, excluding outside and far out values which are displayed as separate points.

STATISTICS ANSWER 8

1. Prevalence rate:

$$\frac{\text{No of existing + new cases}}{\text{Population at risk}} \times 100 = \frac{(500 + 100) \times 100}{5000} = \frac{600 \times 100}{5000} = 12$$

2. Incidence rate:

$$\frac{\text{No of new cases of specific disease during a given period of time}}{\text{Population at risk}} \times 1000 = \frac{100 \times 1000}{5000} = 20$$

3. Case fatality rate:

$$\frac{\text{Total no of deaths due to a particular disease}}{\text{Total no of cases due to the same disease}} \times 100 = \frac{20}{(500+100)} \times$$

$$20 \times 100$$

$$100 = \frac{}{600} = 3.33$$

STATISTICS ANSWER 9

1. False: It tests already set up hypothesis.
2. False: It can be done on relatively small number of cases and controls because status of disease in the subjects is already known.
3. False: It is always retrospective.
4. True: Involves comparison of presence of an antecedent in cases and controls.
5. True: It does not involve any human interventions. Only natural occurrence is observed.

STATISTICS ANSWER 10

49/1000
Fetal deaths = 2%
So live births out of 100 pregnancies (> 28 weeks gestation) = 98
So death within first week = 3% of 98 = 2.94

$$\text{PMR} = \frac{\text{Still birth + death within one week}}{\text{Still birth + live birth}} = \frac{2 + 2.94}{2 + 98}$$

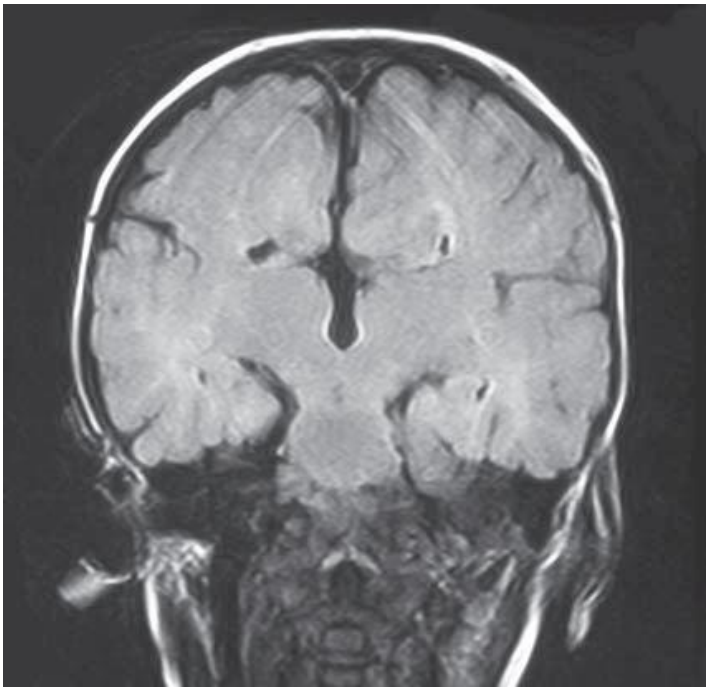
= 4.94% = 49/1000 (as it is a rate and not ratio)

2.6 SCAN QUESTIONS

SCAN QUESTION 1

Following an abnormal cranial ultrasound scan, further imaging is carried out.

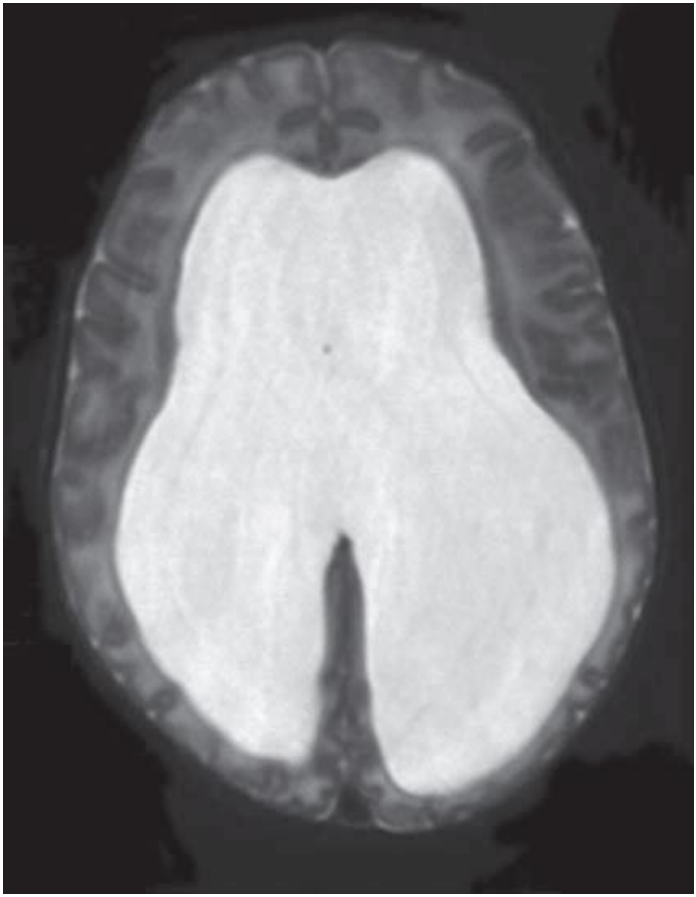
1. Describe the scan.
2. What might this be associated with?
3. What is the long-term outlook for this baby?



SCAN QUESTION 2

An infant is noted on postnatal examination to have a large head circumference, with a bulging fontanelle. He is asymptomatic and feeding well by bottle. An MRI scan is performed.

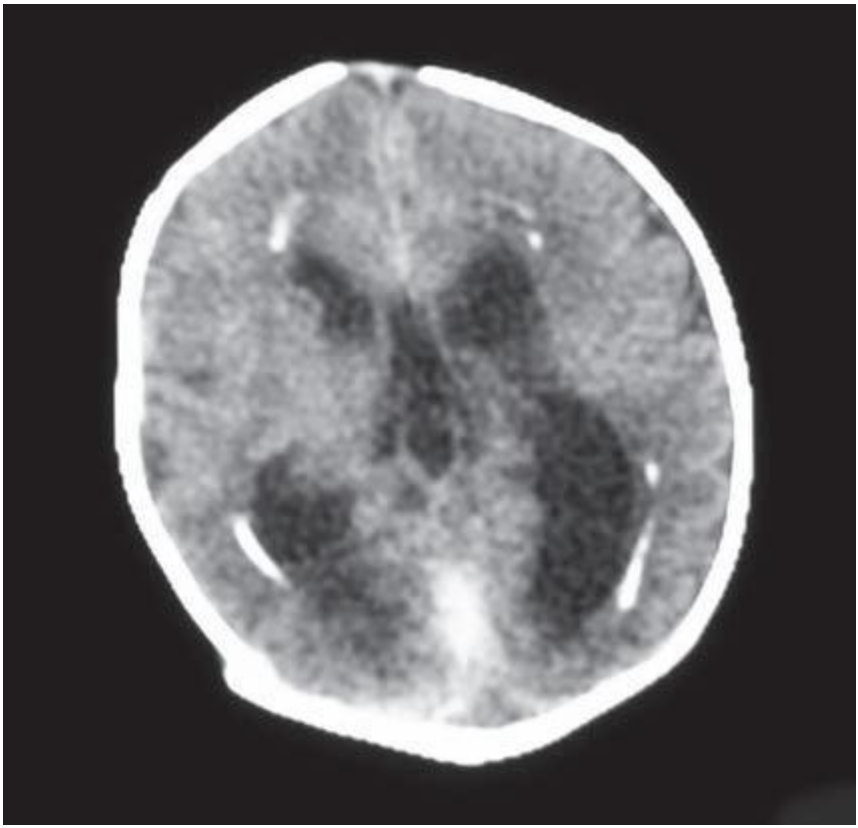
1. Is this a T1 or T2 weighted MRI?
2. What does it show?



SCAN QUESTION 3

A CT scan has been performed on a growth retarded baby born at 38 weeks gestation. There is mixed hyperbilirubinaemia and a petechial rash.

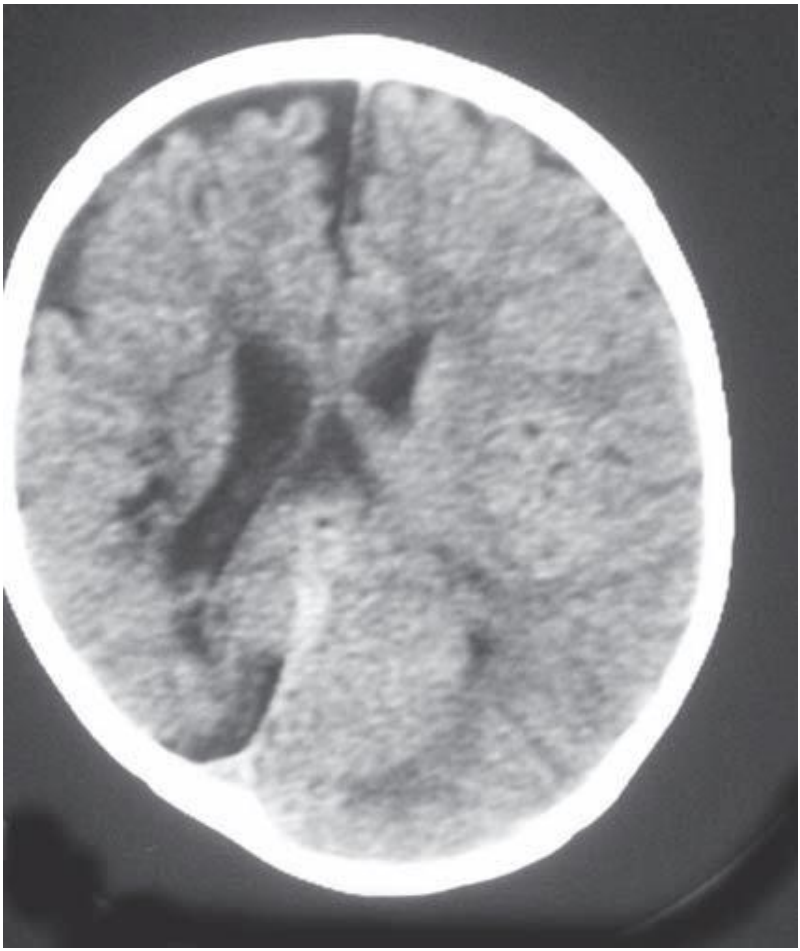
1. What does the scan show?
2. What is the diagnosis?
3. What other investigations must be performed?



SCAN QUESTION 4

An MRI scan is carried out on a six month old infant.

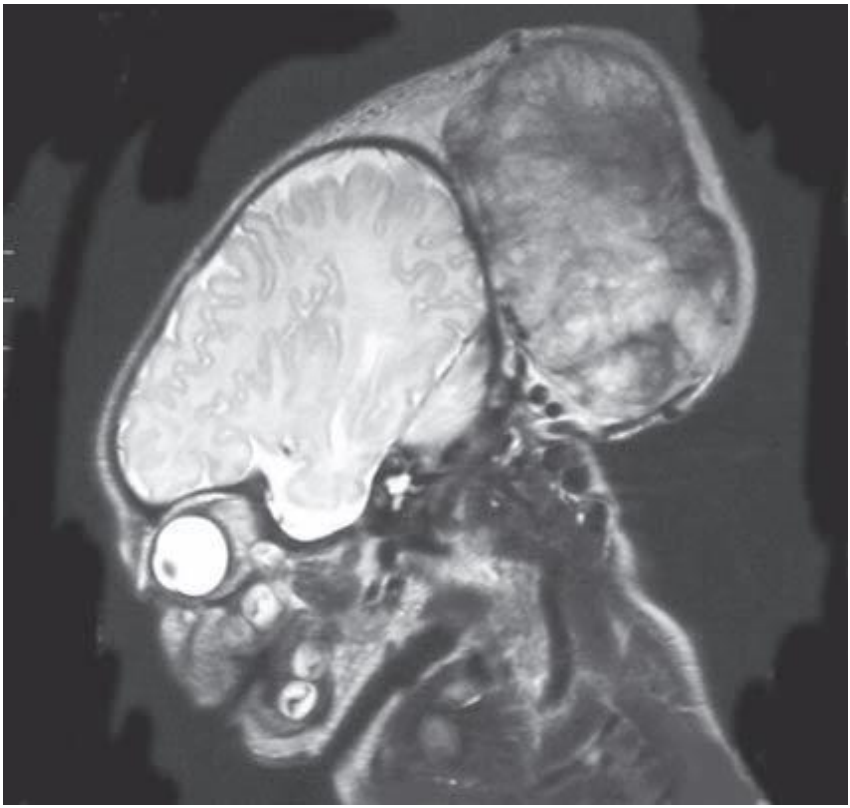
1. Describe two abnormalities with this scan.
2. What is the likely cause?



SCAN QUESTION 5

A term baby is delivered with a growth at the back of the skull. She has an MRI scan as shown below.

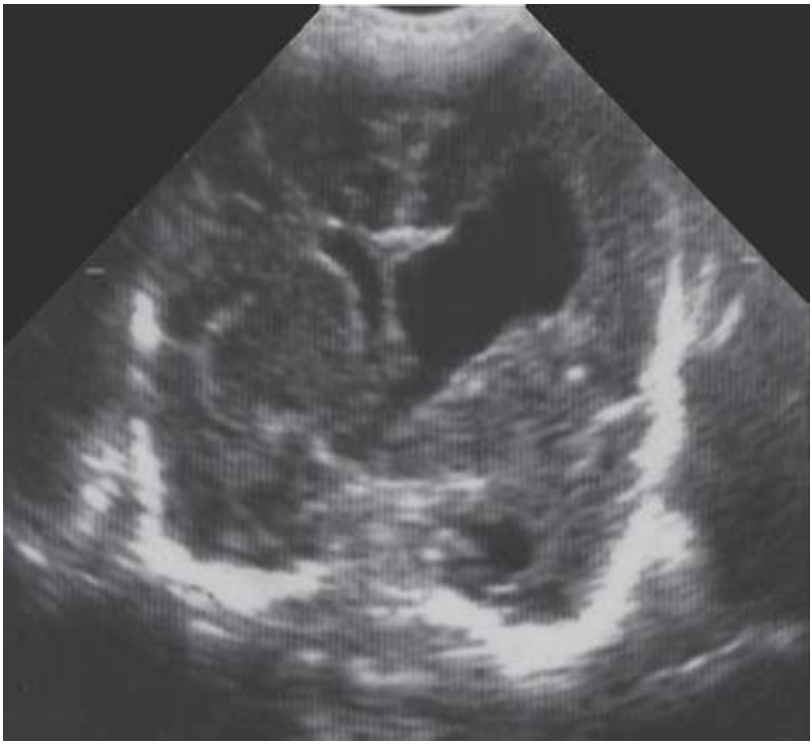
1. Describe the scan.
2. What is the likely diagnosis?



SCAN QUESTION 6

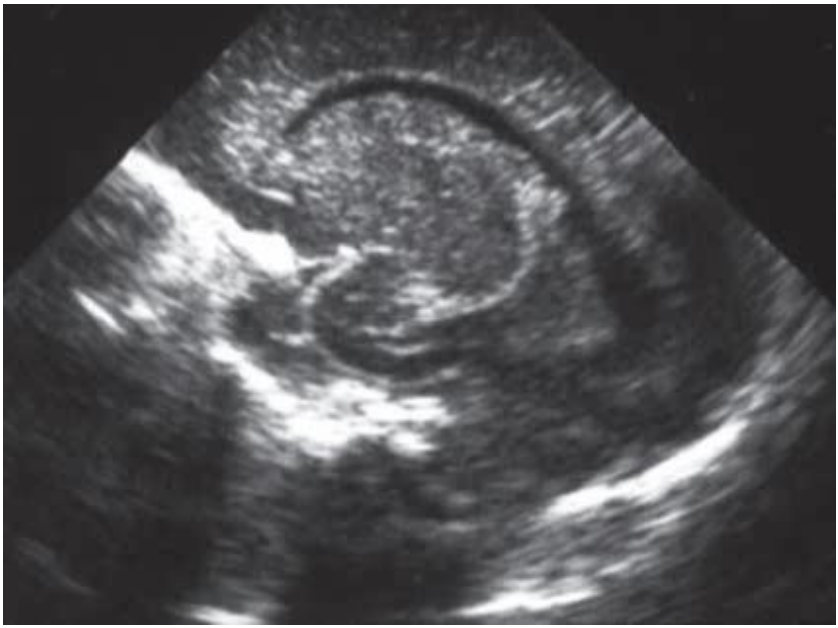
A preterm baby, born at 28 weeks' gestation has a follow-up scan carried out at 34 weeks corrected gestational age.

1. What type of scan is this?
2. What does it show?
3. Why has this happened?
4. What is the outlook for this baby?



SCAN QUESTION 7

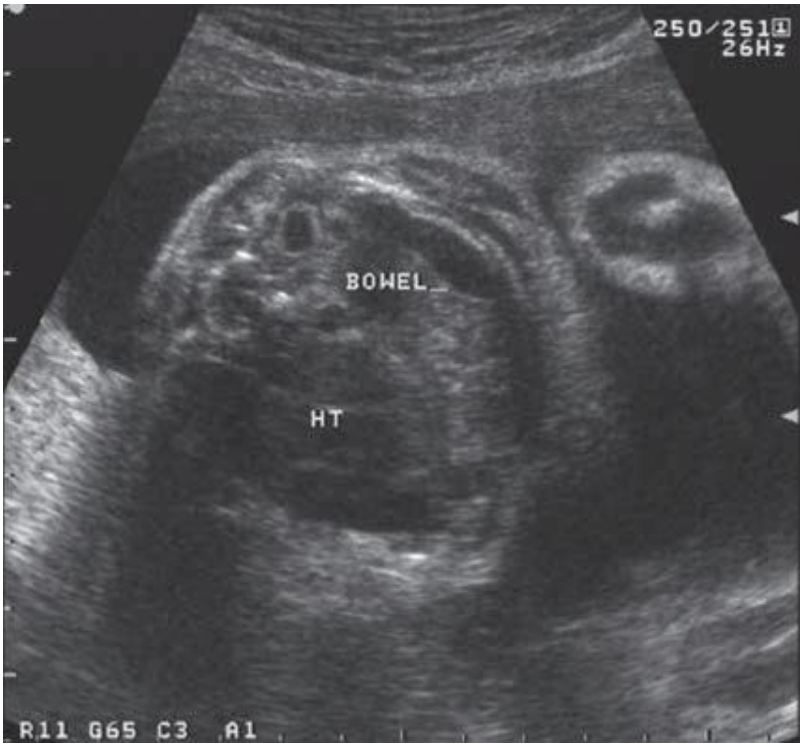
A routine head scan is performed in a 29 week gestation infant. Parents want to know what it shows and whether it means that their baby is going to be normal or not.



SCAN QUESTION 8

A woman is scanned antenatally at 30 weeks.

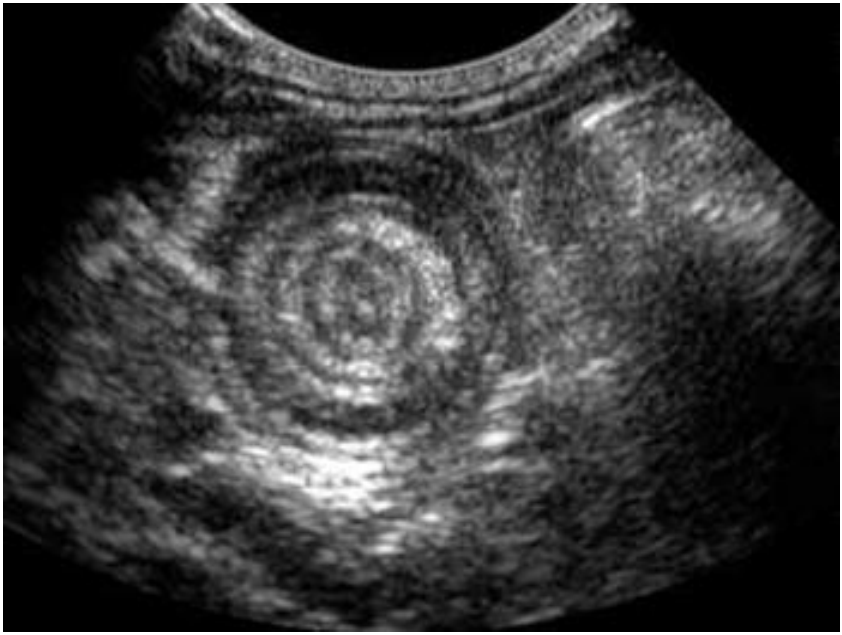
1. What does the scan show?
2. What will be your management of the baby at birth?
3. What are the baby's chances of survival?



SCAN QUESTION 9

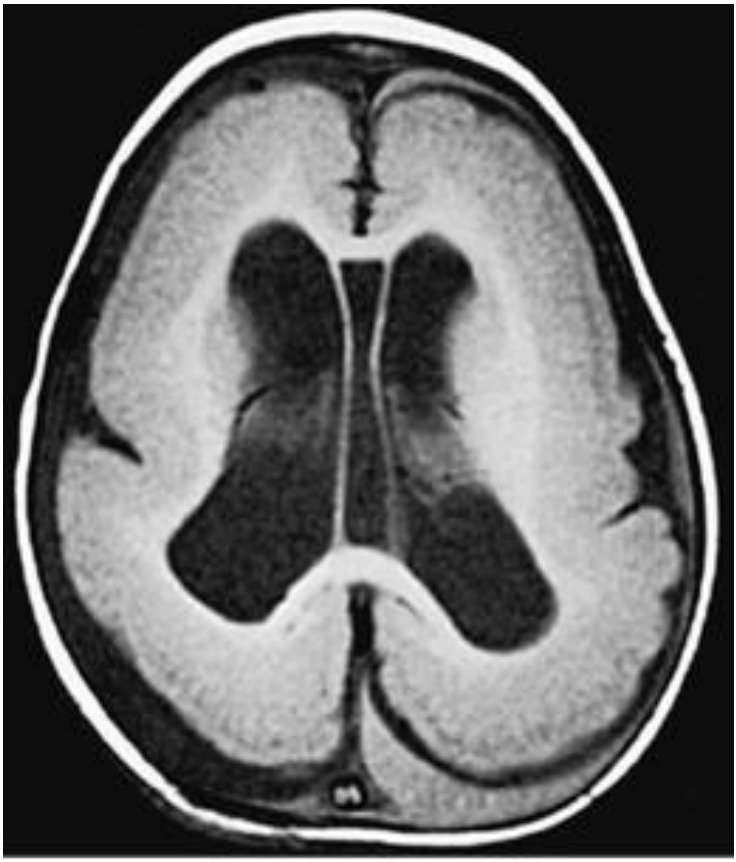
A 6-month-old infant with bile stained vomiting and lethargy with this abdominal u/s.

1. Describe the scan finding.
2. What is the most likely diagnosis?
3. What is your plan of management?



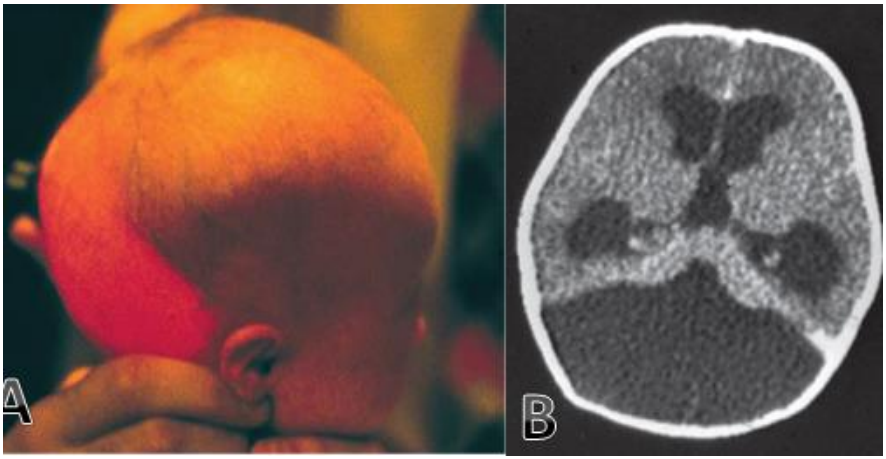
SCAN QUESTION 10

1. What are the MRI findings?
2. What is the diagnosis?



SCAN QUESTION 11

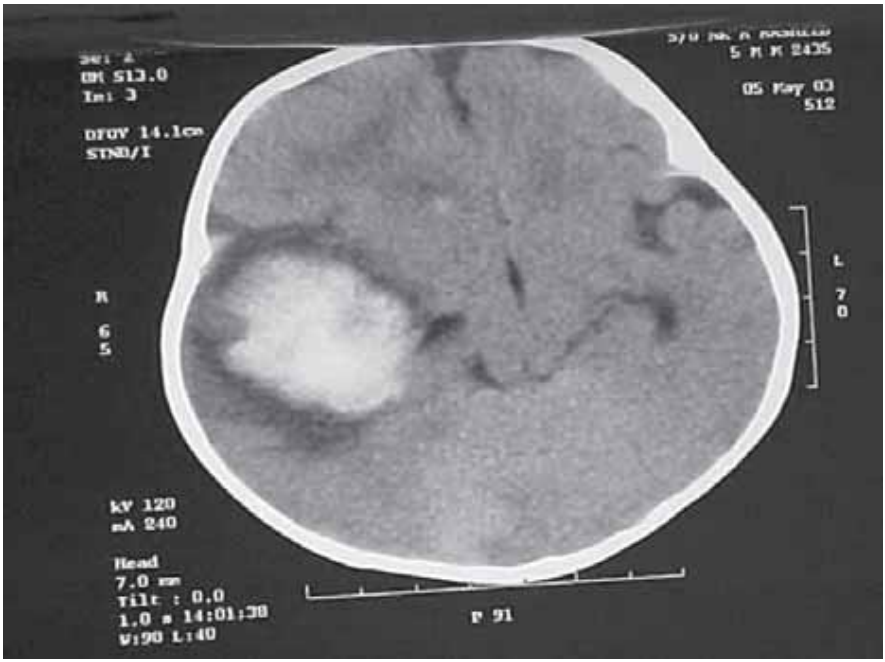
1. What are the findings in these 2 images?
2. What is the diagnosis?



SCAN QUESTION 12

Study the plain CT scan film of a breastfed 3-month-old infant who was brought to the hospital with history of left-sided focal seizures.

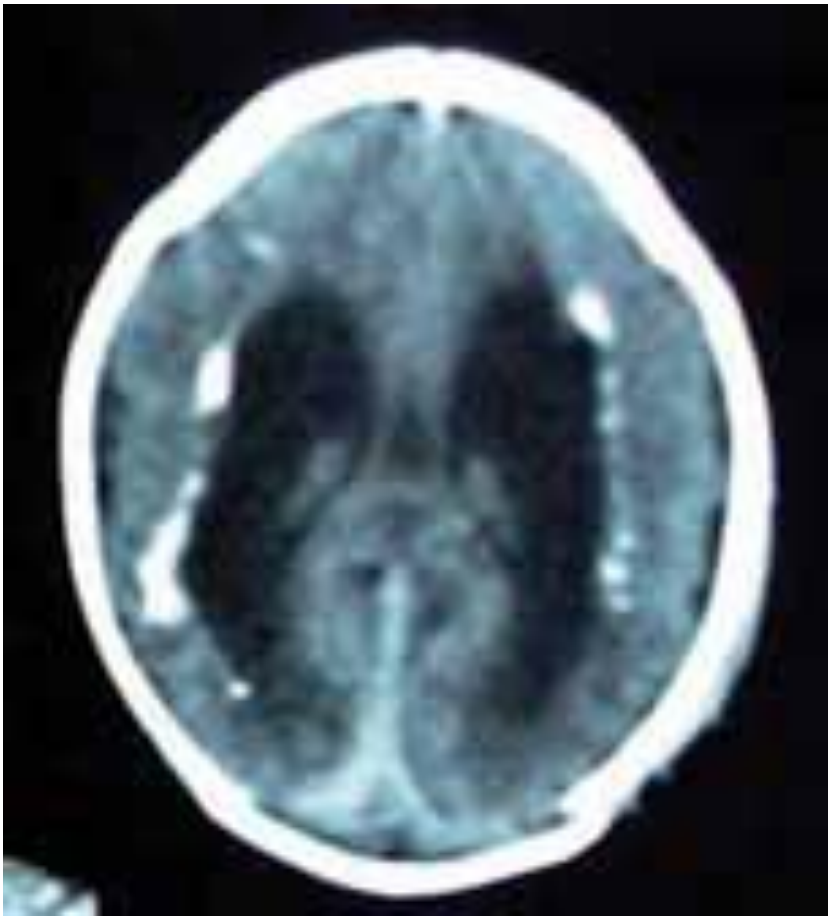
1. What is the CT scan finding suggestive of and what is the most probable diagnosis?
2. How would you confirm the etiological diagnosis? Name two tests.
3. What is the preventive measure for this condition?



SCAN QUESTION 13

Given below is CT of an 1800 g term male neonate born to an unbooked primigravida mother.

1. List 2 positive findings on the CT.
2. What is the most likely etiological diagnosis?
3. List 2 possible clinical findings in the neonatal period which may accompany the likely diagnosis.



2.6 SCAN ANSWERS

SCAN ANSWER 1

1. This MRI scan shows agenesis of the corpus callosum. The lateral ventricles are abnormal and crescentic in shape. They are shifted laterally resulting in the formation of a large midline interhemispheric subarachnoid space. The abnormal shape is due to deformation by fibres of the cerebral hemisphere that was meant to cross in the corpus callosum, but due to the agenesis, run longitudinally as the bundles of Probst.
2. Agenesis of the corpus callosum can be an isolated finding but can be associated with other structural brain anomalies. It is seen in Aicardi, Apert's, Smith–Lemli–Opitz, Goldenhaar, Fryns ', Meckel–Gruber, Zellweger's and Walker–Warburg syndromes. It is also seen with inborn errors of metabolism and in fetal alcohol syndrome. It is therefore important not only to look for other anomalies on the MRI scan, but to look at the infant for anomalies in other systems.
3. Agenesis of the corpus callosum involves a spectrum of abnormalities including abnormalities in the pericallosal nervous tissue. It is thus difficult to give the parents a definitive idea of long-term outlook as the wide range of abnormalities will also imply a wide spectrum of intelligence and of associated neurodevelopmental problems. Normal intelligence is not unusual, but severe compromise may be present, especially if other abnormalities are present.

SCAN ANSWER 2

1. It is a T2 scan. Following application of a magnetic field, the time required for a certain percentage of the tissue's nuclei to realign is termed 'Time 1 ' or T1, which is typically about 1 second. T2 imaging employs a spin echo technique, in which spins are refocused to compensate for local magnetic field inhomogeneities. In practical terms this has a major effect on the appearance of the scans. In T1 weighting white matter appears white and grey matter grey while CSF appears black. In T2 imaging this is reversed with CSF appearing white.
2. The scan shows severe hydrocephalus with very marked reduction of the cortical mantle. The inter-ventricular septum is absent. Although cranial ultrasound is an ideal way to measure ventricular dilatation, more detailed imaging with MRI is usually carried out prior to shunt insertion. The diagnosis in this case is Dandy–Walker malformation. This is associated with severe hydrocephalus, as seen in this scan.

SCAN ANSWER 3

1. This is a CT scan of the brain. The striking abnormalities are ventriculomegaly and the areas of brightness (same as bone) in the periventricular regions due to calcification.
2. This scan is consistent with congenital cytomegalovirus.
3. Urine should be sent for CMV detection by PCR and blood for serology for CMV IgM. This has a sensitivity of approximately 70%.

SCAN ANSWER 4

1. The two abnormalities seen on the scan are marked asymmetry of the cortex, with one hemisphere being much smaller than the other and with asymmetry of the lateral ventricles.
2. This is likely to be secondary to a middle cerebral artery infarct in the neonatal period and the scan shows the long-standing deficit.

SCAN ANSWER 5

1. There is a large mass at the back of the skull which seems to be separate from the brain contents. The brain looks relatively normal and the mass seems to be full of vessels and covered with skin.
2. It is difficult to say from the scan what the diagnosis is, but the most likely is an arterio-venous malformation (as was the case here) as no extension of brain tissue into the sac is visible.

SCAN ANSWER 6

1. This is a coronal section on a cranial ultrasound scan.
2. It shows a very large single cavity cyst which is in communication with the left lateral ventricle. The right lateral ventricle appears unaffected. This is a porencephalic cyst.
3. Porencephalic cysts are the end results of a destructive process in the brain, such as intracranial hemorrhage, infection or surgery. The parenchyma is replaced by fluid, hence the cyst formation. Communication with the ventricles, as in this case, may or may not be present.
4. The prognosis depends on the size and whether unilateral or bilateral. Anecdotally every neonatologist knows of one or more infants who had such a lesion and were normal on long-term follow-up. There is no doubt that with extensive infarction,

particularly bilaterally, outcome is likely to be poor. 8 However, for infants with unilateral and relatively small lesions a substantial number of infants may be normal at follow-up.

SCAN ANSWER 7

1. This is a normal cranial ultrasound scan.
2. It is likely, but by no means certain, that this baby will do well in the long term. Severe abnormalities on cranial scans are important predictors of cerebral palsy and mental retardation, and a normal head scan commonly implies the absence of major impairment. However, a recent study followed infants with normal head scans and showed that up to 30% of ELBW infants had either cerebral palsy or a low score on the mental development index.

SCAN ANSWER 8

1. The scan shows a congenital diaphragmatic hernia. The heart is visible in the chest and there are loops of bowel present at the same level.
2. An experienced neonatal team should attend the delivery of an infant with a known CDH. Affected babies should be delivered in a tertiary centre where pediatric surgery is accessible. Rapid intubation with gentle ventilation is recommended. It is known that infants with CDH are surfactant deficient and some reports have shown that exogenous surfactant could be beneficial.
3. It is extremely difficult to accurately predict the chance of survival in these infants.

SCAN ANSWER 9

1. Target sign.

2. Intussusception.
3. Emergency hydrostatic reduction (if not in shock), If unsuccessful then surgery.

SCAN ANSWER 10

1. Absence of cerebral sulci and the maldeveloped sylvian fissures associated with enlarged ventricles.
2. Lissencephaly.

SCAN ANSWER 11

1. A- Transillumination demonstrates a posterior fossa cyst, bulging occiput, prominent scalp veins, and enlargement of the head.
   B- CT scan shows a posterior fossa cyst, a small cerebellar remnant, and associated hydrocephalus
2. Dandy-Walker malformation.

SCAN ANSWER 12

1. Intracranial hemorrhage right temporoparietal region with midline shift. Late onset vitamin K dependant bleeding (late onset hemorrhagic disease of the newborn).
2. Abnormal PT, abnormal APTT.
3. Injection vitamin K 1 mg intramuscular at birth to every baby.

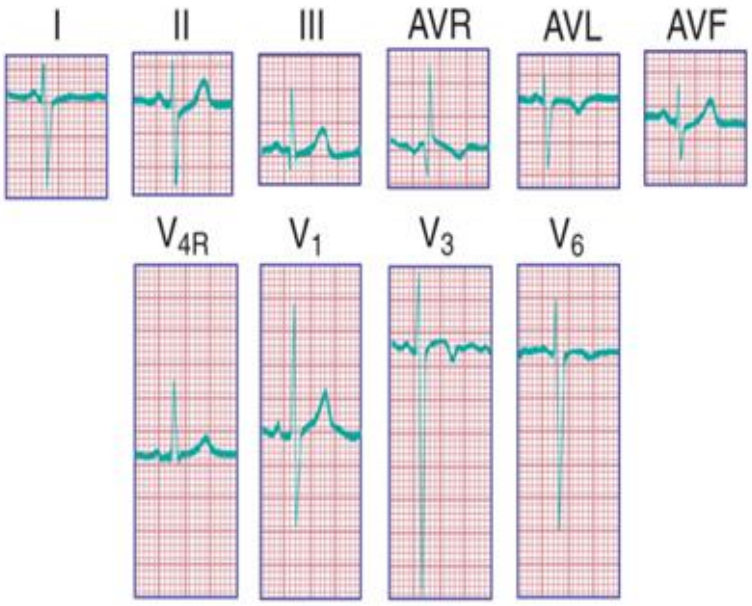
SCAN ANSWER 13

1. Periventricular calcifications, ventricular dilatation.
2. Congenital CMV infection.
3. Hepatosplenomegaly, sensorineural hearing loss, chorioretinitis, thrombocytopenia, and encephalopathy.

2.7 ECG QUESTIONS

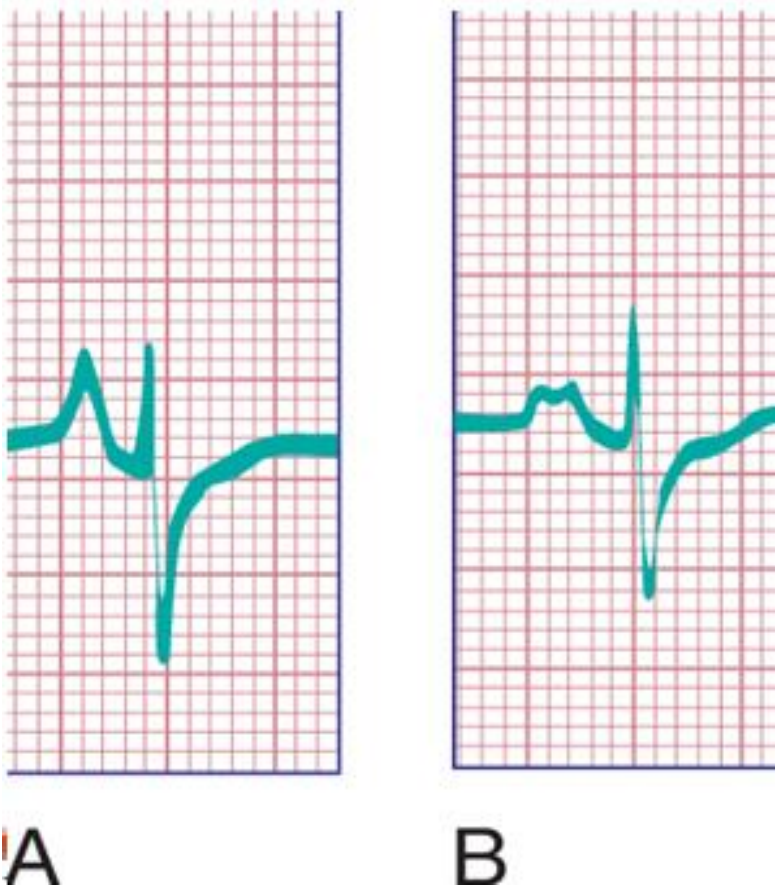
ECG QUESTION 1

1. What are the ECG findings?
2. What is the most likely diagnosis?



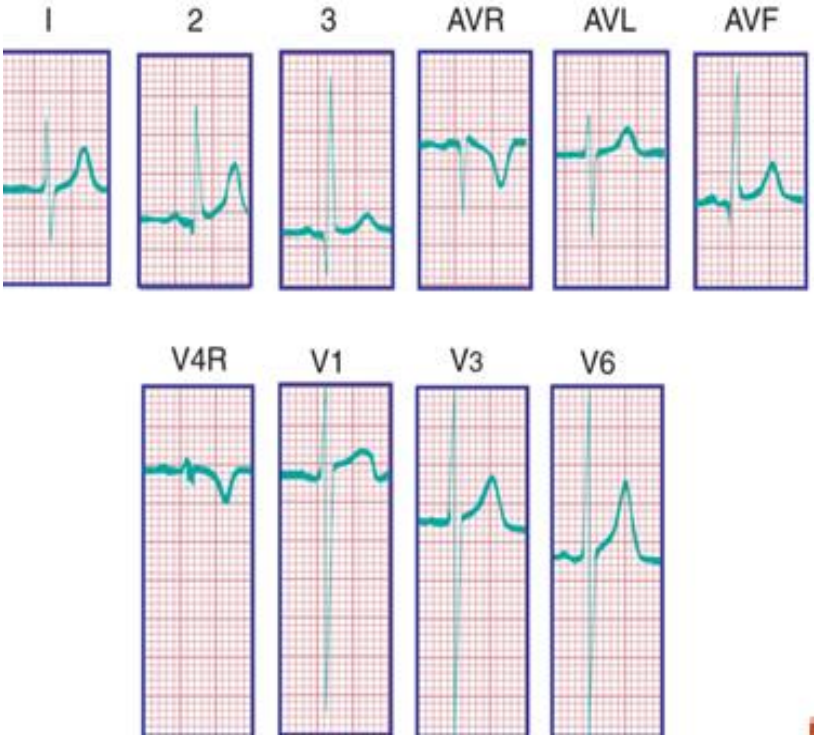
ECG QUESTION 2

1. What are the ECG findings in A&B trace and what did they indicate?
2. Give single example for each.



ECG QUESTION 3

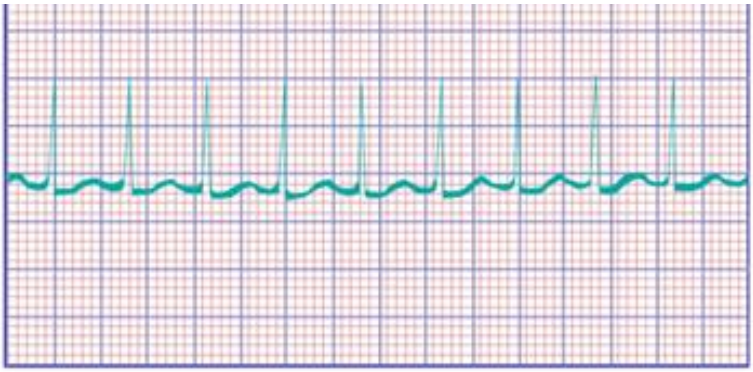
1. What cause such finding?
2. List down steps of management (just guidelines).



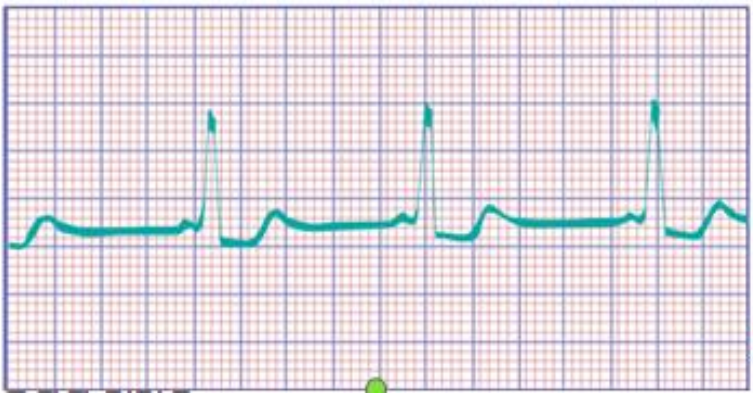
ECG QUESTION 4

Describe your observations in A and B ECG.

A

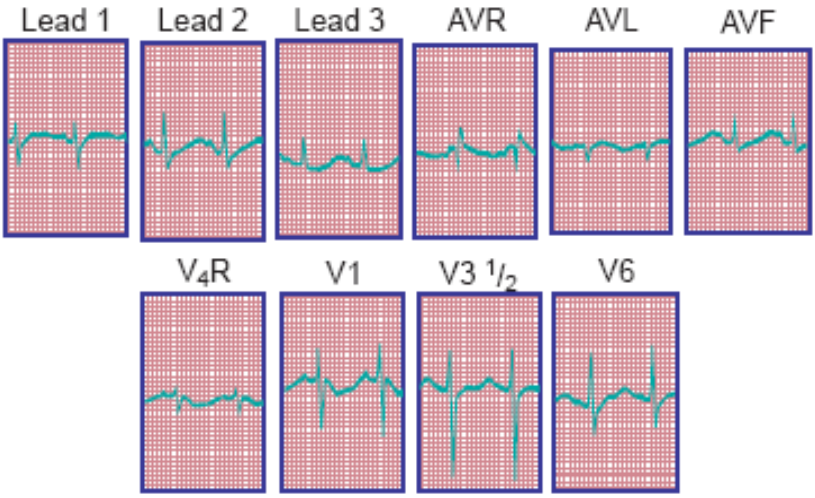


B



ECG QUESTION 5

1. What this ECG denote to?
2. Give example of 2 diseases causing this finding.



2.7 ECG ANSWERS

ECG ANSWER 1

1. Tall R waves in the right precordium and deep S waves in V_6. The positive T waves in V_4R and V_1 are also characteristic of right ventricular hypertrophy.
2. Tetralogy of Fallot.

ECG ANSWER 2

1. A, Peaked narrow P waves characteristic of right atrial enlargement.
   B, Wide bifid M-shaped P waves typical of left atrial enlargement.
2. Ebstien anomaly for A and mitral stenosis for B.

ECG ANSWER 3

1. Electrocardiogram in hyperkalemia. Note the tall, tent-shaped T waves, especially in leads I, II, and V_6.
2. Stabilization of the cardiac membrane with the intravenous calcium (calcium gluconate 10 percent solution in a dose 0.5 to 1.0 mL per kilogram intravenously over 5 to 15 minutes).
Promotion of potassium movement from the extracellular fluid (ECF) into the cells via three different therapies:
1. Administration of intravenous glucose and insulin (0.5 to 1.0 g of glucose per kilogram over 30 minutes and 0.1 unit of insulin per kilogram intravenously or subcutaneously).
2. Administration of intravenous sodium bicarbonate (in a dose of 1 to 2 milliequivalent per kilogram over 30 to 60 minutes); and

3. Administration of beta agonists, such as salbutamol, via nebulization (2.5 mg if the child weighs less than 25 kilogram or 5 mg if the child weighs more). salbutamol can be administered intravenously at 4 to 5 microgram per kg over 15 minutes, but nebulization is the preferred treatment route.
The above modalities only transiently lower the plasma potassium concentration; as a result, additional therapy is required to remove potassium from the body. Thus, kayexalate, an ion exchange resin, can be used to effect a net elimination of potassium, at a dose of 1 gram per kilogram orally or rectally.

ECG ANSWER 4

A, Supraventricular tachycardia in a child with Wolff-Parkinson-White (WPW) syndrome. Note the normal QRS complexes during the tachycardia.
B, Later, the typical features of WPW syndrome are apparent (short P-R interval, delta wave, and wide QRS).

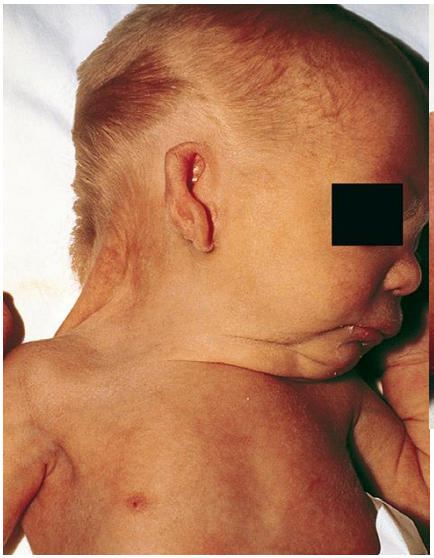
ECG ANSWER 5

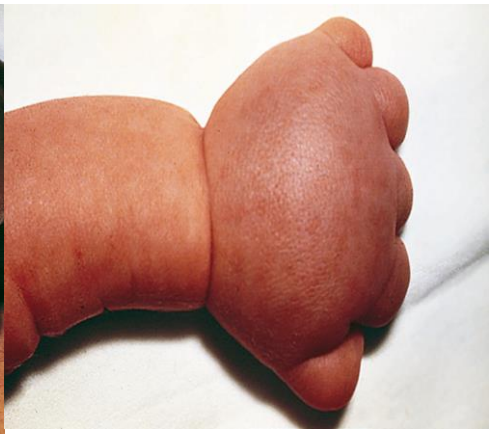
1. Electrocardiogram in hypokalemia. Note the prolongation of electrical systole as evidenced by a widened TU wave, as well as depression of the ST segment in V_4R, V_1, and V_6.
2. Barter syndrome, Adrenogenital syndrome.

2.8 DYSMORPHIC DISORDERS QUESTIONS

DYSMORPHIC DISORDERS QUESTION 1

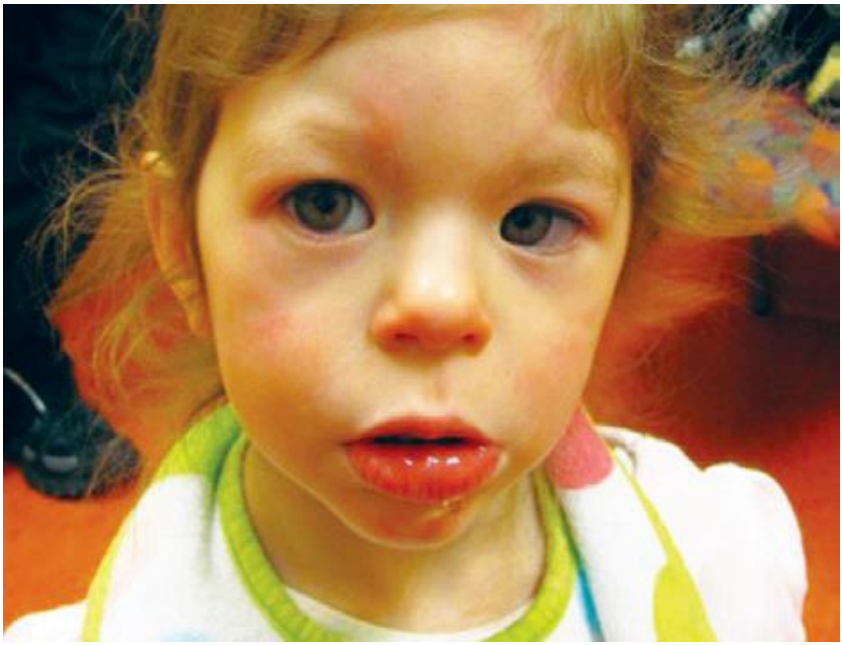
1. What are the findings in these two images?
2. What is the diagnosis?





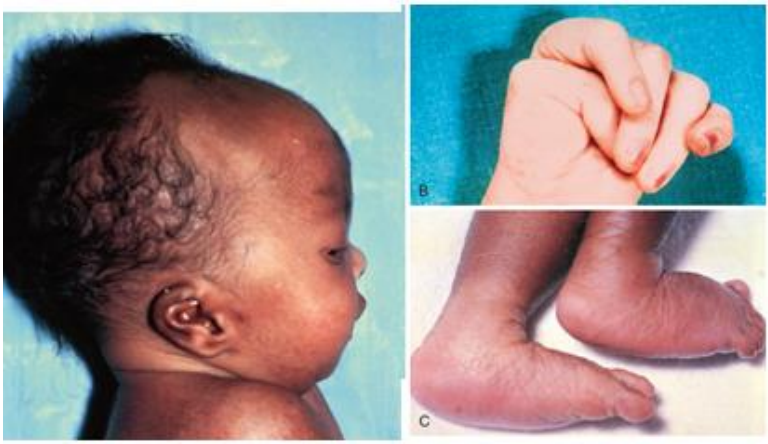
DYSMORPHIC DISORDERS QUESTION 2

1. What characteristic findings you see in this face?
2. What is the most likely diagnosis?
3. What other hallmark features you may find?



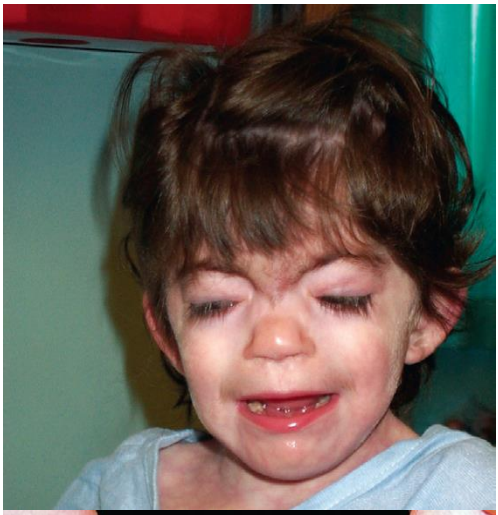
DYSMORPHIC DISORDERS QUESTION 3

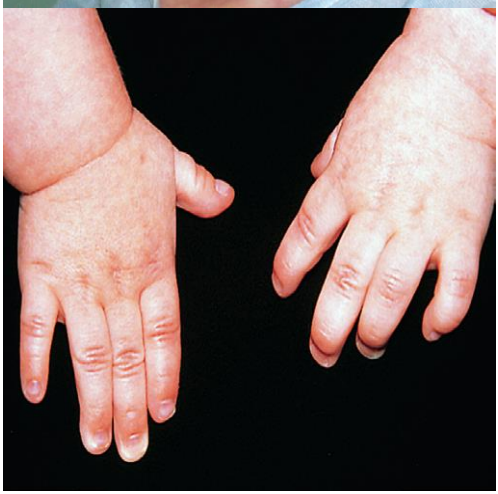
1. What are the findings in these three images?
2. What is the most likely diagnosis?



DYSMORPHIC DISORDERS QUESTION 4

1. What distinctive features you see in the face and hands of this child?
2. What is your diagnosis?

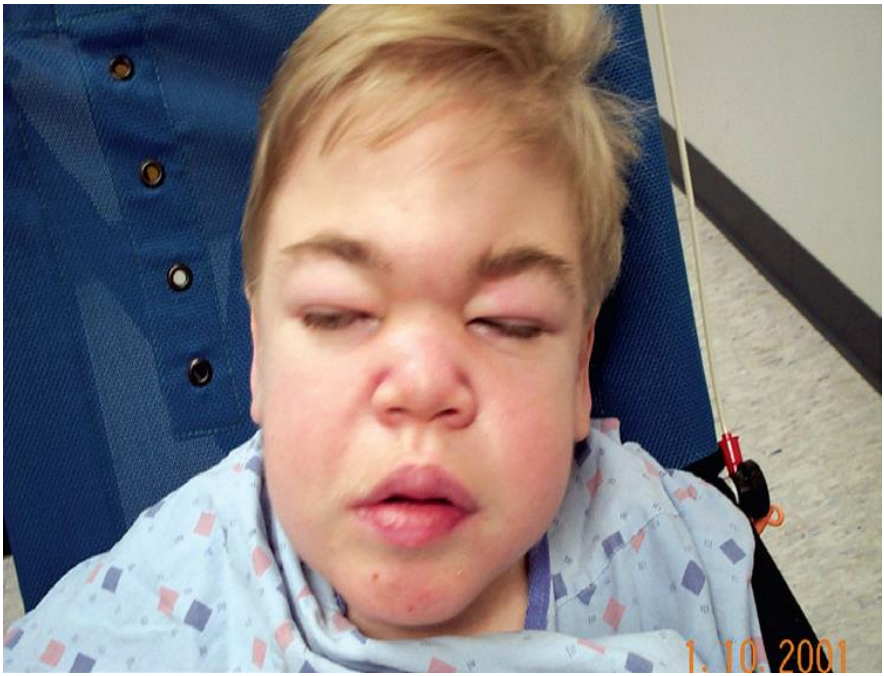




DYSMORPHIC DISORDERS QUESTION 5

This patient presented with growth retardation, hepatosplenomegaly, and cardiac valve disease

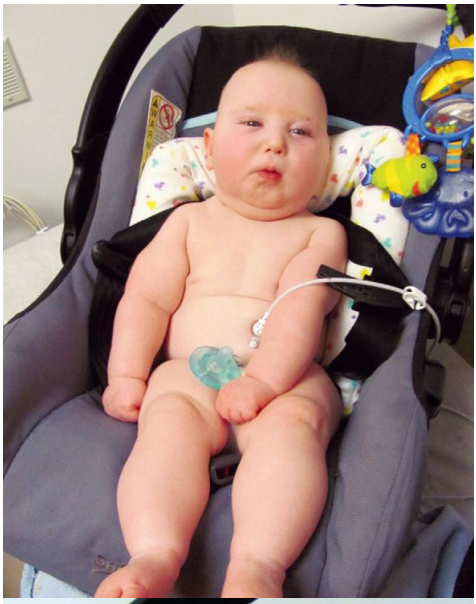
1. What attract your attention in this image?
2. What is the most likely diagnosis?
3. What is your suggested treatment?

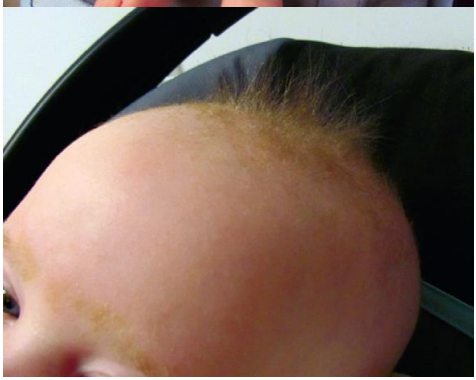


DYSMORPHIC DISORDERS QUESTION 6

This infant presents with loss of milestones, seizures, mental retardation, and weakened bones with fractures.

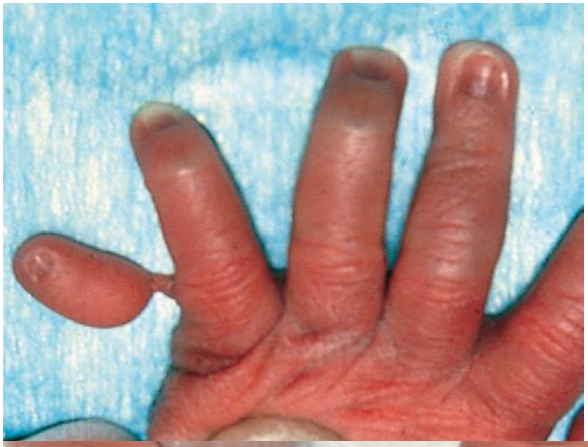
1. What is the most likely diagnosis?
2. What lab. investigations you need to confirm the diagnosis?

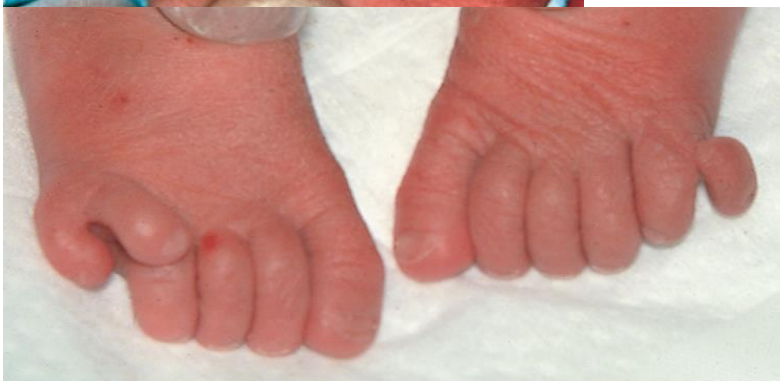




DYSMORPHIC DISORDERS QUESTION 7

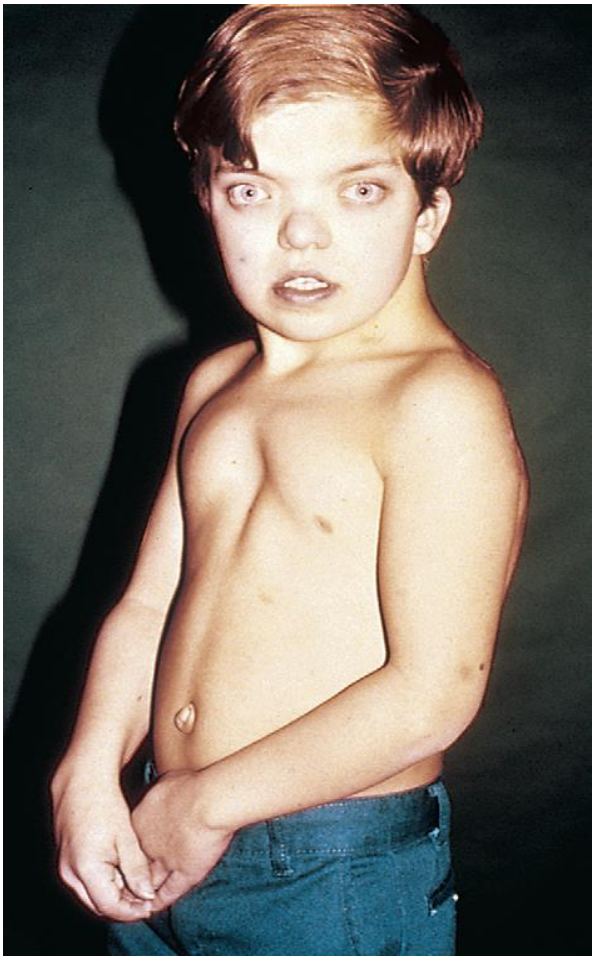
1. Name the anomalies in these two images?
2. How they are managed?





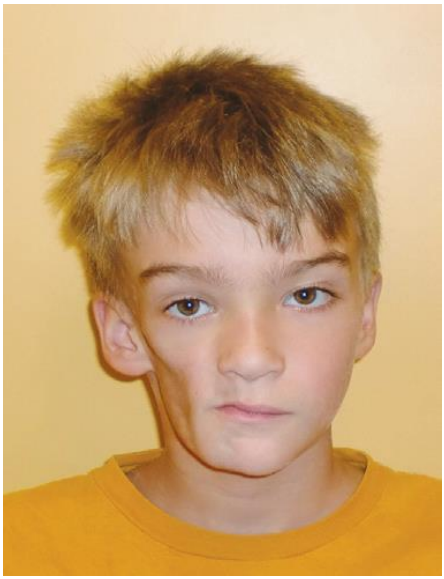
DYSMORPHIC DISORDERS QUESTION 8

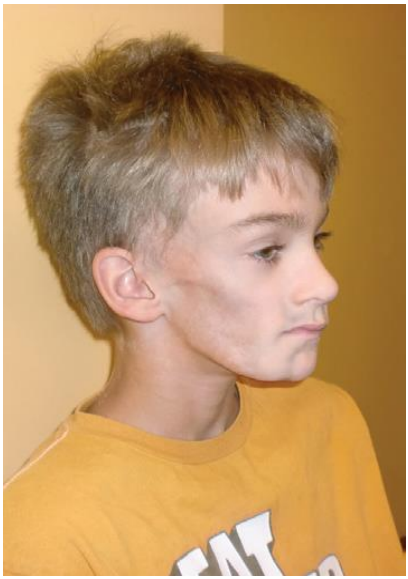
1. What characteristic features you notice in this male child?
2. What is your diagnosis?
3. What cardiac defect you expect to find?



DYSMORPHIC DISORDERS QUESTION 9

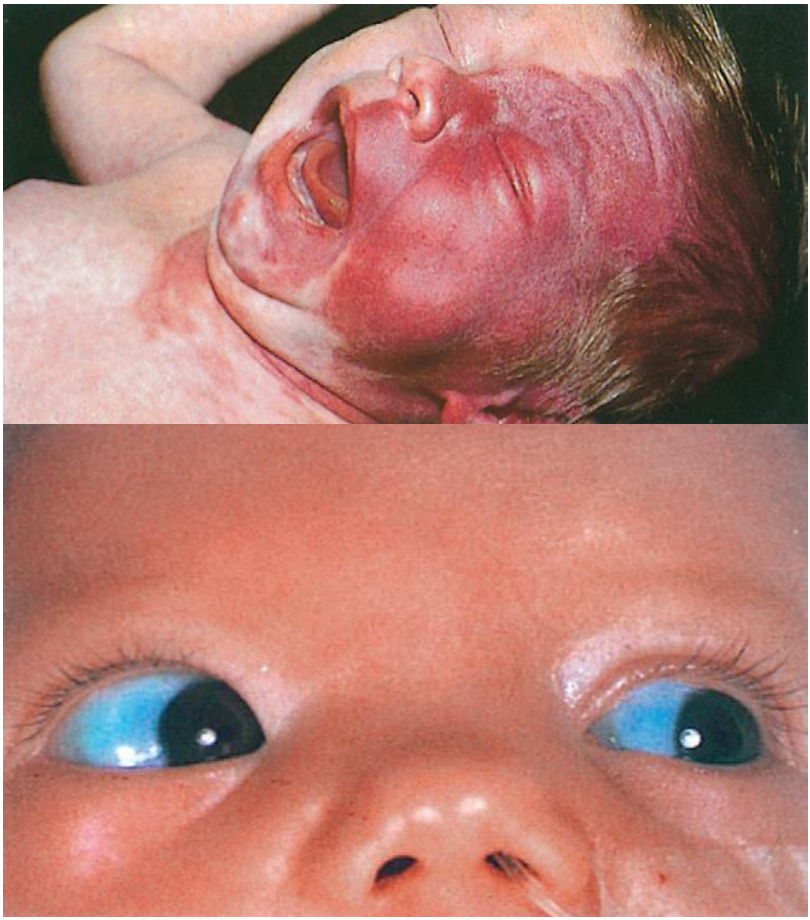
1. What is the cause of this face asymmetry?
2. What is the diagnosis?
3. What other extracutaneous manifestations may be seen?





DYSMORPHIC DISORDERS QUESTION 10

1. Describe your findings in these 2 images.
2. What is the diagnosis?
3. What are the cardinal manifestations of this disease?



2.8 DYSMORPHIC DISORDERS ANSWERS

DYSMORPHIC DISORDERS ANSWER 1

1. In this newborn a webbed neck with low hairline, shield chest with widespread nipples, abnormal ears, and micrognathia in the left image and prominent lymphedema of the hand in the right image.
2. Turner syndrome

DYSMORPHIC DISORDERS ANSWER 2

1. Periorbital fullness, epicanthal folds, prominent lips, long philtrum, and stellate lacy iris pattern.
2. Williams syndrome.
3. Hallmark features include supravalvular aortic stenosis, hypercalcemia, friendly personality, connective tissue abnormalities.

DYSMORPHIC DISORDERS ANSWER 3

1. Typical profile reveals prominent occiput, micrognathia, and posteriorly rotated malformed auricles.
B, Clenched hand showing typical pattern of overlapping fingers.
C, Rocker-bottom feet.
2. Trisomy 18.

DYSMORPHIC DISORDERS ANSWER 4

1. Facial features are quite distinctive and include long eyelashes; a fine, almost “brushed-on” appearance of the arch to the eyebrows; occasional synophrys due to hirsutism; small nose with anteverted nostrils; long philtrum; downturned upper lip with cupid’s-bow shape; and micrognathia.
Extremities are notable for small hands and feet, and varying abnormalities can include proximally placed thumbs.
2. Cornelia de Lange, or Brachmann– de Lange Syndrome.

DYSMORPHIC DISORDERS ANSWER 5

1. The coarsening of facial features characteristic of this disorder includes prominence of the forehead, a flattened nasal bridge, a short broad nose, and widening of the lips. Features appear puffy due to thickening of the skin.
2. Hurler syndrome
3. Enzyme replacement therapy can help temporize treatment, but the only significant treatment for infantile onset disease is by bone marrow transplantation, which stabilizes the disorder but does not improve bony abnormalities.

DYSMORPHIC DISORDERS ANSWER 6

1. Menkes disease.
2. Low serum copper and ceruloplasmin levels.

DYSMORPHIC DISORDERS ANSWER 7

1. Supernumerary digit and true polydactyly.

2. Removal may be accomplished by applying a ligature around the pedicle (assuming that it is thin and lacks palpable bony tissue) as close as possible to the surface of the fifth digit and allowing for the extra digit to fall off naturally. This usually takes approximately 1 week. Care should be taken to observe for infection.
True polydactyly, although removal is not required, it may be indicated cosmetically.

DYSMORPHIC DISORDERS ANSWER 8

1. Widely spaced eyes, low-set ears, webbing of the neck, shield chest, pectus, and increased carrying angle of the arms.
2. Noonan syndrome.
3. Common cardiovascular defects include pulmonary stenosis in association with a dysplastic pulmonary valve, atrial septal defect, and hypertrophic cardiomyopathy.

DYSMORPHIC DISORDERS ANSWER 9

1. Hemiatrophy of the mandible, maxilla, tongue, and subcutaneous and muscle tissue.
2. Localized scleroderma (Parry-Romberg syndrome).
3. Certain extracutaneous manifestations are more common in patients with PRS, including headache, uveitis, seizures, and transient ischemic attacks.

DYSMORPHIC DISORDERS ANSWER 10

1. A port-wine stain, is seen in a trigeminal distribution, including the ophthalmic division and buphthalmos (Enlargement of the cornea of the right eye).
2. Sturge-Weber syndrome.

3. The cardinal manifestations of Sturge-Weber syndrome are as follows:

1. A vascular malformation or port-wine stain over the face that involves the cutaneous distribution of the ophthalmic division of the trigeminal nerve
2. Ipsilateral leptomeningeal angiomatosis with associated intracranial calcifications
3. A high incidence of mental retardation and ipsilateral ocular complications

2.9 INSTRUMENTS QUESTIONS

INSTRUMENTS QUESTION 1

1. What is this instrument?
2. Name the procedure for which this instrument is used.
3. What is the minimum platelet count to be kept prior to this procedure?

INSTRUMENTS QUESTION 2

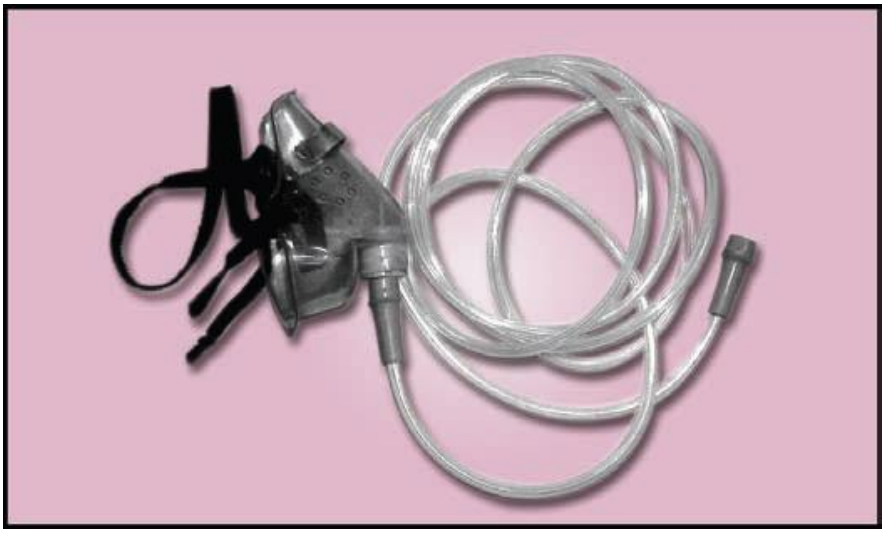
1. Name the following device.
2. What would be the approximate normal value of PEFR of a subject standing 120 cm tall?
3. What does spirometer measures?

INSTRUMENTS QUESTION 3

1. Name this instrument.
2. When it is indicated?
3. What are the disadvantages?

INSTRUMENTS QUESTION 4

1. Name this instrument.
2. When it is indicated?
3. What are the disadvantages?



INSTRUMENTS QUESTION 5

1. Name this instrument.
2. How it is used?
3. What precautions should be considered?

INSTRUMENTS QUESTION 6

1. What are the sizes of these devices?
2. Name the parts each contain.
3. Name its indication in neonate.

INSTRUMENTS QUESTION 7

1. Name these instruments.
2. What are their therapeutic uses?
3. What are the contraindications to their use?

2.9 INSTRUMENTS ANSWERS

INSTRUMENTS ANSWER 1

1. Jamshedi bone marrow biopsy needle.
2. Bone marrow biopsy.
3. No cut off for platelets needed prior to bone marrow study.

INSTRUMENTS ANSWER 2

1. Peak flow meter.
2. 200 liters/min.
Formula for approximate normal PEFR for a given height: PEFR (L/min) = [ht. (in cm) – 80] × 5.
3. Vital capacity and its subdivisions and expiratory (or inspiratory) flow rate.

INSTRUMENTS ANSWER 3

1.Twin bore nasal oxygen set(NASAL CANNULA)
2. Hypoxemia, It leaves the mouth free for nutritional and communication purposes.
3. Excessive oxygen (> 4 L/min) flow can lead to gastric distention, vomiting and chances of aspiration and nasal mucosal injury
, Prongs can cause irritation to nasal mucosa, mucosal edema and increase nasal secretion. Thereby interfere with oxygen delivery.

INSTRUMENTS ANSWER 4

1. Oxygen mask
2. Oxygen therapy and nebulization
3. Interference with feeding, tightly fitted mask is poorly accepted by infants and toddlers, loosely fitted mask provides only 40 percents of oxygen.

INSTRUMENTS ANSWER 5

1. De Lee mucus sucker with trap
2. Aspirate first from mouth and then from nose (Aspiration first from nose will initiate breathing efforts so there are chances of aspiration).
3. Deep and prolonged suction (more than 10 sec) can cause bradycardia and apnea due to vagal stimulation.

INSTRUMENTS ANSWER 6

1. A- Neonate: 250 ml bag, B-Infant and children : 500 ml bag, C-Children above 10 years : 700 ml bag
2. A. Pediatric face mask, B. Non-rebreathing patient valve, C. Pressure regulator, D. Compressible self refilling ventilation ambubag, E. Intake valve, F. Nipple for oxygen tubing, G. Oxygen reservoir (bag or corrugated pipe)
3. a. Apnea or gasping
   b. Heart rate less than 100/min
   c. Persistent central cyanosis despite administration of 100% oxygen.

INSTRUMENTS ANSWER 7

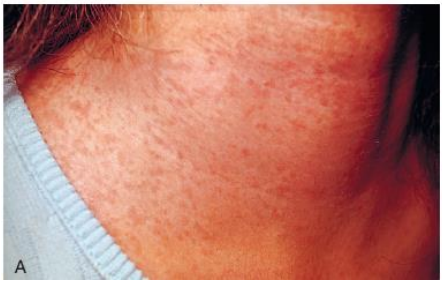
1. Bone marrow aspiration needle.
2. Intraosseous fluid therapy, Bone marrow transplantation.
3. A. Local infection.
   B. Osteomyelitis.
   C. Hemorrhagic diasthesis, Hemophilia.

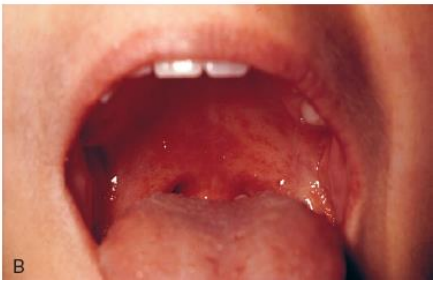
2.10 INFECTION QUESTIONS

INFECTION QUESTION 1

A young child presented with fever for one day, a discrete, pinkish red, fine maculopapular eruption, occipital, posterior cervical, and postauricular nodes enlargement.

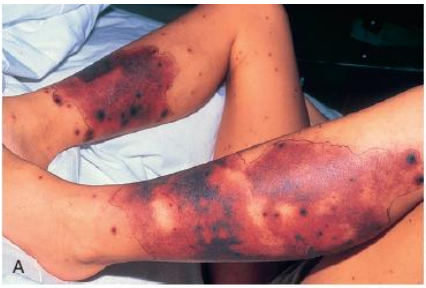
1. Name the finding in photo B?
2. What is the most likely diagnosis?
3. What complications may be seen in children?

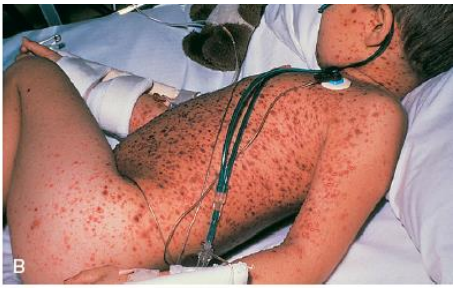




INFECTION QUESTION 2

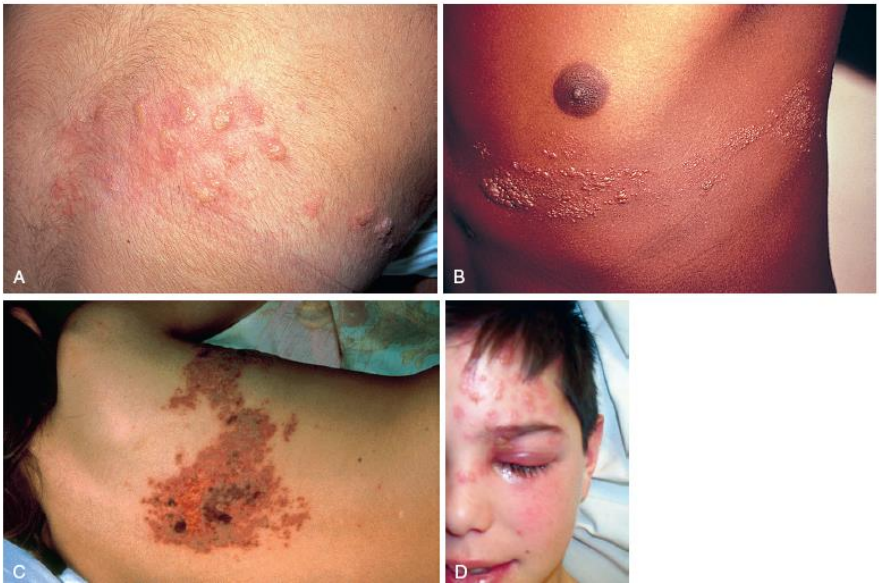
What do these images (A & B) demonstrate in a child with varicella?





INFECTION QUESTION 3

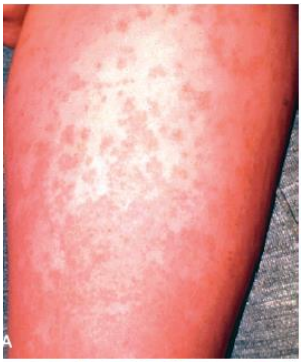
1. What is the diagnosis?
2. What dermatome involved in photo D?
3. Why this disease is less contagious than varicella?

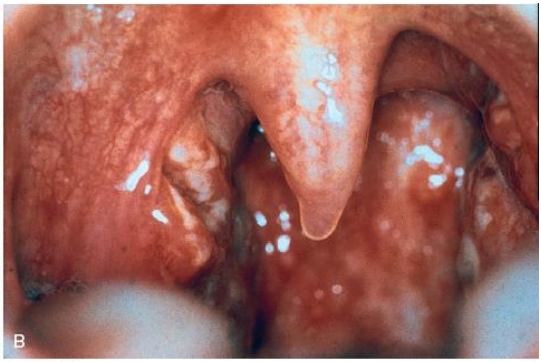


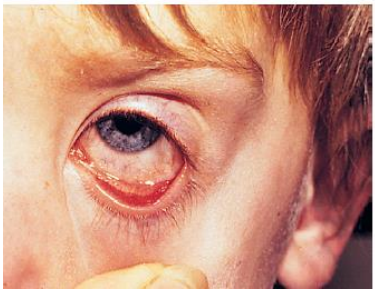
INFECTION QUESTION 4

A young child presented with conjunctivitis, pharyngitis with exudate, and a discrete, blanching, maculopapular rash

1. What is the most likely cause?
2. What other diseases can be caused by this organism?



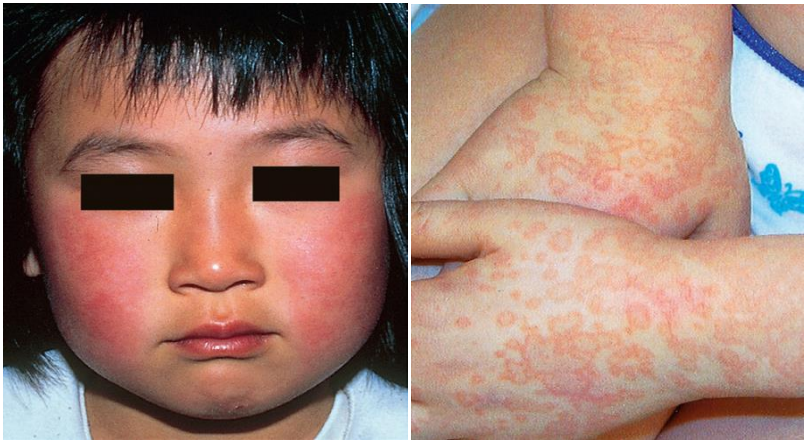




INFECTION QUESTION 5

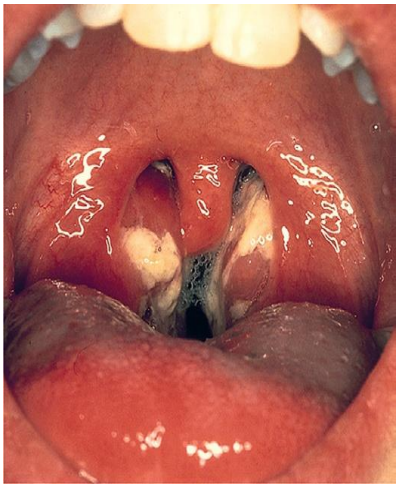
A preschool age child presented with large, bright red, erythematous patches over both cheeks, on the next day, a symmetrical rash appears on the extensor surfaces of the extremities.

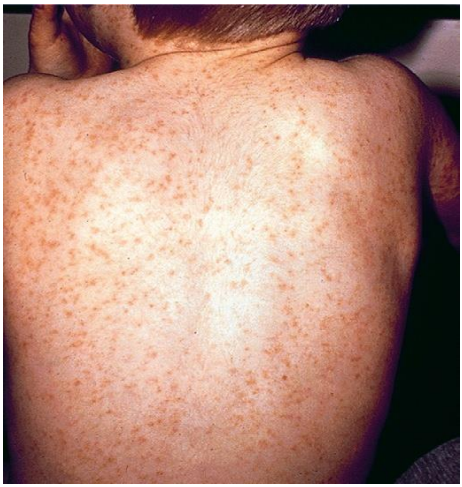
1. What is the causative agent?
2. What is the mode of transmission?
3. What is the main complication?



INFECTION QUESTION 6

1. What is the most likely diagnosis?
2. What are the modes of transmission?
3. How much is the incubation period?





INFECTION QUESTION 7

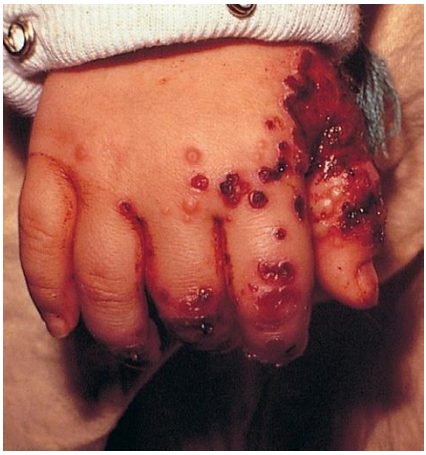
A 3-year-old child presented with high fever, irritability, anorexia, mouth pain, and copious drooling.

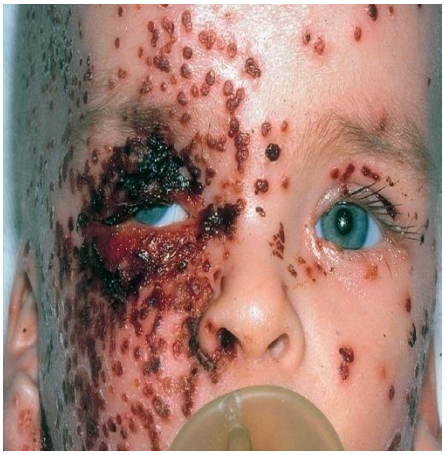
1. What is the most likely diagnosis?
2. Name 2 other common sites of involvement?
3. Which site of involvement is serious and needs urgent management?

INFECTION QUESTION 8

An 18-month-old child with atopic dermatitis presented with high fever, irritability, discomfort, and these lesions.

1. What is the most likely diagnosis?
2. How you manage such patient?

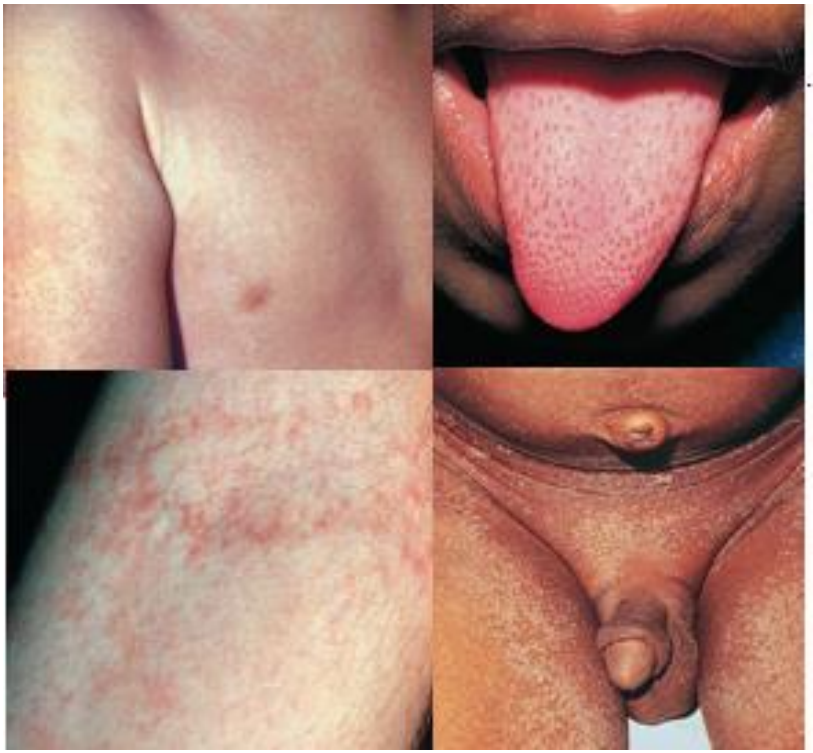




INFECTION QUESTION 9

These are different images of a contagious disease.

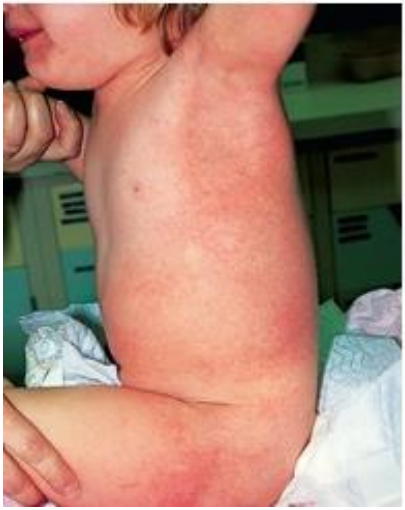
1. What are the findings in these 4 photos?
2. What is your diagnosis?
2. What is the drug of choice and for how long?

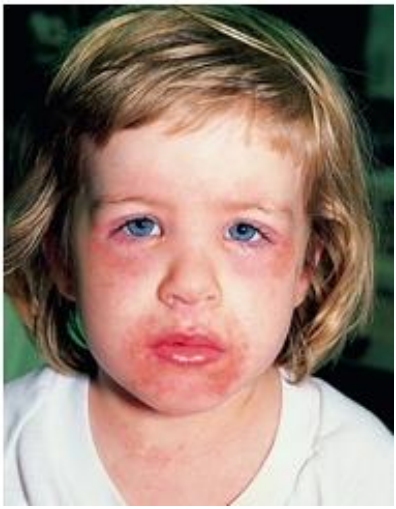


INFECTION QUESTION 10

This child presented with fever, irritability, moderate malaise, and a generalized erythematous **tender** rash. Within 2 to 5 days the skin begins to crack, fissure, and weep, especially in the perioral and periorbital areas.

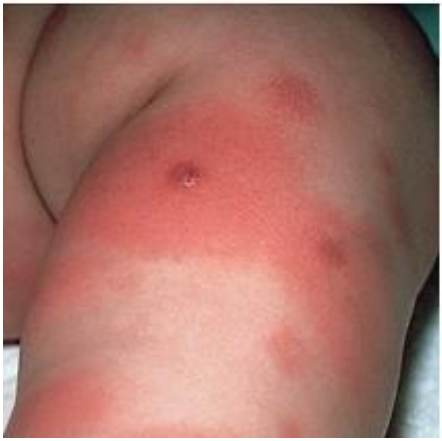
What is the most likely diagnosis?

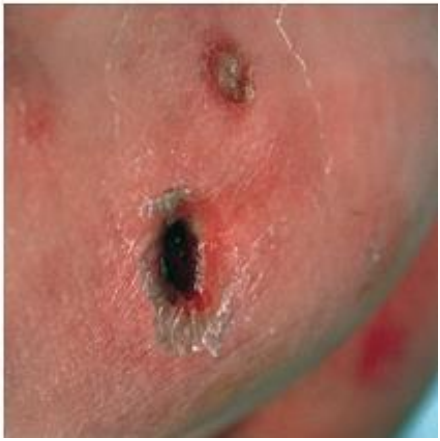




INFECTION QUESTION 11

1. What is the diagnosis?
2. What is the etiology?
3. What is the expected laboratory finding in the blood film?





2.10 INFECTION ANSWERS

INFECTION ANSWER 1

1. Red palatal lesions (Forschheimer spots).
2. Rubella/German measles.
3. Complications are rare in childhood and include arthritis, purpura with or without thrombocytopenia, and mild encephalitis.

INFECTION ANSWER 2

IMAGE A Superinfection of this child's lesions with group A β-streptococci led to purpura fulminans.
IMAGE B Disseminated hemorrhagic varicella.

INFECTION ANSWER 3

1. Herpes zoster (shingles).
2. Involvement of the ophthalmic branch of the trigeminal nerve produces lesions involving the forehead, eyelids, and nose.
3. Although varicella can be transmitted by patients with herpes zoster, contagion is generally less of a problem because most patients have lesions on areas that are covered by clothing and the oropharynx is not involved in most cases.

INFECTION ANSWER 4

1. Adenovirus Infections.
2. Conjunctivitis, upper respiratory tract infections and pharyngitis, croup, bronchitis, bronchiolitis and pneumonia (occasionally

fulminant), gastroenteritis, myocarditis, nephritis, cystitis, and encephalitis.

INFECTION ANSWER 5

1. Parvovirus B19.
2. The virus is transmitted primarily by respiratory secretions.
3. Aplastic crisis in patients with sickle cell disease, other hemoglobinopathies, and other forms of hemolytic anemia.

INFECTION ANSWER 6

1. Infectious Mononucleosis.
2. Transmission of EBV can occur by intimate oral contact (i.e., kissing), sharing eating utensils, transfusion, or transplantation.
3. The incubation period usually ranges from 30 to 50 days, although it is shorter (14 to 20 days) in patients with transfusion-acquired infection.

INFECTION ANSWER 7

1. Primary herpetic gingivostomatitis.
2. Although the virus can infect any area of the skin, the lips and fingers or thumbs (as in herpetic whitlow) are the most common sites of involvement.
3. Ocular herpetic infection.

INFECTION ANSWER 8

1. Eczema Herpeticum (Kaposi Varicelliform Eruption).
2. Prompt treatment with intravenous acyclovir is recommended. A significant risk of secondary bacterial infection also exists.

INFECTION ANSWER 9

1. A-diffuse, blanching, erythematous rash that has a sandpapery consistency on palpation.
   B-a white strawberry tongue
   C-Pastia lines
   D-Desquamation occurs in fine, thin flakes as the acute phase of the illness resolves
2. Streptococcal scarlet fever.
3. Treatment with a 10-day course of penicillin or erythromycin (in penicillin-allergic children) is important for reducing the risk of transmission and preventing rheumatic fever and pyogenic complications

INFECTION ANSWER 10

Staphylococcal scarlet fever.

INFECTION ANSWER 11

1. Ecthyma gangrenosum.
2. Septicemia with Pseudomonas aeruginosa
3. Neutropenia.

2.11 BLOOD GASES QUESTIONS

BLOOD GASES QUESTION 1

Study this arterial blood gas report of a 4-year-old child in the PICU with feeble peripheral pulses.

- pH : 7.28
- PaCO2 : 32 mmHg
- PaO2 : 87 mmHg
- HCO3 : 12 mMol/L
- Base excess : 8 mMol/L

1. Give the complete ABG diagnosis and possible cause of the abnormality.
2. Name the most appropriate corrective measure for this child.
3. Calculate the predicted carbon dioxide level for this level of bicarbonate.

BLOOD GASES QUESTION 2

Study the arterial blood gas report and answer the questions.

- Ph : 7.343
- PaCO2 : 60
- PaO2 : 47.8 mmHg
- Bicarbonate : 32 mMol/L

1. Interpret this blood gas.
2. What is the normal PaO2 level expected if a child is breathing at room air with normal lungs?

BLOOD GASES QUESTION 3

Study the arterial blood gas report of a 12 day old neonate on ventilator and answer the questions.

- pH : 7.30
- PaCO2 : 55 mmHg
- PaO2 : 85 mm Hg
- HCO3 : 31 mMol/L
- BE : +6.7

1. Interpret this blood gas
2. What change in bicarbonate you expect if there is rise in PaCO2 by 10 mm (process is chronic)?
3. What change in bicarbonate you expect if there is rise in PaCO2 by 10 mm (process is acute)?

BLOOD GASES QUESTION 4

A child with pneumonia on ventilator has following ABG report.

- pH : 7.29
- PCO2 : 60 mmHg
- PaO2 : 68 mmHg
- HCO3 : 30 mMol/L
- SpO2 : 92%

1. What is the acid base disorder?
2. Is it a simple disorder or mixed?
3. Is it a compensated disorder?

BLOOD GASES QUESTION 5

A patient being treated in the ICU has the following arterial blood gas report:

pH : 7.199
PCO2 : 38.4 mmHg
HCO3 : 12 mMol/L
PO2 : 86.6 mmHg
Na : 136 mEq/L
K : 4 mEq/L
Cl : 103 mEq/L

1. Describe the metabolic condition.
2. Calculate the expected CO2 level for the given HCO3 level.
3. Calculate anion gap.
4. Name two conditions with similar anion gap as above.

2.11 BLOOD GASES ANSWERS

BLOOD GASES ANSWER 1

1. Uncompensated metabolic acidosis; shock.
2. Fluid bolus.
3. 12 × 1.5 + 8 + 2 = 24-28 mmHg.

BLOOD GASES ANSWER 2

1. Uncompensated respiratory acidosis.
2. 80-100 mmHg.

BLOOD GASES ANSWER 3

1. Respiratory acidosis with partial metabolic compensation.
2. 3.5 mmol/L; HCO3 increases by 3.5 for each 10 mm Hg rise in PCO2.
3. 1 mmol/L; HCO3 increases by 1 for each 10 mm Hg rise in PCO2.

BLOOD GASES ANSWER 4

1. Respiratory acidosis.
2. Simple.
3. Uncompensated.

BLOOD GASES ANSWER 5

1. Mixed metabolic and respiratory acidosis.
2. Expected CO2 level for the given HCO3. = HCO3 × 1.5 + 8 ± 2 = 12 × 1.5 + 8 ± 2 = 24-28 mmHg.
3. Anion gap = (Na) – (Cl + HCO3) = 136-115 = 21.
4. Lactic acidosis (shock, severe anemia, hypoxemia), diabetic ketoacidosis, starvation, alcoholic ketoacidosis, renal failure, inborn errors of metabolism, poisoning with methanol, salicylate.

CHAPTER 3

CASE STUDIES

A 1½-year-old male child presented with episodes of on and off fast breathing for the past 5 months, occasionally associated with cough . He is also having high-grade intermittent fever for last 2 weeks. Empirical antitubercular treatment for past 3 months has had no benefit. There is a past history of chronic otitis media with perforation and the child has been taken to the dentist twice for loose teeth and swollen gums. On examination, seborrheic dermatitis, pallor and hepatomegaly (5 cm below costal margin) are the salient positive findings.

Questions

1. What is your most probable diagnosis?
2. What is the characteristic lesion found on skeletal survey?
3. What do you expect to find in the bone marrow?

3.1 DATA INTERPRETATION QUESTIONS

DATA INTERPRETATION QUESTION 1

History

Faris is a 7-week-old infant who presents to the A&E department with a 1-week history of non-bilious vomiting. His mother describes the vomit as 'shooting out'. He has a good appetite but has lost 300 g since he was last weighed a week earlier. He has mild constipation.

There is no vomiting in any other members of the family. His sister suffers from vesicoureteric reflux and urinary tract infections.

Examination

Faris is apyrexial and mildly dehydrated. His pulse is 170 beats/min, blood pressure 82/43 mmHg, and peripheral capillary refill 2 s. There is no organomegaly, masses or tenderness on abdominal examination. There are no signs in the other systems.

Investigations

Haemoglobin 11.7 g/dL
White cell count 10.0 × 109/L
Platelets 332 × 109/L
Sodium 134 mmol/L
Potassium 3.1 mmol/L
Chloride 81 mmol/L (98–106 mmol/L)
Urea 9.0 mmol/L (1.8–6.4 mmol/L)
Creatinine 60 µmol/L (18–35 µmol)
Capillary gas
pH 7.56 (7.36–7.44)
*P*CO2 6.0 kPa (4.0–6.5 kPa)

*P*O2 3.2 kPa (12–15 kPa)
HCO3 38 mmol/L (22–29 mmol/L)
Base excess +10
Urine dipstick No abnormality detected

Questions
1. What is the most likely diagnosis?
2. What is the differential diagnosis?
3. How would you confirm the diagnosis?
4. What is the treatment?

DATA INTERPRETATION QUESTION 2

History

Hind is a 6-year-old girl who presents to the A&E department where her mother states that Hind's urine has turned red. She has brought a jar of urine which contains what appears to be reddish-brown urine. She has no dysuria, frequency or abdominal pain and there is no history of trauma. She is otherwise well but she and the rest of the family have recently had colds. There have been no nosebleeds or abnormal bruising. She has had no problems with her joints. She had a urinary tract infection at the age of 4 years, but following a normal renal ultrasound she was discharged from clinic. She is on no medication. There is no family history of renal problems but her grandmother has hypertension.

Examination

There is no anaemia. She is apyrexial. There is no skin rash or bruising. There is no oedema of the legs. There are no abdominal signs or joint abnormalities. Blood pressure is 124/80 mmHg. There are no other signs.

Investigations

Haemoglobin 11.7 g/dL
White cell count 8.7 $\times 10^9$/L
Platelets 372 $\times$ 10^9/L
Sodium 137 mmol/L
Potassium 4.1 mmol/L
Urea 11.3 mmol/L (1.8–6.4 mmol/L)
Creatinine 145 mol/L (27–62 mol/L)
Alkaline phosphatase 372 U/L (145–420 U/L)
Bilirubin 16 mol/L (2–26 mol/L)
Alanine aminotransferase (ALT) 32 U/L (10–40 U/L)
Albumin 41 g/L (37–50 g/L)
Clotting Normal
Urine dipstick
Blood 4+
Protein 2+
Leucocytes 1+
Nitrites Nil
Microscopy – red blood cells and red blood cell casts seen

Questions
1. What further investigations should be performed?
2. What is the most likely diagnosis?
3. What is the treatment?

DATA INTERPRETATION QUESTION 3

History

Hasan is a 3-year-old boy who presents to the paediatric rapid referral clinic with a 2- day history of puffy eyes. His GP initially prescribed antihistamines but these have not helped. He is otherwise well. He has asthma, which is treated with budesonide

100 µg b.d. and salbutamol two to six puffs 4-hourly as necessary. He is on no other medication. His mother suffers from asthma and hay fever.

Examination

He looks well and is apyrexial. He has puffy eyes and pitting pedal oedema. Pulse is 112 beats/min, blood pressure is 103/70 mmHg and capillary refill is 2 s. There is no abdominal distension, tenderness or organomegaly. However, his scrotum appears oedematous. Respiratory rate is 28 breaths/min and there are no respiratory signs.

Investigations

Haemoglobin 15.2 g/dL
White cell count 11.7 × 10^9/L
Platelets 472 × 10^9/L
Sodium 142 mmol/L
Potassium 4.2 mmol/L
Urea 6.3 mmol/L (1.8–6.4 mmol/L)
Creatinine 59 µmol/L (27–62 µmol/L)
Alkaline phosphatase 372 U/L (145–420 U/L)
Bilirubin 18 µmol/L (2–26 µmol/L)
Alanine aminotransferase (ALT) 37 U/L (10–40 U/L)
Albumin 19 g/L (37–50 g/L)
Urine dipstick
Blood, 1+
Protein, 4+
Leucocytes, nil
Nitrites, nil

Questions

1. What is the diagnosis?
2. What other investigations should to be performed at presentation?
3. What is the treatment?
4. What are the complications of this condition?

DATA INTERPRETATION QUESTION 4

A male neonate aged 17 days was brought to the hospital with complaints of excessive urination. Clinically, the neonate appeared dehydrated, with 22% weight loss since birth. Observation and investigations in hospital revealed the following.

Investigations

Weight: 2.8 kg
Urine output: 479 ml/24 hours (>7 ml/kg/hour)
Serum Na: 156 mEq/L
Serum K: 4.2 mEq/L
BUN: 14 mg/dL
Serum glucose: 108 mg/dL
Urine osmolality: 97 mOsm/L
Administration of a hormonal preparation failed to produce decrease in the urine output or change in urinary or serum osmolality.

Questions

1. What is the diagnosis?
2. Give the formula for calculation of serum osmolality.
3. What is the serum osmolality in this case?
4. What is the treatment for this condition?

DATA INTERPRETATION QUESTION 5

You are evaluating an 8-month-old previously healthy infant who has a 3-day history of nonbilious vomiting, watery diarrhea, and decreased oral intake. He is sitting in his mother's lap and responds appropriately when you examine him. His heart rate is 120 beats/min, respiratory rate is 30 breaths/min, and blood pressure is 85/50 mm Hg, and he has palpable peripheral pulses.

A capillary blood gas on room air reveals

- ✓ pH = 7.22
- ✓ PaCO2 = 25 mm Hg
- ✓ bicarbonate (HCO3) = 10 mEq/L

Initial electrolyte values are:

- ➢ Sodium, 141 mEq/L
- ➢ Potassium, 4.0 mEq/L
- ➢ Chloride, 120 mEq/L
- ➢ Bicarbonate, 11 mEq/L
- ➢ Glucose, 100 mg/Dl

QUESTIONS

1. How much is the anion gap in this patient?
2. What is meant by anion gap?
3. What is the most likely cause of the infant's metabolic acidosis?
4. Mention 3 causes of increased anion gap acidosis in children.

DATA INTERPRETATION QUESTION 6

You are asked to see a 3 1/2-week-old girl because of jaundice. The infant was the 3,200-g product of a full-term, uncomplicated pregnancy and delivery. She has been exclusively breastfed since birth, and "mild" jaundice was noted at the time of hospital discharge. The mother states that the infant has been feeding well but is concerned that her daughter's "eyes are still yellow." Physical examination demonstrates a vigorous infant whose weight is 3,520 g. Her skin appears jaundiced and the sclerae are icteric. Physical examination findings are normal except for a smooth liver edge palpated 1 cm below the right costal margin, with a total percussible span of 4 cm. Laboratory tests demonstrate the following:

- Hemoglobin, 13.5 g/dL (135 g/L)
- White blood cells, 9,500/µL (9.5 x 109/L)
- Total bilirubin, 9.0 g/dL (153.9 µmol/L)
- Direct bilirubin, 4.2 mg/dL (71.8 µmol/L)
- Reticulocyte count, 1%
- Aspartate aminotransferase, 85 U/L; reference range, ≤40 U/L
- Alanine aminotransferase 125 U/L; reference range, ≤30 U/L

Questions

1. What is the most appropriate next test to order?
2. How you define direct hyperbilirubinemia?
3. What are the ultrasonic findings in extrahepatic biliary atresia?
4. When is the optimum time for surgical correction of extrahepatic biliary atresia?

DATA INTERPRETATION QUESTION 7

A 4-year-old boy is brought to your office for leg pain. Over the past month, he has been more irritable and frequently asks to be carried. He has also been taking longer naps. The mother reports that he had intermittent, low-grade fevers (up to 38.6°C) with no upper respiratory or gastrointestinal symptoms. In the office, his oral temperature is 37.7°C, pulse rate is 100 beats/min, respiratory rate is 22 breaths/min, and blood pressure is 90/60 mm Hg. On examination, the child is in no apparent distress. There are scattered petechiae on his face and neck. There is no swelling, warmth, or tenderness in his joints or deformity in his legs. He has no hepatosplenomegaly or lymphadenopathy. The remainder of the physical examination is normal. The following are the results of the child's complete blood cell count:

• White blood cell count, 3,200/µL (3.2 x 109/L), with 5% polymorphonuclear leukocytes, 88% lymphocytes, 5% monocytes, and 2% eosinophils; peripheral blood smear showed normal morphology
• Hemoglobin, 9.0 g/dL (90 g/L)
• Mean corpuscular volume, 90/µm3 (90 fL)
• Platelet count, 18 x 103/µL (18 x 109/L)

Questions
1. What is the most appropriate next step in management?
2. What is the cause of the leg pain?

DATA INTERPRETATION QUESTION 8

A 16-year-old boy is brought to the emergency department with a 1-day history of illness characterized by a diffuse, erythematous rash, nausea and vomiting, 3 loose stools, marked abdominal pain, and increasing confusion. A week ago, he cut his hand climbing a fence but did not seek medical attention.
Physical examination reveals a temperature of 39.2°C; heart rate of 130 beats/min; blood pressure of 80/50 mm Hg; respiratory rate of 24 breaths/min; diffuse erythematous, blanching rash; supple neck without significant adenopathy; and a laceration on the right hand with surrounding erythema and edema. Head, eyes, ears, nose, and throat examination reveal injected sclerae and inflamed lips and tongue. Lungs are clear to auscultation. Cardiac auscultation reveals tachycardia without murmur, rub, or gallop. Upon neurologic examination, the boy is sleepy and difficult to arouse. The laboratory test results are as follows:

• White blood cell count, 14,400/µL (14.4 x 109/L), with 80% neutrophils, 8% band neutrophils, and 12% lymphocytes

- Hemoglobin, 11.0 g/dL
- Hematocrit, 34.6% (0.34)
- Platelets, 86 x 103/µL
- Sodium, 132 mEq/L
- Potassium, 4.6 mEq/L
- Chloride, 106 mEq/L
- Bicarbonate, 16 mEq/L
- Blood urea nitrogen, 52 mg/dL
- Creatinine, 2.3 mg/dL
- Alanine aminotransferase, 128 U/L
- Aspartate aminotransferase, 211 U/L
- Total bilirubin, 2.2 mg/dL
- Direct bilirubin, 0.6 mg/dL

Questions

1. What is the most likely diagnosis?
2. What is the best initial therapy for this boy's condition?
3. What antimicrobial therapy you suggest?

DATA INTERPRETATION QUESTION 9

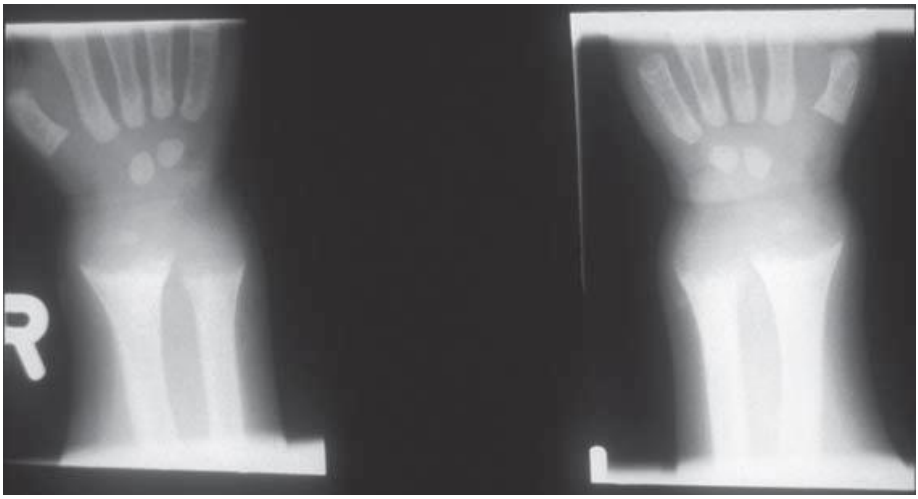
History

Tariq is a 2-year-old boy who presents to pediatric outpatients with bow legs and poor weight gain. He was breast-fed for the first year. His mother states that he currently has several bottles of cow's milk a day and that he has a poor appetite with a poor intake of solids. He has no gastrointestinal symptoms. His mother feels that he is not as active as other boys his age. There is no history of fractures. There is no family history of note.

Examination

He is pale, with a prominent forehead and a marked bow leg deformity. He has swollen wrists and ankles. There are no other

clinical signs. His height is on the 25th centile, and his weight is on the 2nd centile.



Tariq'swrist X-ray.

Investigations

Haemoglobin 9.8 g/dL
Mean cell volume 64 fL (70–86 fL)
Mean corpuscular haemoglobin 22 pg (24–30 pg)
White cell count 8.7 × 10^9/L
Platelets 572 × 10^9/L
Ferritin 4 ng/mL (15–200 ng/mL)
Haemoglobinopathy screen Normal
Sodium 137 mmol/L
Potassium 4.1 mmol/L
Urea 4.7 mmol/L (1.8–6.4 mmol/L)
Calcium 2.21 mmol/L (2.20–2.70 mmol/L)
Phosphorous 1.30 mmol/L (1.25–2.10 mmol/L)
Alkaline phosphatase (ALP) 1372 U/L (145–420 U/L)
Bilirubin 16 µmol/L (2–26 µmol/L)
Alanine aminotransferase (ALT) 32 U/L (10–40 U/L)

Questions

1. Name the two disorders that affect this child.
2. What is the treatment?

DATA INTERPRETATION QUESTION 10

An 18-month-old female presents with failure to thrive, polydipsia, and photophobia. Her weight is 8 kg and height is 70 cm (both <5th percentile). On physical examination, she appears pale and small for stated age, and she closes her eyes when you attempt to perform ophthalmoscopy.

She has tacky mucous membranes and capillary refill of 2 to 3 seconds. Pertinent findings on laboratory evaluation include:

- Sodium, 135 mEq/L
- Potassium, 2.3 mEq/L
- Chloride, 109 mEq/L
- Bicarbonate, 14 mEq/L
- Blood urea nitrogen, 15 mg/dL
- Creatinine, 0.3 mg/dL
- Calcium, 8.4 mg/dL
- Phosphorus, 2.1 mg/dL
- Magnesium, 1.4 mg/dL
- Hemoglobin, 10.5 g/D

Glucose, 102 mg/dL

1. Mention the abnormal laboratory findings in this case.
2. What is the most likely diagnosis?
3. What is the best clinical test to establish the diagnosis?

3.1 DATA INTERPRETATION ANSWERS

DATA INTERPRETATION ANSWER 1

1. Pyloric stenosis.
2. Differential diagnosis
• Gastro-oesophageal reflux
• Gastritis
• Urinary tract infection
• Overfeeding
3. The diagnosis could be clinically confirmed by carrying out a test feed. A feed leads to peristalsis which occurs from left to right. The abdominal wall is usually relaxed during a feed, making palpation easier. A pyloric mass, which is the size of a 2-cm olive, may be felt in the right hypochodrium by careful palpation. An ultrasound is also usually done for further confirmation.
4. Initial treatment consists of treating the dehydration, acid–base and electrolyte abnormalities with intravenous fluids (0.9 per cent saline with 5 per cent dextrose and added KCl would be the appropriate starting fluid in this infant with a low sodium and potassium). Feeds should be stopped, a nasogastric tube inserted and the stomach emptied. The definitive operation is Ramstedt's pyloromyotomy.

DATA INTERPRETATION ANSWER 2

1. The following investigations should be performed:
• Throat swab

• Anti-streptolysin O titre (ASOT), C3 and C4 – ASOT is raised and C3 is reduced in post-streptococcal glomerulonephritis
• ESR and ANA – will be abnormal in vasculitides, e.g. SLE
• Abdominal X-ray and renal US – will demonstrate normality of kidneys and help exclude calculi.
2. The most likely diagnosis is a post-streptococcal glomerulonephritis.
3. Treatment is primarily symptomatic. A 10-day course of oral penicillin should be given but this will not alter the natural history of the glomerulonephritis.
Fluids should be restricted to 1 L/day and the diet should have no added salt.
Frusemide is helpful in cases of hypertension or oedema and will increase urine output. If hypertension persists, a calcium channel blocker such as amlodipine may be helpful.
If heavy proteinuria develops or if renal function deteriorates, a renal opinion should be sought. Indications for dialysis include life-threatening hyperkalaemia and the clinical manifestations of uraemia.

DATA INTERPRETATION ANSWER 3

1. The diagnosis is nephrotic syndrome.
2. The following investigations should be done:
• Blood
- Cholesterol and triglyceride levels (elevated in nephrotic syndrome)
- Anti-streptolysin O titre (ASOT) and C3/C4 levels to investigate the possibility of post-streptococcal disease
- Antinuclear antibody (ANA), which may be positive in vasculitides such as SLE
- Blood culture if febrile

• Urine – microscopy and culture, spot urine protein/creatinine ratio (will be >2 in nephrotic syndrome).

3. Treatment consists of prednisolone 60 mg/m2 (maximum daily dose 60 mg) given as a single morning dose for 4 weeks followed by (if in remission, defined as urine dipstick negative or trace for protein on three consecutive days) a prolonged reducing regime. Because of the increased risk of bacterial infections (due to urinary losses of immunoglobulins, immunosuppressive therapy and other factors), most paediatricians administer prophylactic penicillin until the patient is in remission.

Fluid balance is very important. Our patient does not have hypovolaemia, but this should always be assessed, especially if the albumin is very low or if there is vomiting or diarrhoea. Four-hourly observations, including blood pressure, should be done, weight should be assessed once or twice daily, an input/output chart should be kept, and children should be on a low-salt diet.

4. There are several potential complications. Hypovolaemia may present with non-specific symptoms, such as abdominal pain and vomiting. The haematocrit will be >0.45. It can be treated with 0.9 per cent sodium chloride or 4.5 per cent human albumin 10–20 mL/kg intravenously over 1 hour. Bacterial sepsis is a further important complication.

Bacterial peritonitis is the commonest type of infection and *Streptococcus pneumoniae* is the most common organism, but other infections and organisms may also be involved. There is also a risk (2–5 per cent) of thromboembolic events due to hyperviscosity.

These may be venous (e.g. renal vein thrombosis) or arterial (e.g. pulmonary embolus).

Approximately 70 per cent of patients relapse (≥2+ proteinuria for three consecutive days or proteinuria with oedema).

DATA INTERPRETATION ANSWER 4

1. Nephrogenic diabetes insipidus.
2. (2 × Na) + (BUN mg/dl/2.8) + (glucose mg/dl/18)
3. 312 + 5 + 6 = 323 mosmol/L.
4. Hydrochlorthiazide, amiloride, indomethacin, potassium supplementation.

DATA INTERPRETATION ANSWER 5

1. The anion gap is the difference between routinely measured cations and anions in the blood and is estimated by using the following equation: sodium [Na+]-chloride [Cl-]-[HCO3-]. The anion gap for the child described in the vignette is 141-120-11=10.
2. Anion gap reflects unmeasured anions such as proteins, sulfates, phosphates, and organic acids.
3. Gastrointestinal loss of bicarbonate.
4. Common causes of increased anion gap acidosis in children include ketoacidosis, as seen in diabetes mellitus or starvation; lactic acidosis, as seen in septic shock or with inborn errors of metabolism; and renal failure.

DATA INTERPRETATION ANSWER 6

1. The initial step in this evaluation should be to image the biliary tract by means of an abdominal ultrasound examination.
2. Direct hyperbilirubinemia is defined by a serum direct bilirubin concentration of more than 1.0 mg/dL (17.1 µmol/L) with a total bilirubin values of less than 5.0 mg/dL (85.5 µmol/L) or greater than 20% of the total bilirubin for values greater than 5.0 mg/dL (85.5 µmol/L).

3. Nonvisualization of the gall bladder and common bile duct; presence of a "triangular cord sign"
4. The best outcomes resulting when surgical correction (portoenterostomy) is performed between 30 and 45 days of age.

DATA INTERPRETATION ANSWER 7

1. Obtain bone marrow studies.
2. Leukemic cell expansion in the bone marrow can produce severe bone pain, which is reported in 25% of patients with newly diagnosed leukemia.

DATA INTERPRETATION ANSWER 8

1. Toxic shock syndrome (TSS).
2. Fluid resuscitation to maintain venous return and cardiac filling is the most important initial step in the treatment of the patient with TSS.
3. Antimicrobial therapy to cover Staphylococcus aureus, including community-acquired methicillin-resistant strains (CA-MRSA) and group A Streptococcus would be an important part of the initial management. Of the choices listed, vancomycin provides the best coverage for these organisms. In serious infections such as this, addition of clindamycin or nafcillin or oxacillin might be warranted.

ANSWER 9

1. Rickets and iron deficiency anemia.
2. Treatment consists of 600000 I U vit D divided within 24 hour. Bone chemistry should be measured 2 weeks after starting treatment and regularly thereafter to avoid hypercalcaemia and to

ensure that the biochemical and haematological parameters normalize.
This should be followed by maintenance doses of vitamin D for the long term.
The prognosis for complete resolution of the deformities is good. In cases where the serum calcium is low, calcium is also given initially until levels normalize.
There is often accompanying iron deficiency anaemia, as in this case. Red meat and green vegetables are good sources of iron and some foods, such as cereals, are often fortified with iron. The anemia should be treated with a 3-month course of oral iron.

DATA INTERPRETATION ANSWER 10

1. Hypokalemia, metabolic acidosis, and hypophosphatemia.
2. Fanconi syndrome (nephropathic cystinosis).
3. Ophthalmologic examination reveals cystine accumulation within the cornea results in intense photophobia.

3.2 EMERGENCY QUESTIONS

EMERGENCY QUESTION 1

History

Salma is a 4-year-old child who presents to the ED with a sudden onset of noisy breathing. She has had a runny nose for 2 days, a cough for 1 day and developed noisy breathing 3 hours earlier. Her mother feels that she is getting progressively more breathless. Her father had a cold the previous week.

She is otherwise well but has troublesome eczema which is treated with emulsifiers and steroid creams. Her mother states that she is allergic to peanuts.

She is fully immunized. Her 8-year-old sister has asthma.

Examination

Oxygen saturation is 89 percent in air. Her temperature is 38^0C. There is loud noisy breathing, mainly on inspiration. Her respiratory rate is 52/min with supracostal and intercostals recession.

On auscultation, there are no crackles or wheezes. There are no other signs.

Questions

1. What is the most likely diagnosis?
2. What is the differential diagnosis?
3. What is the treatment?

EMERGENCY QUESTION 2

History

Mohammed is a 3-month-old boy seen by his GP. He developed a runny nose and bit of a cough 2 days ago but has become

progressively more chesty and has now gone off his feeds and is having far fewer wet nappies. He has two older siblings who also have colds. He was born at 34 weeks' gestation but had no significant neonatal problems and went home at 2 weeks of age. Both parents smoke but not in the house. His mother had asthma as a child.

Examination

Mohammed is miserable but alert. His airway is clear. He is febrile (37.8^0C) and has copious clear nasal secretions and a dry wheezy cough. His respiratory rate is 56 breaths/min with tracheal tug and intercostal and subcostal recession. On auscultation, there are widespread fine crackles and expiratory wheeze. The remainder of the examination is unremarkable.

Questions

1. What is the most likely diagnosis?
2. What is the commonest causative organism?
3. What are the indications for referral to hospital?
4. What is the management in hospital?

EMERGENCY QUESTION 3

History

Mustafa is a 13-year-old boy who is seen in the A&E department at the request of the GP. He is a known asthmatic and this is his third attendance with an acute wheeze in 3 months. His mother reports that last time he was nearly transferred to the paediatric intensive care unit (PICU).

He has developed a cold and become acutely breathless and is using his salbutamol inhaler hourly without much relief. The accompanying letter says that he is prescribed a beclometasone metered dose inhaler (MDI) 100 µg/metered inhalation 2 puffs

b.d., salmeterol MDI 50 µg/metered inhalation 1 puff b.d. and salbutamol MDI 100 µg/metered inhalation p.r.n.

Examination

Mustafa is sitting up in bed with a nebulizer in progress containing 5 mg salbutamol. His oxygen saturation on 15 L of oxygen on arrival is documented as 89 per cent.

He is quiet but able to answer questions with short sentences. His chest is hyperinflated (increased anteroposterior diameter) and he is using his accessory muscles of respiration. His respiratory rate is 60 breaths/min and he has marked tracheal tug with intercostal and subcostal recession.

On auscultation there is equal but poor air entry with widespread expiratory wheeze. His temperature is 37.6^0C. His pulse is 180 beats/min with good perfusion.

Questions

1. What is the most likely underlying cause for this acute episode?
2. What signs would you look for of impending respiratory failure?
3. Outline your management plan for this acute episode
4. What should happen before he is discharged?

EMERGENCY QUESTION 4

History

Zaid is 3 days old. He is brought by ambulance to the resuscitation room in A&E. He was found in his cot this morning looking mottled and breathing very fast. He had been well until yesterday when he did not feed as well as usual.

He was born at 39 weeks' gestation by normal vaginal delivery in a midwife-led birthing unit and was discharged home the same day. There was no prolonged rupture of membranes and he did not

require any resuscitation at birth. He has been exclusively breast-fed. He did not receive vitamin K due to parental objection.

Examination

Zaid is grunting and has a respiratory rate of 70/min with subcostal, intercostals and sternal recession. His lung fields sound clear. Oxygen saturation monitoring does not pick up a trace. He looks mottled, cyanosed peripherally and his limbs feel cold. Capillary refill time is 5 s, heart rate is 180/min, blood pressure is unrecordable, and the femoral pulses cannot be felt. The heart sounds are unremarkable. The liver edge is palpable 3 cm below the costal margin and his temperature is 35.0^{0}C.

Investigations

		Normal
Arterial blood gas		
pH	7.01	7.35–7.42
PaCO2	5.3. kPa	4.7–6.0 kPa
PaO2	8.1 kPa	9.3–13.3 kPa
HCO3	10 mmol/L	18–20 mmol/L
Base excess	–18	+2.5 to–2.5 mmol/L
Glucose	3.8 mmol/L	3.3–5.5 mmol/L

Questions

1. What is the interpretation of the blood gas result?
2. What is the most likely diagnosis and what is the differential?
3. What is the initial management of a collapsed neonate?

EMERGENCY QUESTION 5

You are moonlighting in a rural emergency room when a father rushes his 3-year-old daughter into the waiting area. You quickly determine that he and the child have been at a relative's farm

where they were spraying for bugs in an old barn. The child had been fine, but while at the farm developed abdominal cramping, cough, drooling, and tearing.
While in route the child seems to be having increased respiratory difficulty, and the dad notes she soiled and urinated upon herself.

Questions

1. What is the most likely diagnosis?
2. How is the diagnosis made?
3. What is the best therapy?

EMERGENCY QUESTION 6

A 21-day-old male infant of consanguineous parents was referred by his GP with collapse, vomiting and dehydration. He had no relevant antenatal history, and had been born normally at term and breast fed.
There were no dysmorphic features, and he was estimated to be 10--15% dehydrated clinically. The infant was apyrexial, and there was no rash. His capillary refill time was 8 seconds.
Initial tests reveal the following:
Na+ 116mmol/l,
K+ 7.9mmol/l,
Urea 18mmol/l,
Chloride 85mmol/l,
pH 7.08,
pCO2 4.7,
BE _15,
Glucose 1.2mmol/l.

Questions

1. What is the most probable diagnosis? What are the two diagnostic tests of choice?
2. Outline the initial management of this infant.
3. What are essential additional investigations that need to be performed?
4. What are the main cornerstones of ongoing treatment for this important condition?

EMERGENCY QUESTION 7

A 3-week-old boy was admitted with pyrexia, irritability, poor feeding and a high pitched cry. He had been born by spontaneous vaginal delivery at 41 weeks gestation, weighing 3.6 kg.

On examination his temperature was 38.8°C, there were two small pustules on the chest; he disliked any handling and showed neck retraction. He was tachycardic but well perfused.

Investigation results included:

CSF microscopy
220 RBC/mm3
80 WBC/mm3
No organisms
The white cells were 90% lymphocytes.
CSF glucose 3.2 mmol/l
CSF protein 1.2 g/l
Blood glucose 4.4 mmol/l

Six hours after admission he started to have focal, right-sided seizures.

Questions

1. What diagnoses should be considered?
2. What treatment should be commenced?
3. What is the prognosis?

EMERGENCY QUESTION 8

A 4-year-old boy presents with new-onset type 1 diabetes mellitus and diabetic ketoacidosis. He appears tired but, on physical examination, shows only mild signs of dehydration. Initial laboratory tests reveal the following results:

- Serum glucose, 884 mg/dL
- Serum sodium, 131 mEq/L
- Serum potassium, 4.5 mEq/L
- pH, 6.92 on arterial blood gas

Questions

1. What is the most important first step in managing this patient?
2. When you should start insulin therapy?
3. Is there any indication for intravenous sodium bicarbonate in this patient?
4. What are the adverse effects of sodium bicarbonate therapy?

EMERGENCY QUESTION 9

You are called by the normal nursery because an infant has failed the congenital heart disease screening testing performed 3 days after birth. On room air, the oxygen saturation value on the right hand (preductal) is 93% and the oxygen saturation value on the right foot (postductal) is 85%. Vital signs include a temperature of 37°C, heart rate of 150 beats/ min, and respiratory rate of 70 breaths/min. The blood pressure readings are 70/40 mm Hg in the right arm and 55/30 mm Hg in the right leg. Examination reveals a soft 1/6 systolic murmur at the left lower sternal border, clear lungs, weak femoral pulses bilaterally, and a capillary refill of 4 to 5 seconds in the lower extremities. Arterial blood gas includes a pH

of 7.25, PCO2 of 39 mm Hg, PO2 of 45 mm Hg, bicarbonate of 17 mEq/L, and base deficit of -9.

Questions

1. What is the most appropriate next step in this infant's management?
2. Name the critical congenital heart disease.
3. What are the congenital heart diseases that can be screened by pulse oximetry before being discharged from the hospital?

EMERGENCY QUESTION 10

History

Ali is a 4-year-old boy who is admitted to the paediatric ward with pneumonia. This is his fourth hospital admission. In the first year of life, he was admitted twice with bronchiolitis, requiring several days on oxygen, and about 6 months ago he was admitted with pneumonia, again requiring oxygen and intravenous antibiotics. He has had many courses of oral antibiotics over the last few years from his GP for chest infections.

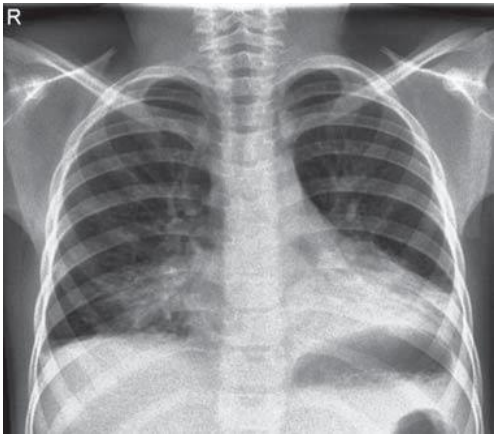
He also has recurrent abdominal pain and his parents report large offensive stools. His parents both smoke 20–30 cigarettes/day. He is unimmunized as his parents are worried about potential side-effects.

Examination

He is small (height ninth centile, weight second centile), pale-looking, miserable and very clingy to his mother. He has finger clubbing. His temperature is 38.7^{0}C, respiratory rate 40 breaths/min, heart rate 140 beats/min and oxygen saturation 89 per cent in air (95 per cent in facemask oxygen). There is reduced air entry at the left base with bronchial breath sounds in the left midzone, and coarse crackles are heard on both sides of the chest.

Cardiovascular examination is unremarkable. His abdomen is mildly distended but non-tender.

INVESTIGATIONS	**Normal**
Haemoglobin 10.1 g/dL	11.0–13.8 g/dL
White cell count 19.7 × 109/L	6–17 ×109/L
Platelets 401 × 109/L	210–490 ×109/L
Immunoglobulin G 10.2 g/L	5.0–15.0 g/L
Immunoglobulin A 2.5 g/L	0.3–3.0 g/L
Immunoglobulin M 1.8 g/L	0.4–2.0 g/L



Questions

1. What does the chest radiograph show?
2. What is the likely underlying diagnosis?
3. What investigation would you do to confirm the diagnosis?
4. What are the other manifestations of this disease?

EMERGENCY QUESTION 11

History

Salem is a 3-year-old boy referred to the paediatric unit.

He was seen 4 days ago with a cough and fever and diagnosed with a viral upper respiratory tract infection (URTI). The following day he returned and was commenced on oral antibiotics.

He is now complaining of tummy ache and has vomited once.

The GP is worried that he is becoming dehydrated and may have a urinary tract infection or intra-abdominal pathology. He has not been immunized but there is no other medical history of note.

Examination

Salem is miserable, flushed, toxic and febrile (38.8^0C) with a capillary refill time of 2 s. His pulse is 140 beats/min, his oxygen saturation is 91 per cent in air and his blood pressure is 85/60 mmHg. He seems to be in pain, especially when he coughs, and his respiratory rate is 48 breaths/min with nasal flaring. There is dullness to percussion in the right lower zone posteriorly with decreased breath sounds and bronchial breathing. He seems reluctant to have his abdomen examined but bowel sounds are normal.

INVESTIGATIONS

Haemoglobin 11.8 g/dL

White cell count 25.4 × 10^9/L

Neutrophils 20.8 × 10^9/L

Platelets 467 × 10^9

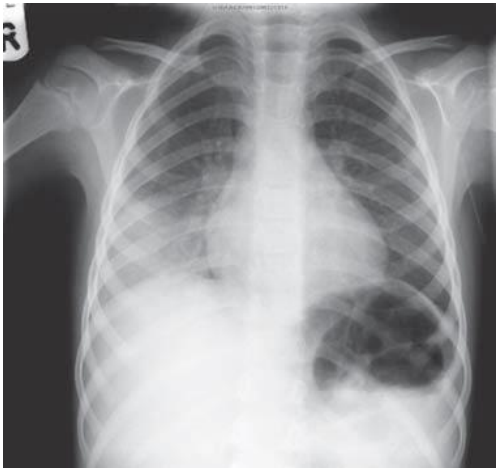
Sodium 126 mmol/L

Potassium 3.5 mmol/L

Urea 20 mg /dL

Glucose 75 mg/dL

C-reactive protein 387 mg/L



Questions

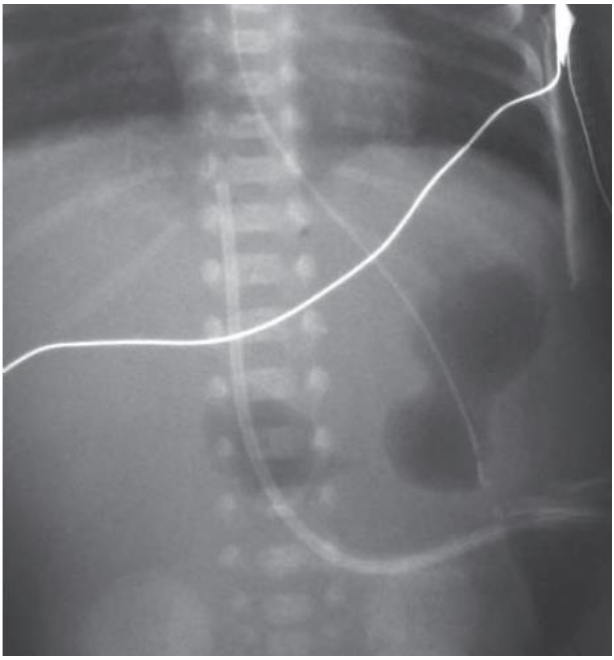
1. What are the chest X-ray findings?
2. What is the most likely causative organism?
3. What complication may have arisen and how would you confirm it?
4. List the steps in management.

EMERGENCY QUESTION 12

A baby born at 24 weeks gestation is 2 weeks old. He has been stable on low ventilation pressures but has not tolerated CPAP. Attempts have been made to start nasogastric feeds on several occasions but he does not appear to tolerate them as there are reasonable volume gastric aspirates on most occasions.

Over the last 48 hours the aspirates have become increasingly bilious and an abdominal X-ray is taken.

1. Describe the X-ray abnormalities.
2. What is the diagnosis?
3. What is this diagnosis commonly associated with?
4. What is your immediate management plan?
5. What is the likely outcome for this baby?



3.2 EMERGENCY ANSWERS

EMERGENCY ANSWER 1

1. The most likely diagnosis is laryngotracheobronchitis (croup).
2. Differential diagnosis of acute stridor
- Laryngotracheobronchitis
- Inhaled foreign body
- Anaphylaxis
- Epiglottitis
- Rare causes include:
  - Bacterial tracheitis
  - Severe tonsillitis with very large tonsils
  - Inhalation of hot gases (e.g. house fire)
  - Retropharyngeal abscess

3. Initial management deals with the ABC. As the oxygen saturation is low, high-flow 100 per cent oxygen will be needed to elevate the saturation to ≥95 per cent.
The first step in the treatment of croup is oral dexamethasone.
A less frequently used alternative is nebulized budesonide. If 2–3 hours later the child has improved and the oxygen saturation is ≥95 per cent in air, the child can be discharged.
In some cases a further dose of steroids can be administered 12–24 hours later.
If the child deteriorates then nebulized adrenaline can be administered. If adrenaline is required then senior help and an anaesthetist should be summoned urgently.
If the child deteriorates further (increasing tachypnoea, recession and exhaustion) then intubation and ventilation are required to secure the airway and to prevent hypoxia and its sequelae.
If intubation is unsuccessful, an ENT surgeon will be required to perform an emergency tracheostomy.

EMERGENCY ANSWER 2

1. Acute bronchiolitis.
2. The commonest causative organism is respiratory syncytial virus (RSV).
3. Indications for hospital referral
• Apnoeic episodes (commonest in babies <2 months and may be the presenting feature)
• Intake <50 per cent of normal in preceding 24 hours
• Cyanosis
• Severe respiratory distress – grunting, nasal flaring, severe recession, respiratory rate >70/min
• Congenital heart disease, pre-existing lung disease or immunodeficiency
• Significant hypotonia, e.g. trisomy 21 – less likely to cope with respiratory compromise
• Survivor of extreme prematurity
• Social factors
4. Management is supportive. Investigations are rarely indicated.
A chest X-ray is only needed if the clinical course is unusual.
Blood tests are only required if there is diagnostic uncertainty, e.g. if the infant has a temperature ≥39^{0}C and a superadded bacterial respiratory infection is suspected.
Oxygen saturations should be kept at ≥92 per cent and the infant should be nasogastrically fed if they cannot maintain >50 per cent of normal intake. Intravenous fluids are used in severe cases. All fluids are restricted to two-thirds of maintenance. Nasal and oral suction is helpful.
There is no evidence that bronchodilators, oral or inhaled steroids modify the clinical course or any important outcomes such as the need for ventilation or the length of stay.
A capillary blood gas should be checked if the infant is deteriorating. Every season a small proportion of infants need high-

dependency or intensive care – most respond well to continuous positive airways pressure (CPAP), avoiding the need for intubation. Babies are discharged when they are well enough to continue recovering at home but many continue to cough and wheeze for weeks and get similar symptoms with subsequent upper respiratory tract infections.

Response to conventional asthma treatment is variable. Leukotriene antagonists may have a role. Exposure to tobacco smoke must be avoided.

EMERGENCY ANSWER 3

1. Acute exacerbation of asthma. The most likely underlying cause is poor adherence to home treatment.
2. Signs of impending respiratory failure
- Exhaustion (this is a clinical impression)
- Unable to speak or complete sentences
- Colour – cyanosis ± pallor
- Hypoxia despite high-flow humidified oxygen
- Restlessness and agitation are signs of hypoxia, especially in small children
- Silent chest – so little air entry that no wheeze is audible
- Tachycardia
- Drowsiness
- Peak expiratory flow rate (PEFR) persistently <30 per cent of predicted for height or personal best. Children < 7 years cannot perform PEFR reliably and technique in sick children is often poor.

3. Acute management goals are to correct hypoxia, reverse airway obstruction and prevent progression.

Give high-flow oxygen via mask and monitor saturations.

Start a regular inhaled β-agonist (e.g. salbutamol) via a nebulizer. Beta-agonists can be given continuously.

If so, cardiac monitoring is needed as side-effects include irritability, tremor, tachycardia and hypokalaemia.
Inhaled ipratropium bromide can be added.
Give oral prednisolone or intravenous (IV) hydrocortisone.
Frequent clinical review is paramount.
Blood gases (capillary or venous) and a chest X-ray may be required.
If there is no improvement or the child deteriorates, additional treatment is needed. These include IV salbutamol, IV magnesium sulphate (a smooth muscle relaxant) and IV aminophylline, although the effectiveness of the latter two is still controversial.
His precipitating 'cold' is almost certainly viral and antibiotics are unlikely to be beneficial.
4. Before discharge a thorough review of his asthma is needed:
• How often does he miss his regular drugs?
• Is there parental supervision?
• What device does he use? Children rarely use MDIs effectively and need a spacer.
• Consider changing to a combined steroid/long-acting β-agonist inhaler.
• Ask about smoking – him and his family. Adults should be encouraged to stop smoking or to smoke outside.
• Educate about allergen avoidance, e.g. daily vacuuming to reduce house dust mites.
Consider measuring total IgE and specific allergen IgE (RAST) if the history suggests allergies.
• All asthmatics should have a written home management plan.
• Provide an asthma symptom diary and arrange hospital follow-up until control improves.

EMERGENCY ANSWER 4

1. The pH is 7.01, which is a severe acidosis. The *P*aCO2 is normal, so the acidosis is not respiratory in origin. The low bicarbonate and large negative base excess indicate that this is a metabolic acidosis. There is also a degree of hypoxaemia.
2. This is most likely to be a case of cardiogenic shock due to a congenital left heart obstructive lesion. The clues are in the age of the baby and the absence of the femoral pulses.
Zaid actually had hypoplastic left heart syndrome (HLHS).
Congenital cardiac lesions presenting with neonatal collapse
• Severe aortic coarctation
• Aortic arch interruption
• Hypoplastic left heart syndrome
• Critical aortic stenosis
Differential diagnosis of a collapsed neonate
• Infection – e.g. group B *Streptococcus*, herpes simplex
• Cardiogenic – e.g. hypoplastic left heart syndrome, supraventricular tachycardia
• Hypovolaemic – e.g. dehydration, bleeding
• Neurogenic – e.g. meningitis, subdural haematoma ('shaken baby')
• Lung disorder – e.g. congenital diaphragmatic hernia (late presentation)
• Metabolic – e.g. propionic acidaemia, methylmalonic acidaemia
• Endocrine – e.g. panhypopituitarism
3. In any collapsed neonate, it is essential to adopt a standard approach to resuscitation.
The airway should be maintained, high-flow oxygen, intravenous access obtained and fluid resuscitation should be given for the shock. Blood glucose measurement must be checked early and corrected if low. A blood gas sample should be analysed.

Intravenous antibiotics should be given promptly as sepsis is a possible treatable cause. If there is any suspicion of a duct-dependent cardiac lesion, a prostaglandin infusion should be commenced, as this is life-saving. Early involvement of senior paediatricians, an anaesthetic team and paediatric intensive care services will help appropriate management.

EMERGENCY ANSWER 5

1. Most likely diagnosis: Organophosphate poisoning.
2. Making the diagnosis: High index of suspicion so therapy is not delayed; confirmation via decreased serum pseudocholinesterase and erythrocyte cholinesterase levels.
3. Best therapy: Decontamination of the child, supportive care, administration of atropine or pralidoxime

EMERGENCY ANSWER 6

1. The most likely diagnosis is a salt-losing crisis caused by congenital adrenal hyperplasia (CAH). The key diagnostic tests are serum17 hydroxyprogesterone (17-OHP) and urinary metabolites of 17-OHP.
It will be necessary to check that the child is male (and not a virilized female) by ultrasound of the genitalia and by karyotyping.
2. This infant has hypovolaemic shock, as supported by the prolonged capillary refill time. You must therefore stabilize ABC and thus gain intravenous access, and give 20ml/kg normal saline followed by a dextrose bolus and infusion. Broad-spectrum intravenous antibiotics must be given, and intravenous hydrocortisone is life-saving.

3. The infant needs to be admitted to hospital and will need close attention. Essential further investigations include a full blood count and film, C reactive peptide, blood and urine cultures.
Urinary electrolytes will be helpful in this case (a high sodium level will be noted).
4. Treatment cornerstones include the following:
* Glucocorticoid replacement -- hydrocortisone is the usual choice in children.
* Mineralocorticoid replacement -- if there is salt wasting, salt supplements (about 6--8mmol/kg/day) and fludrocortisone are the usual treatment regimen.
* Other -- it is important to mention that these children and their parents will require psychological counselling.
Surgery is occasionally used for genital anomalies.

EMERGENCY ANSWER 7

1. Viral encephalitis, bacterial meningitis, sepsis elsewhere.
2. Intravenous acyclovir and antibiotics. Anticonvulsants for seizure control, e.g. phenobarbitone. The CSF findings are more suggestive of viral infection but antibiotics should be continued until cultures are negative. The vesicle fluid can be examined by electron microscopy for herpes virus particles, which was positive in this case.
Neonatal herpes simplex infection may occur in disseminated form, localized (skin, eye, mouth) or with an encephalitis. It is usually caused by HSV type 2. In 50% of cases of herpes simplex encephalitis no vesicles appear.
3. Neonatal herpes encephalitis has a mortality of 15% and a high risk of long-term neurological sequelae (> 50%).

EMERGENCY ANSWER 8

1. Normal saline, 10 to 20 mL/kg over 1 to 2 hours.
2. All guidelines recommend starting insulin therapy 1 to 2 hours after fluid resuscitation has begun.
3. No
4. Adverse effects of sodium bicarbonate therapy, including paradoxical central nervous system acidosis, hypokalemia, and an increased risk of cerebral edema.

EMERGENCY ANSWER 9

1. Initiation of prostaglandin El (PGE1).
2. Critical congenital heart disease (CCHD) refers to cardiac defects that require treatment in the neonatal period. Transposition of the great arteries, coarctation of the aorta, interrupted aortic arch, and hypoplastic left heart syndrome are types of CCHD that depend on the patency of the ductus arteriosus and pose a unique diagnostic challenge for the clinician.
3. Seven forms of CCHD are identified as the primary targets of the screening, including hypoplastic left heart syndrome, pulmonary atresia, transposition of the great vessels, truncus arteriosus, tricuspid atresia, tetralogy of Fallot, and total anomalous pulmonary venous return.

EMERGENCY ANSWER 10

1. The chest radiograph shows consolidation with some collapse of the left lower lobe and further consolidation in the right middle lobe. There are small bilateral pleural effusions.

2. These features are consistent with the clinical diagnosis of pneumonia. The combination of clubbing and recurrent chest infections is strongly suggestive of cystic fibrosis (CF).
3. Diagnosis can be made by the sweat test, which will demonstrate elevated sweat sodium and chloride concentrations, and by genetic testing.
4. Presentations of cystic fibrosis

Neonatal

- Meconium ileus
- Intestinal atresia
- Hepatitis/prolonged jaundice

Infant

- Rectal prolapse (may be recurrent)
- Failure to thrive
- Malabsorption and vitamin deficiency (A, D, E, K)

Older children

- Recurrent chest infections
- 'Difficult' asthma
- Haemoptysis
- Nasal polyps
- Distal intestinal obstruction syndrome
- Liver disease
- Diabetes mellitus

EMERGENCY ANSWER 11

1. The chest X-ray shows loss of the right hemidiaphragm, right lower zone consolidation and a normal right heart border – the characteristic features of right lower lobe pneumonia.

2. The most likely causative organism is *Streptococcus pneumoniae*.

3. Salem has hyponatraemia. There are no pointers to excess sodium loss (e.g. diarrhoea or significant vomiting) and hence the most likely cause is the syndrome of inappropriate antidiuretic hormone secretion (SIADH), a known association with pneumonia. The hyponatraemia is dilutional. First, the result should be confirmed – taking blood from children can be difficult and unexpected results should be repeated. At the same time, urine should be sent for osmolality and sodium.
His serum osmolality is calculated as follows:
2 × ([Na] + [K]) + [urea] + [glucose] = 266 mosmol/kg (normal 278–305)
Normally a fall in serum osmolality would suppress antidiuretic hormone secretion to allow excretion of excess water as dilute urine.
4. Steps in management
• Oxygen to maintain saturation at >92 per cent
• Adequate pain relief for pleuritic pain
• Intravenous antibiotics according to local guidelines, e.g. co-amoxiclav
• Initial fluid restriction to two-thirds maintenance to help correct the hyponatraemia. Fluid restrict even if no hyponatraemia, as SIADH may still develop
• Fluid balance, regular urea and electrolytes – adjust fluids accordingly. Weigh twice daily
• Physiotherapy, e.g. bubble blowing. Encourage mobility
• Monitor for development of a pleural effusion. If the chest X-ray is suspicious, an ultrasound will be diagnostic. If present, a longer course of antibiotics is recommended to prevent empyema (a purulent pleural effusion). A chest drain may be necessary if there is worsening respiratory distress, mediastinal shift on the chest X-ray, a large effusion or failure to respond to adequate antibiotics

• Ensure adequate nutrition – children have often been anorectic for several days. Low threshold for supplementary feeds probably via nasogastric tube
• Organise immunization programme before discharge
• Arrange a follow-up chest X-ray in 6–8 weeks for those with lobar collapse and/ or an effusion. If still abnormal, consider an inhaled foreign body

EMERGENCY ANSWER 12

1. There is a ‘double bubble ’ with a dilated stomach and duodenum.
2. Duodenal atresia.
3. Additional problems may be Down syndrome, cardiac abnormalities and malrotation.
4. A large-bore nasogastric tube must be inserted and left on free drainage; electrolyte and blood gas anomalies must be corrected.
5. Isolated duodenal atresia can be successfully corrected by surgery although experience at such early gestation is very limited. Other anomalies such as cardiac defects (which are much commoner with duodenal atresia) will affect the prognosis.

3.3 MISCELLANEOUS QUESTIONS

MISCELLANEOUS QUESTION 1

History

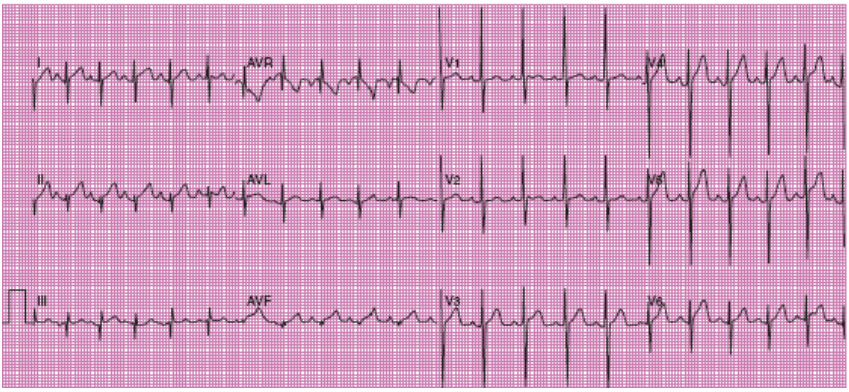
Huda is a 3-year-old girl referred to outpatients by her GP, who heard a murmur when she presented to him with a fever and a cough. Looking through her notes, the murmur was not heard at her 6-week check and she has only been seen twice since, with minor infections.

He brought her back a week later to listen again, the murmur was still present and he has referred her on. She is otherwise entirely healthy with no significant past medical or family history.

Examination

Huda looks generally healthy and her height and weight are on the 75th centiles. She is not clinically anemic, jaundiced or cyanosed. Her pulse is 88/min and her blood pressure 90/50 mmHg. She has normal femoral pulses.

Examination of the praecordium shows no thrills but there is a heave at the lower left sternal border. The apex beat is in the fifth intercostals space in the mid-clavicular line. Both heart sounds are present but the pulmonary component of the second sound is quiet. There is a click immediately after the first heart sound and an ejection systolic murmur which is heard loudest in the pulmonary area. This radiates into both lung fields and is heard in the back between the scapulae. Examination of the respiratory and abdominal systems is normal with no hepatomegaly.



Huda's electrocardiogram

Questions

1. Why did the GP bring her back to listen again?
2. What features suggest that a murmur is innocent?
3. What is the most likely diagnosis?
4. What does the ECG show?
5. What should happen next?

MISCELLANEOUS QUESTION 2

History

Ahmed is a 7-year-old boy who presents to paediatric outpatients because he's overweight. His father became concerned 1 year ago. His mother is overweight, hypertensive and has type 2 diabetes, but his father's weight is average. His father says the boy's diet is generally good but that his grandmother spoils him.

He does sports twice a week at school. He is bullied at school about his weight. His birth weight was 3.8 kg and there were no problems in the neonatal period. He snores every night but his parents have

not noticed any sleep apnoea. His development is normal. He is on no medication. No other diseases run in the family.

Examination

There are no dysmorphic features. There are some pink abdominal stretch marks. There is no acanthosis nigricans and no goitre. His blood pressure is 116/75 mmHg. His tonsils are large but with a good gap between them. There are no other signs. His height is 125 cm (75th centile) and his weight is 38.7 kg (_99.6th centile).

Investigations

Full blood count, urea and electrolytes, liver and thyroid function tests are normal. His fasting glucose, insulin, cholesterol and triglycerides are normal.

Questions

1. What is this child's body mass index (BMI)?
2. What is the most likely cause of this child's obesity?
3. How should this child be treated?

MISCELLANEOUS QUESTION 3

History

Zaineb is an 8-year-girl referred to children's outpatients by her GP. She has been seen several times by different partners over the previous couple of years with abdominal pain. She describes the pain as peri-umbilical, non-radiating, sometimes sharp, but usually an ache. There is no obvious periodicity, including to food. Her appetite is good and there are no concerns about her growth and weight gain. She has her bowels open most days and there has never been any blood or mucus. She occasionally feels nauseated with the pain but has never vomited. There are no urinary symptoms. She started junior school last year and moved house

around the same time after her parents separated. She lives with her mother, but she and her 4-year-old brother have frequent contact with their father. She was doing well at infants but is now falling behind, having missed quite a lot of school. There is no family history of note, including migraine. Her mother is worried that this is something to do with puberty and that her periods are about to start.

Examination

Zaineb is a generally healthy, cooperative, but slightly anxious girl. Her nails are bitten but there is no clubbing, anemia, lymphadenopathy or jaundice. Her height is on the 25th centile and her weight is on the 9th. She is prepubertal. Full examination is normal.

Investigations

Haemoglobin 12.3 g/dL
White cell count 8.4 × 10^9/L
Platelets 365 × 10^9/L
Sodium 138 mmol/L
Potassium 4.5 mmol/L
Urea 4.2 mmol/L (1.8–6.4 mmol/L)
C-reactive protein 6 mg/L
Immunoglobulins Normal
Transglutaminase antibodies Negative
Midstream urine Normal
Abdominal ultrasound Normal

Questions

1. What is the most likely diagnosis?
2. What is the differential diagnosis?
3. How would you manage this patient?

MISCELLANEOUS QUESTION 4

History

Layla is a 4-year-old girl who presents to outpatients with a 2-year history of constipation. She opens her bowels about once every 5 days and strains. She soils her knickers on most days. She has intermittent abdominal pain, which is relieved by opening her bowels.

Recently, there has been fresh blood on the toilet tissue. Lactulose has been used, with little success. She has recently had a urine infection diagnosed by her GP. The illness was mild and responded well to antibiotics. She was delivered by emergency Caesarean section because of fetal distress and meconium staining.

Examination

A faecal mass is palpable in the left iliac fossa. The anus appears normal. Rectal examination –hard stool palpated. The back is normal. Blood pressure is 101/62 mmHg. There are no other signs. Weight is on the 50th centile and height is on the 25th centile.

Questions

1. What is the most likely diagnosis?
2. Would you carry out any investigations?
3. What is the treatment?

MISCELLANEOUS QUESTION 5

History

Salem is referred by the community midwife because he is still jaundiced at 3 weeks of age. He is seen in the paediatric clinic at 4 weeks of age. He was born at 39 weeks' gestation by ventouse delivery and is the first child. His birth weight was 3.8 kg (75th

centile). His mother had gestational diabetes controlled by diet alone. All antenatal scans and screening blood tests were normal. His mother's blood group is O-positive. He has been well since birth.

Examination

Salem's weight is 4.5 kg (50th centile). On examination, his face, trunk and upper limbs are jaundiced. He is not dysmorphic, he has no bruising, and cardiovascular and respiratory examinations are normal. Abdominal examination reveals a firm liver edge 4 cm below the costal margin and a small umbilical granuloma.

Investigations

Urinalysis
Urobilinogen Negative
Bilirubin ++
Reducing substances Negative
Blood
Haemoglobin 13.4 g/dL
White cell count 8×10^9/L
Platelets 205×10^9/L
Reticulocytes 2%
Blood group O Rhesus positive
Thyroid-stimulating hormone 4.6 mU/L (0.3–5.0 mU/L)
Free thyroxine 13 pmol/L (9–23 pmol/L)
Total bilirubin 140 mmol/L (1.7–26 mmol/L) (after 1 month)
Conjugated bilirubin 110 mmol/L

Questions

1. What additional questions should be asked to help determine the diagnosis?
2. What is the likely cause of this infant's prolonged jaundice?
3. How would you manage this baby?

MISCELLANEOUS QUESTION 6

A 6-month-old male infant is brought to your office for poor feeding. The mother reports that he refuses to drink from a bottle and cries when she tries to feed him. He has been seen in your office in the past for various infections, including a perirectal abscess, otitis media, and pneumonia. His axillary temperature is 38.3°C, pulse rate is 110 beats/ min, respiratory rate is 24 breaths/min, and blood pressure is 100/60 mm Hg.

On examination, the child is fussy but consolable. He has erythematous ulcerations in his oral mucosa, but no hepatosplenomegaly or lymphadenopathy. The remainder of the physical examination is normal. The following are the results of the infant's complete blood cell count:

- White blood cell count, 6,000/µL, with 5% polymorphonuclear leukocytes, 85% lymphocytes, 7% monocytes, and 3% eosinophils
- Hemoglobin, 12.5 g/dL
- Mean corpuscular volume, 85/µm3
- Platelet count, 300 x 103/µL

Questions

1. What is the most likely diagnosis?
2. What is the most appropriate next step in management for this patient?
3. What is the main serious risk of this disease?

MISCELLANEOUS QUESTION 7

An 11-year-old boy who has a history of attention-deficit/ hyperactivity disorder comes to see you because of uncomfortable feelings in his legs and frequent urges to move his legs. The symptoms are worse during rest and decrease when he is moving.

They are also worse during the evening and at night. The results of his physical examination, including a thorough neurologic assessment, are unremarkable.

Questions

1. What is the most likely diagnosis?
2. What are the definition criteria for this condition?
3. What test MOST likely shows an abnormality contributing to this condition?

MISCELLANEOUS QUESTION 8

A 13-month-old boy is seen in the emergency department (ED) for the third time with a history of decreased oral intake, lethargy, and irritability. Symptoms have been present for 4 hours since awakening at 6:00 AM; his last formula feed prior to this morning was at 11:00 PM last night. His first visit to the ED at 5 months of age resulted in admission to the hospital with concurrent symptoms of an upper respiratory infection without fever; he also had hypoglycemia that resolved spontaneously. The result of a sepsis workup was negative (normal complete blood cell count as well as negative blood, cerebral spinal fluid, and urine cultures), and he received 3 days of antibiotics until the cultures were negative. His second visit to the ED took place at 8 months of age, when he had a mild bout of acute gastroenteritis. He was also hypoglycemic at that time but responded well to intravenous glucose, a single bolus of normal saline, and oral rehydration; he was discharged after 6 hours of observation in the ED, during which time he had frequent finger stick glucose levels that were within normal limits.

Results of a basic chemistry panel are within normal limits except for a glucose level of 27 mg/dL (1.5 mmol/L). There is moderate elevation in his transaminases, a mildly elevated ammonia level,

and negative urinary ketones. His examination is significant for mild hepatomegaly with no fever or other systemic symptoms.

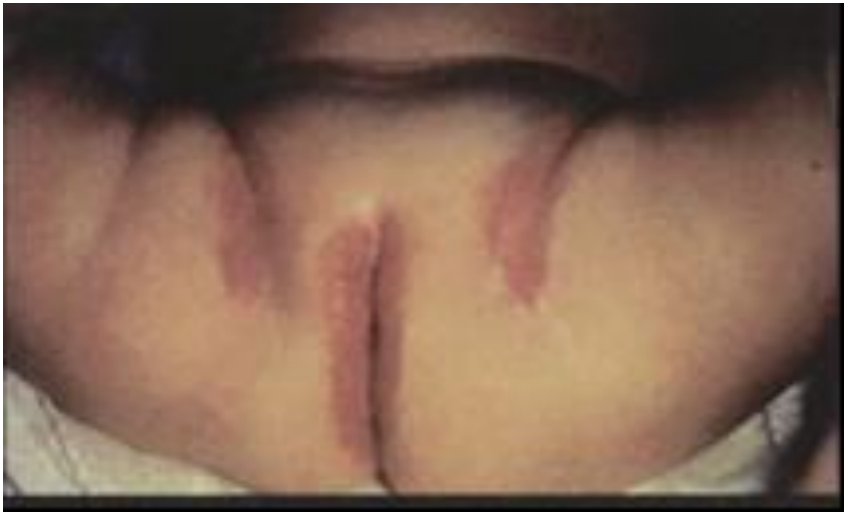
Questions

1. What is the most likely diagnosis?
2. What is the most likely helpful investigation?
3. What is your suggested treatment?
4. What are the sequelae of the disease if not treated properly?

MISCELLANEOUS QUESTION 9

A 15-month-old girl is seen for persistent diaper rash. Despite treatment with zinc oxide cream and topical antifungal cream for over a month, there has been no improvement. The mom also reports that she wants to drink all day long and has doubled the number of wet diapers per day. In the office, she is afebrile with stable vital signs. She is at the 50th percentile for weight and height. On physical examination, there are crusted erythematous and brown papules covering the groin and involving the intertriginous areas. A similar rash is seen on areas of the posterior scalp and axillae. The affected area of the scalp is scaly and seborrheic. The remainder of his physical examination is normal. Initial laboratory test results are as follows:

- Serum sodium, 146 mEq/L
- Serum osmolality, 301 mOsm/kg water; normal range, 275 to 295 mOsm/kg water
- Urine specific gravity, 1.001
- Urine osmolality, 95 mOsm/kg water; normal range, 300 to 1,000 mOsm/kg water

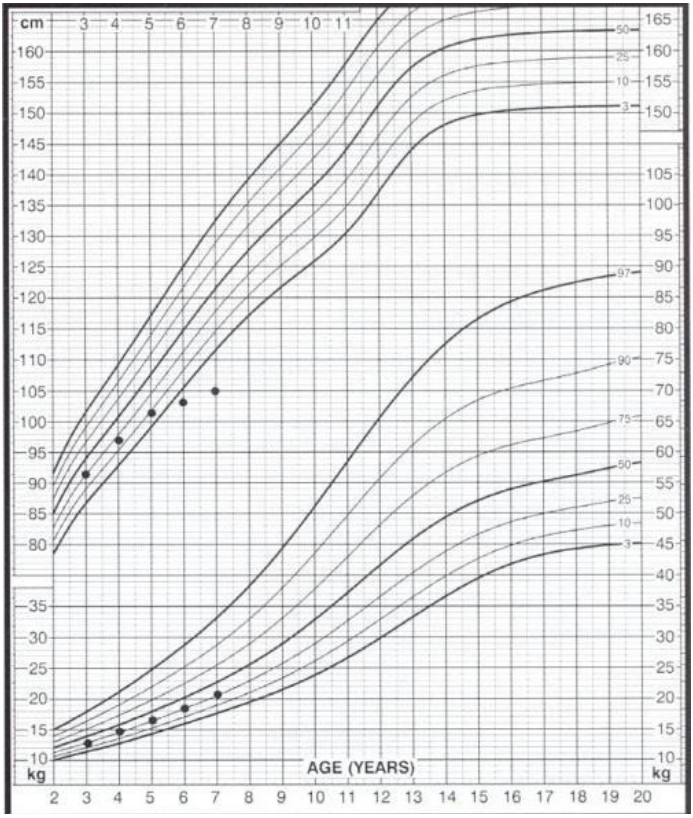


Questions

1. What is the most likely diagnosis?
2. What is the most likely additional finding?

MISCELLANEOUS QUESTION 10

During a health supervision visit, a 7-year-old girl is noted to be growing poorly. She has had a minimal increase in height during the last 2 years, but her weight continues to track at the 25th percentile. The mother reports that her daughter is a picky eater but is otherwise well. The girl has no constipation, diarrhea, or other signs of malabsorption. Her parents are not concerned because her mother is 5 feet, 1 inch (155 cm) tall and her father is 5 feet, 6 inches (168 cm) tall, and both had delayed puberty and had growth spurts in their late teenage years.



Questions

1. What is the most likely diagnosis?
2. Why?

MISCELLANEOUS QUESTION 11

Baby Salma is admitted to the neonatal unit on the day of birth because of low blood glucose. He was born at 35 weeks' gestation by vaginal delivery after 48 hours of ruptured membranes but an otherwise uneventful pregnancy. His birth weight was 2.0 kg (ninth

centile). His mother had two previous pregnancies which resulted in live born infants. This baby was thought to be jittery within a few hours of birth, and blood glucose was 30 mg/dl. A breast-feed was attempted, but he did not latch on well. He was admitted to the neonatal unit at that point for a nasogastric feed, some blood tests were done and the blood glucose rose to 60 mg/dl after the first feed. At the age of 6 hours he became apnoeic and a neonatal nurse stimulated him and gave some oxygen.

Over the next hour he had five more apnoeic episodes requiring stimulation, and on the last occasion he required a brief period of facemask intermittent positive pressure ventilation.

Examination

Baby Salma does not appear dysmorphic, jaundiced or cyanosed. He appears lethargic (reduced spontaneous movement) and his tone feels reduced on handling. Respiratory rate is 50/min with no signs of increased effort, oxygen saturation is 95 per cent in air, and heart rate is 180 beats/min. His temperature is 37.8^{0}C. Femoral pulses, heart sounds and breath sounds are normal. The abdomen is soft with normal bowel sounds. His fontanelle is normotensive. His palate and genitalia are normal.

Investigations

Haemoglobin 17 g/dL
White cell count 21 × 10^9/L
Platelets 153 × 10^9/L
C-reactive protein (CRP) 7 mg/L
Glucose 58 mg/dl
Venous blood gas
pH 7.17
*P*aCO2 7.1 (4.7–6.0 kPa)
Bicarbonate 19 (20–26 mmol/L)
Base excess -8.5

Questions

1. What is the definition of apnea?
2. What is the most likely reason for the recurrent apneas in this baby?
3. What additional information about the mother and her treatment would be helpful?
4. How should this baby be managed?

MISCELLANEOUS QUESTION 12

A 3-month-old male child presented with diarrhea and ear discharge from both ears for the last 15 days. Child is on exclusive breast milk. Since diarrhea he has lost 1 kg weight and his current weight is 3.5 kg.

He was given BCG and hepatitis B at birth, BCG left no scar mark. Rest of the history including birth history is normal. On examination, he has mucocutaneous candidiasis and multiple pyaemic abscesses all over the body along with a eczematous rash at abdomen. There is mild hepatosplenomegaly and there are no other findings. His initial investigations revealed lymphopenia (<2000) and low IgA levels. His antibody levels against HBSAg (after 2 doses) are absent. On CT scan examination, he was found to have a very small thymus (< 1 gm) and very underdeveloped tonsils and adenoid tissue.

Questions

1. What is the most probable diagnosis?
2. What is the specific treatment, if any?
3. What special precaution should be taken if the infant requires transfusion of a blood product and why?

3.3 MISCELLANEOUS ANSWERS

MISCELLANEOUS ANSWER 1

1. Up to 40 per cent of children will have a murmur heard at some time during childhood, particularly if examined at a time of high cardiac output – e.g. fever, anemia or anxiety. It is good practice to re-examine asymptomatic healthy children 1–2 weeks later when they are well. If the murmur persists, they should be referred.
2. Clinical findings in innocent murmurs
• Asymptomatic
• No thrills or heaves
• Normal heart sounds, normally split with no added clicks
• Quiet and soft
• Systolic (isolated diastolic murmurs are never innocent)
• Short, ejection (pansystolic murmurs are pathological)
• Single site with no radiation to neck, lung fields or back
• Varies with posture (decreases or disappears when patient sits up, loudest when they're lying)
3. The findings are characteristic of moderate pulmonary valve stenosis (PS).
4. This child's ECG shows right axis deviation and evidence of RVH (an 'R' in V1 > 20 millimetres, an 'S' in V6 > 5 millimetres and upright T waves across all the right precordial leads).
5. She needs an echocardiogram to:
• confirm the clinical diagnosis
• assess severity to guide further investigation and treatment
• exclude any associated cardiac lesions, e.g. ventricular septal defect.

MISCELLANEOUS ANSWER 2

1. Ahmed's BMI = weight (kg)/height (m)2 = 38.7/(1.25)2 = 24.8 kg/m2.
2. The most likely cause of this child's obesity is simple obesity.
3. Treatment should be multidisciplinary. Dietetic input is very important. Children should be encouraged to exercise for 60 min/day. Sedentary activities such as playing computer games should be discouraged. Obesity can lead to low self-esteem and, in our case, Ahmed is being bullied. He would therefore benefit from seeing a psychologist, who could also initiate behavioural therapies to help treat the obesity.

As the enlarged tonsils are not leading to sleep apnoea, tonsillectomy is not currently indicated. The systolic blood pressure is below the 95th centile for a 7-year-old male with a height on the 75th centile and therefore does not need treatment.

Drug treatment with drugs such as Orlistat or sibutramine is reserved for children ≥12 years of age and is only recommended in the presence of severe physical or psychological co-morbidities. Post-puberty, bariatric surgery, such as gastric stapling, can be considered in severe cases.

MISCELLANEOUS ANSWER 3

1. The most likely diagnosis is chronic abdominal pain of childhood or recurrent abdominal pain (RAP).
2. Differential diagnosis of chronic abdominal pain

- Psychosomatic
- Urinary tract infections
- Constipation
- Gastro-oesophageal reflux
- Coeliac disease

• Inflammatory bowel disease
• Cow's milk intolerance
• Abnormal renal anatomy, e.g. pelviureteric junction obstruction
• Abdominal migraine
• Peptic ulcer
• Sexual or other abuse

3. Management focuses on explanations and reassurance.

The classic time for RAP is in the morning before school. Most parents recognize this and have often already asked questions about bullying or other worries, but sometimes a cycle sets in where missing school and falling behind worsen the symptoms and cause more anxiety. The child may be recognized as a 'worrier' and most can understand the concept of psychosomatic symptoms. Some families still find it difficult to accept that there is nothing medically wrong and pursue a diagnosis such as food allergy. They may seek advice from practitioners of alternative medicine and it is important to discuss openly the dangers of dietary exclusions that they may suggest.

Once a diagnosis has been reached, the child should be discharged from hospital follow up to prevent the risk of reinforcing a medical diagnosis. Referral to a psychologist or psychiatrist is sometimes necessary.

MISCELLANEOUS ANSWER 4

1. The most likely diagnosis is functional constipation.

2. No investigations are necessary. Usually, clinical assessment suffices to make the diagnosis. In children who refuse a rectal examination, or if there is doubt about the diagnosis, then an abdominal X-ray is useful to assess the degree of fecal loading.

3. Dietary advice needs to be given, encouraging a good fluid intake, a daily high-fibre cereal and fruit and vegetables. Star charts may also help.

Initial drug treatment consists of an osmotic laxative such as lactulose. If that is ineffective, as in this case, a stimulant laxative such as senna should be added.
If the patient remains constipated, a more powerful osmotic laxative such as Movicol can be used as a single agent. The doses of these medications can be titrated to the frequency of bowel actions, with the aim being for the child to open their bowels daily in a pain-free manner without soiling.
If the child has pain secondary to an anal fissure, lidocaine ointment should help.
Whenever possible, treatment is administered orally. However, in some cases glycerine suppositories or phosphate enemas are required to help disimpact hard stool in the rectum.
In very severe cases, a bowel-cleansing solution such as Klean-Prep may be needed, and in extreme cases a manual evacuation may need to be performed in theatre.

MISCELLANEOUS ANSWER 5

1. The history should establish when jaundice first occurred, as the causes of early-onset jaundice are different from the causes of prolonged jaundice. Parents should be asked specifically about the presence of pale stools and dark urine.
2. Prolonged conjugated hyperbilirubinaemia in a baby who appears well is likely to be due to extrahepatic biliary atresia.
3. It is important to pick up cases of extrahepatic biliary atresia early, so that the diagnosis can be confirmed by ultrasound and liver biopsy and then surgery can be performed before irreversible damage to the liver has occurred. The outcome of the Kasai procedure (portoenterostomy) is much better for surgery performed before 60 days of age. For this reason, the case needs to be discussed promptly with the local specialist centre.

MISCELLANEOUS ANSWER 6

1. Severe congenital neutropenia.
2. Draw a blood culture and give parenteral antibiotics.
3. Severe congenital neutropenia is associated with an increased risk of malignant tumors.

MISCELLANEOUS ANSWER 7

1. Restless leg syndrome (RLS).
2. RLS is defined by 4 criteria: (1) an uncomfortable sensation or unexplainable urge to move, (2) increased symptoms when at rest; (3) decreased symptoms with movement; and (4) worsening of symptoms in the evening or night.
3. Serum ferritin level.

MISCELLANEOUS ANSWER 8

1. Systemic primary carnitine deficiency (PCD).
2. Plasma carnitine levels.
3. Supplementation with levocarnitine.
4. Untreated carnitine deficiency can result in irreversible cardiomyopathy and skeletal muscle dysfunction.

MISCELLANEOUS ANSWER 9

1. The child described in the vignette with a persistent scalp and diaper rash and symptoms of diabetes insipidus may have Langerhans cell histiocytosis (LCH).
2. The most likely additional finding would be lytic lesions seen on a skull radiograph.

MISCELLANEOUS ANSWER 10

1. Hypothyroidism
2. An endocrine cause of poor growth is likely when linear growth arrests but weight gain is either normal or increasing.

MISCELLANEOUS ANSWER 11

1. An apnoea is an episode of cessation of breathing lasting more than 20 s, or a shorter time if there is bradycardia or a colour change.
2. The most likely diagnosis is sepsis. The baby was born prematurely after prolonged rupture of membranes – both risk factors for sepsis.
3. There is no information provided about whether the mother had any microbiological samples taken, received intrapartum antibiotics, had a fever or had evidence of chorioamnionitis. These are all factors which would affect the risk of sepsis in the newborn. It is also important to know whether the mother received any drugs during labour which may suppress neonatal respiration, e.g. pethidine, or whether she uses any illicit drugs.
4. Management priorities are to secure the airway with optimal positioning of the head, ensure adequate breathing with either CPAP or intubation, establish vascular access, give fluid boluses to achieve cardiovascular stability and administer antibiotics as early as possible. After this, further assessment for the source of the sepsis, and to exclude other causes of apnoea, can be undertaken.

MISCELLANEOUS ANSWER 12

1. Severe combined immunodeficiency (SCID).
2. Bone marrow transplant before 3½ months of life.
3. Give irradiated blood products to prevent GVHD.

CHAPTER 4

COUNSELING AND HISTORY QUESTIONS

4.1 COUNSELING QUESTIONS

COUNSELING QUESTION 1

DATA

Ali came to your office concerning his 10- month- old boy Mohammed.

TASK

Ali has some questions about vaccinations. Talk to him and answer his questions in the next 5 minutes.

COUNSELING QUESTION 2

DATA

A young newly graduated pharmacist hesitate to vaccinate his 3-month-old baby because, he heard that oral polio vaccine may cause permanent paralysis in the recipient

TASK

In the next few minutes alleviate this father concern and answer his questions

COUNSELING QUESTION 3

DATA

A young mother brought her 2-month-old baby for vaccination but she is afraid from Rota virus vaccine because she had heard that it may cause intussusceptions

TASK

Talk to the mother about the complications of the disease, the importance of the vaccine, clarify her misconception about the vaccine, and answer her questions

COUNSELING QUESTION 4

DATA

You are a newly graduate specialist Pediatrician in a maternity hospital, you are evaluating a 6–hours-old boy , product of cesarean section for an old primigravida with gestational diabetes, , during routine exam you find systolic murmur, CXR shows narrow upper mediastinum, echo cardiography shows D-TGA with small ASD and PDA. His O2 saturation is 92% in room air, active and feeding well. You asked the couple to attain your room.

TASK

Explain the echo findings and answer their concerns.

COUNSELING QUESTION 5

DATA

You are senior house officer in outpatient duty , you are evaluating a referred case from health center with a cardiac murmur, the referred letter is like this(A 4- year- old female child with URTI, she is thriving well, no cyanosis or clubbing, has a grade II vibratory systolic murmur, at LLSB, not radiating, with normal S_1 S_2)

You confirmed these findings

TASK

You need to explain the nature of the finding to the mother first, and whether the baby will need additional investigations or not.

COUNSELING QUESTION 6

DATA

You are a third year board resident evaluating a 7- year -old girl with bed wetting every night, she is on that habit since she was diaper free 3 years ago, mother mentioned to you that her older

son also complaining from similar problem, her anthropometric measures above 50 centile, her examination was unremarkable, Investigations were normal. She started her school this year, she feel embarrassed every day at morning. Mother needs a solution.

TASK

Explain the condition to the mother, tell her your suggestions, and answer her questions.

COUNSELING QUESTION 7

DATA

You are a junior pediatrician in a teaching hospital, an 18- month-old baby boy with Kawasaki disease (KD) that had been diagnosed by evaluating team. His echo shows dilatation of left coronary artery (small aneurysm).

A junior house officer working in the hospital, she is the aunt of the baby, had read about the disease and she has some concern and she wants to ask you some questions about the disease.

TASK

Explain the nature of the disease, alleviate her worriness, and answer her questions.

COUNSELING QUESTION 8

DATA

A young pharmacist mother brought her 2-month-old bottle-fed infant with prolonged and excessive crying for the last 4 weeks, he cries more than 4 hours each night without an apparent cause, she is anxious that her baby may have serious illness, the baby looks well, thriving well.

TASK

1-Discuss your suggested strategies for managing colic in this infant.
2-Define infantile colic for the examiner and enumerate 6 gastrointestinal identifiable causes of prolonged crying in infancy.

COUNSELING QUESTION 9

DATA
Hayder has 2 children; Sajad (11 months) and Ruqaya (8 years). Ruqaya diagnosed to have enterobiasis.
TASK
1-Inform the father about the treatment and prevention plan.
2-Answer the examiner questions

COUNSELING QUESTION 10

DATA
A primary school teacher brought his 4-year-old child who passed 2 live worms, 20-25 cm length yesterday. The father is anxious and he is asking for a doctor to discuss the problem with him.
TASK
You are the responsible doctor, tell the father about the cause, pathophysiology, complications, treatment, and answer his questions.

4.1 COUNSELING ANSWERS

COUNSELING ANSWER 1

Suggested communication skill checklist of vaccination of a 10-month-old child

1	Greet father/child and introduce yourself
2	Maintain appropriate eye contact/body language throughout
3	Q: Can I give my child measles vaccine if he received blood transfusion 3 weeks ago? A: No, you should wait at least 3 months
4	Q: Can I give my baby DTP which he missed at 6 months? A: Yes, DTP is an inactivated vaccine which is not affected by antibody containing product (blood)
5	Q: Can I give blood transfusion after measles vaccine or should I wait? A: No, you should wait for 2 weeks
6	Q: Can I give my 10-month-old child Rotavirus vaccine? A: No, Rotavirus vaccine is not approved for children older than 32 weeks
7	Q: Can I give my pregnant wife MMR vaccine to protect her against measles and the fetus against congenital rubella? A: No, live vaccines should not be administered to women known to be pregnant
8	Q: My son Hussien, 3-year-old had leukemia, can I vaccinate Mohammed his missed dose of TOPV? A: No, TOPV should not be given if an immunosuppressed person is in the household
9	Q: Can I give Mohammed his missed dose of measles? A: Yes, MMR may be given when an immunosuppressed

	person lives in the same house
10	Q: Mohammed has low grade fever and mild diarrhea, can I vaccinate him? A: Yes, Children with mild acute illnesses, such as low-grade fever, upper respiratory infection (URI), colds, otitis media, and mild diarrhea, should be vaccinated on schedule
11	Q: Mohammed is on augmenten for otitis media, can he receive measles vaccine? A: Yes, Antibiotics do not have an effect on the immune response to most vaccines
12	Ask the father if he has any more question and thank him for this counseling

COUNSELING ANSWER 2

Suggested communication skill checklist of vaccination of a 3-month-old infant with TOPV

1	Greet father/child and introduce yourself
2	Maintain appropriate eye contact/body language throughout
3	Poliomyelitis is a crippling disease with no curable treatment
4	There are three poliovirus serotypes (P1, P2, and P3) and TOPV contain the 3 serotypes of vaccine virus
5	Immunity to one serotype does not produce significant immunity to the other serotypes
6	TOPV is highly effective in producing immunity to poliovirus. A single dose of TOPV produces immunity to all three vaccine viruses in approximately 50% of recipients. Three doses produce immunity to all three poliovirus types in more than 95% of recipients
7	Immunity from oral poliovirus vaccine is probably lifelong

8	One case of vaccine-associated paralytic polio(VAPP) occurred for every 2 to 3 million doses of TOPV administered
9	VAPP is more likely to occur in persons 18 years of age and older than in children
10	VAPP is much more likely to occur in immunodeficient children than in those who are immunocompetent
	FATHER QUESTIONS
11	Q: Is there any available procedure for identifying persons at risk to develop paralytic disease after TOPV A: No, There is no procedure available for identifying persons at risk of paralytic disease, except excluding older persons and screening for immunodeficiency
12	Q: Does immunoglobulin in human milk interfere with vaccine virus A: No
13	Q: Does vaccine virus transmit to contacts A: Yes
14	Q: For how long vaccine virus shedded in stool of recipient? A: Up to 6 weeks
15	Ask the father if he has any more question or concern and thank him for this counseling

COUNSELING ANSWER 3

Suggested communication skill checklist of misconception about Rota virus vaccination

1	Greet mother and introduce yourself
2	Maintain appropriate eye contact/body language throughout
3	Ask about job of mother and its level of education
4	Infection with rotavirus is nearly universal, with almost all

	children infected by 5 years of age. Rotavirus is responsible for 500,000 deaths from diarrhea worldwide
5	Rotavirus infection can lead to severe diarrhea, dehydration, electrolyte imbalance, and metabolic acidosis
6	In 1998, rotavirus vaccine was withdrawn from the U.S. market within one year of its introduction because of its association with intussusception
7	Reports of intussusception among the new rotavirus vaccine (produced in February 2006) is not greater than are expected by chance
	QUESTIONS
8	**Q:** Can I postpone the vaccine till the age of 4 months? **A:** No, Vaccination should not be initiated for infants older than 12 weeks because of insufficient data on safety of the first dose of rotavirus vaccine in older infants
9	**Q:** What is the maximum age for completion of rota virus vaccine? **A:** The maximum age for any dose of rotavirus vaccine is 32 weeks
10	**Q:** Does breastfeeding diminish the immune response to the vaccine **A:** No, Breastfeeding does not appear to diminish immune response to three doses of vaccine
11	**Q:** If an Infant has recovered from documented rotavirus Infection, does he need to complete his vaccine series? **A:** Yes, Infants who have recovered from documented rotavirus infections may not be immune to all five serotypes present in the vaccine. These infants should complete the three dose vaccination series by 32 weeks of age
12	**Q:** If the baby spits out some or all of the dose, should he receive a second dose **A:** No, a second dose of rotavirus vaccine should not be

	administered to an infant who regurgitates, spits out some or the entire dose, or vomits during or after administration of vaccine. The infant should receive the remaining recommended doses, if needed, on the usual schedule
13	**Q:** If the baby received blood recently, can we give him rotavirus vaccine? **A:** No, vaccination for infants who have received an antibody-containing product, including blood and immunoglobulin should be deferred for 6 weeks after receipt of the blood product
14	Ask the mother if she has any more questions or concern and thank her for this counseling

COUNSELING ANSWER 4

Suggested communication skill checklist (breaking bad news) of CHD in precious newborn

	Greet mother and introduce yourself	
	Congratulate to them the new baby	
	Maintain appropriate eye contact and body language with them	
	Ask about job of mother and its level of education	
	Show sympathy and understanding of their questions	
	Start to explain the baby had congenital heart disease, Use paper and pen (diagram) to explain the findings,(we have 2 parallel circulations, exchange depends on a small canal) tell them we need to act right now so we can maintain the baby life	
	Parents will object saying, the baby is well, no complaint, even his O_2 sat. is >90% You start to explain again that we need to act as early as possible before the small canal close, at that time it is too late to interfere	

	Parents: How much you are sure doctor? Actually we are lucky to pick the case early, the clinical picture and CXR goes with the echo findings	
	Parents: From where he got this thing doctor? Is it related to mother condition at pregenancy? You answer NO , actually most of CHD had no clear cause, , gestational diabetes can cause some changes in the heart but not a CHD	
	Parents will say O K , what you will do? We will take the baby to intensive care unit, we will start to measure his vital signs, we will give him medication to keep that canal opened	
	Explain the side effect of that medication, can cause hypotension, apnea in 10% so we may go for ventilation	
	We will call the cardiac center and arrange with them the next step	
	Explain that the next step will be arranged after 2nd evaluation by pediatric cardiologist, in case of confirmation ,they will do some opening her (put your pin on IAS)by a balloon, it needs only small opening here; the femoral area; to do it)	
	Parents may ask about further next step Be ready to tell them, he will be elected to do cardiac surgery later on, the timing usually arranged between cardiac surgeon and pediatric cardiologist	
	Parents: When you will start to act doctor? Right now	
	Ask the parents if they have any more questions or concern and thank them for their counseling	

COUNSELING ANSWER 5

Suggested communication skill checklist (innocent murmur) in a 4-year-old girl

	Greet mother and introduce yourself	
	Maintain appropriate eye contact and body language with the mother	
	Show sympathy and understanding of her questions	
	Use paper and pen (diagram) to explain the findings	
	Explain that the heart is hollow structure composed of 4 rooms contains walls and valves and sound can happen when blood pass through its structures or valves	
	Explain that these sounds can be non pathological (are seen commonly in your practice) and pathological	
	Explain why the sound with her baby is non pathological (thriving well, quality of murmur, no cyanosis….etc.)	
	Explain that no need for further investigations	
	Other investigations will add nothing more to what discovered in examination, it can give some unwanted effects like radiation in CXR and sedation in ECHO	
	Explain that the sound can still be heard, can be increased or decreased in intensity with fever, URTI… etc so no need to worry	
	Ask the mother if she had other concerns or questions	
	Summarize the counseling and thank the mother	

COUNSELING ANSWER 6

Suggested communication skill checklist (Nocturnal enuresis) in a 7-year-old girl

	Greet mother and introduce yourself	
	Maintain appropriate eye contact and body language with the mother	
	Show sympathy and understanding of her questions	
	Use paper and pen (diagram) to explain the condition	
	Explain it is a case of nocturnal enuresis and it is a common problem that we see; by 5 years of age 7% of boys and 3% of girls have enuresis. The exact cause of enuresis is unknown but familial tendency with likely biologic (who much the sphincter is ready to control), emotional, and learning (influenced by the family action)factors play a role	
	We will start with (plan one), I hope it will be successful, it needs your cooperation and your daughter compliance, she also lessening to my plan and she want certainly to achieve success. 1. We will make charting with rewards for dry nights 2. Voiding before bedtime 3. Night awakening 2-4 hr after bedtime 4. These children also need ready access to school toilets 5. Make sure that her bowel habit is normal (no constipation) Contact me after 2 weeks to see how much this plan is effective	
	Please do not punish the child for bed wetting	
	If this plan fail ,we can use medications, we have hormone which reduce the urine during night, we can use it as tablets, but remember we have rare side effects, it can increase the water in the body reducing sodium salt in the boy, which can make seizure, also the disease can recur after discontinuing treatment	
	If this fail, we can use antidepressants like Tofranil 25 mg before sleep	
	Mother says thanks doctor I will go through your plans and I will	

	be in contact with you every 2 weeks	
	You say: that is good, please call me at any time for help, I will be happy to respond to you	
	Greeting and closing	

COUNSELING ANSWER 7

Suggested communication skill checklist (Kawasaki disease) in an 18-month-old boy

	Greet her by name (as you know her)	
	Maintain appropriate eye contact and body language with her	
	Ask what she knows about the subject, start from where she ends	
	Use paper and pen (diagram) to explain the subject	
	Explain that KD is the leading cause of acquired heart disease in children, it is a vasculitis with a predilection for the coronary arteries, and approximately 20-25% of untreated patients experience coronary artery abnormalities, including aneurysms	
	Explain that the cause of KD remains unknown, but certain epidemiologic and clinical features support an infectious origin	
	Explain the possible echo findings	
	Explain the treatment , type and duration of each(2 g/kg of intravenous gammaglobulin (IVIG) and high-dose aspirin (80-100 mg/kg/day divided q6h) as soon as possible after diagnosis and, ideally, within 10 days of disease onset), The dose of aspirin is usually decreased from anti-inflammatory to antithrombotic doses (3-5 mg/kg/day as a single dose) after the patient has been afebrile for 48 hr	
	Explain the benefit of each treatment (aneurysms about 20% with aspirin alone and 2-4 % with both)	
	Explain the type of vaccination needed if long term aspirin therapy is considered (annual influenza and varicella vaccine)	

	Explain the need to change aspirin to another type of antiplatelet 6 weeks after varicella vaccination	
	Defer life attenuated vaccination 11 months after IVIG	
	Prognosis for KD ,majority returns to normal, 1-3% recurs, fatality <1%, small aneurysms most likely to regress (overall 50% will regress by 1-2 years)	
	Ask if there are other concerns , summarize ,thank, and closing	

COUNSELING ANSWER 8

Suggested strategies for managing colic

1	Greet the mother	
2	Maintain appropriate eye contact and body language with her	
3	Because the baby is thriving well with no constitutional symptoms, most of the time there is no identifiable cause	
4	No need for investigations	
5	Change formula from cow's milk to soy-based or to hydrolysate	
6	Change nipple or bottle, feed in an upright position with frequent burping	
7	Supplemental daytime carrying or front carrier	
8	Place car seat in a secure position on dishwasher or clothes dryer	
9	Ride in the car	
10	Change of scenery	
11	Pacifier	
12	Swing	
13	Belly massage	
14	Swaddling	
15	Heartbeat tape or white noise generator	
16	Hot-water bottle on belly (avoid making water too hot, as it may cause burns)	
17	SleepTight® (device that generates white noise and vibrates the	

	bed)	
18	Warm bath	
19	Herbal tea	
20	Sucrose	
21	Simethicone	
22	Parental support	
23	Antispasmodics (should not be used secondary to risk of severe adverse effects)	
24	Thank the mother and ask if she has any question	

Definition of infantile colic

The word "colic" is used broadly by parents and clinicians to refer to prolonged and excessive crying for no apparent reason during the first three months of life. The most widely accepted definition for colic (the Wessel criteria or "rule of three") is crying that lasts for more than three hours per day, occurs on more than three days per week, and persists for more than three weeks.

Gastrointestinal identifiable causes of prolonged crying in infancy are:

1. Intussusception
2. Constipation
3. Gastroenteritis
4. Anal fissures
5. Inguinal hernia
6. Gastroesophageal reflux
7. Volvulus

COUNSELING ANSWER 9

Suggested communication skill checklist (enterobiasis) in an 8-year-old girl.

1	Greet the father and Introduce himself	
2	Anthelmintic drugs should be administered to Ruqaya and their family members	
3	Sajad less than 2 year of age so mebendazole should be used only when the potential benefits justify the possible risks	
4	A single oral dose of mebendazole (100 mg PO for all ages) repeated in 2 wk	
5	Alternative regimens a single oral dose of albendazole (400 mg PO for all ages) repeated in 2 wk	
6	Morning bathing removes a large portion of eggs	
7	Frequent changing of underclothes, bed clothes, and bed sheets	
8	Good hand hygiene is the most effective method of prevention	
9	Ask the father if there is any question or any subject need more explanation	
10	Thanks the father	

EXAMINER QUESTIONS

Q_1-What is the most common presentation?
A_1-Nocturnal anal itching
Q_2-does it cause eosinophilia
A_2-Rarely
Q_3-Can it be serious?
A_3-Yes, appendicitis, salpingitis, peritonitis

COUNSELING ANSWER 10

Suggested communication skill checklist (Ascariasis) in a 4-year-old boy.

1	Greet the father and Introduce himself
2	CAUSE Ascaris lumbricoides is a large roundworm, 15 to 40 cm in length, which infects humans via eggs found in soil.
3	**PATHOPHYSIOLOGY** The life cycle begins when eggs are ingested from soil contaminated with human feces.
4	Subsequently, the larvae are liberated in the small intestine.
5	The rhabdoid larvae invade the venous system and travel finally to pulmonary capillaries.
6	They penetrate the alveoli, and are subsequently expelled by coughing across the epiglottis and swallowed.
7	The larvae become adult worms in the small intestine.
8	The cycle takes 2 months.
9	One female worm produces 200,000 eggs per day.
10	Fertilized eggs must incubate in the soil for 2 to 3 weeks.
11	All ages may be affected; however, children are more frequent hosts due to oral behavior.
12	Ascariasis is more common where sanitation is poor and population dense.
13	**COMPLICATIONS** Bronchopneumonia may be seen during the migrational stage, producing fever, cough, dyspnea, wheeze, eosinophilia, and pulmonary infiltrates.
14	Heavy infestations may cause abdominal pain, malabsorption, and growth failure.
15	Children may experience obstruction (ileocecal),

	malabsorption, or intussusception.
16	Perforation of a viscus, or migration into the appendix, biliary, or pancreatic ducts may rarely occur.
17 18	**TREATMENT** Either albendazole 400 mg as a single dose or mebendazole 100 mg twice daily for 3 days is currently considered to be first line therapy for symptomatic infection. A single dose of pyrantel pamoate (11 mg/kg; maximum, 1 g) is also effective.
19	Piperazine citrate (75 mg/kg/d for 2 days; maximum, 3.5 g) is suggested in cases of obstruction due to large worm bezoars to aid passage. It should not be administered with pyrantel pamoate.
	QUESTIONS AND ANSWERS
20	**Q1:** Where do children get this infection? **A1:** Commonly from playing in dirt contaminated with Ascaris eggs.
21	**Q2:** What is the prognosis if obstructive or respiratory complications have occurred **A2:** The prognosis is less favorable.
22	Thanks the father

4.2 HISTORY QUESTIONS

HISTORY QUESTION 1

DATA
Salwa, a 6-year-old child presented with abdominal pain
TASK
Take a focused history and suggest 3 helpful investigations

HISTORY QUESTION 2

DATA
Sarah,a 15- year- old student, her parents concerned about her loss of weight during the last 6 months.
TASK
1. Take a focused history regarding her complaint.
2. Explain your differential diagnoses with examiner.

HISTORY QUESTION 3

DATA
Ali, a 6- year- old child presented with history of dark color urine for the last 2 days.
TASK
1. Take a focused history.
2. Discuss your work up with examiner.

HISTORY QUESTION 4

DATA

Ali, a young father brought his 5-year-old child(Mohammed) to Karbala teaching hospital complaining from fever for the last 2 weeks, he visited the primary health center in his rural area (Abu Ghareq) and did all the available investigations with no clear diagnosis.

TASK

1- Take a focused history.

2- Answer the examiner questions.

HISTORY QUESTION 5

DATA

You are a senior house officer in Pediatric department of a general hospital, a 3-year-old child presented to you with vomiting for the last 2 days.

TASK

1- Take a focused history.

2- Answer the examiner questions.

HISTORY QUESTION 6

DATA

A 3-year-old child presented by his father with a third attack of generalized urticaria, itching, wheezing, and swollen lips.

TASK

Take a focused history of this allergic child and answer the father questions.

HISTORY QUESTION 7

DATA

An 11-year-old child presented with back pain.

TASK

1. Take a focused history from the patient.
2. What are warning signs of potentially serious causes of back pain in children?

HISTORY QUESTION 8

DATA

A 14-year-old adolescent student presented with chest pain

TASK

1. Take a focused history
2. What are the most common causes of pediatric chest pain?

HISTORY QUESTION 9

DATA

Ali, a 4-month-infant, with frequent episodes of crying started shortly after birth usually relieved by lifting or rocking, today presented by his young mother with continuous inconsolable crying for more than 2 hours.

TASK

1. Take a focused history from the mother.
2. What factors make this crying an emergency?
3. Enumerate 5 characteristic types of crying?

HISTORY QUESTION 10

DATA

Mohammed, a-7-year old child brought by his mother with painful swallowing.

TASK

1. Take a focused history
2. Answer the examiner question

HISTORY QUESTION 11

DATA

A young father brought his 3-year-old child thinking that he has delayed speech development (he knows about 40 words with no single sentence formation)

TASK

1. Take a focused history

4.2 HISTORY ANSWERS

HISTORY ANSWER 1

Suggested checklist of a 6-year-old child with abdominal pain

1	Greet parents/child and introduce yourself
2	Maintain appropriate eye contact/body language throughout
3	Ask about pain location and its onset whether acute(ovarian or testicular torsion, intussusception, volvulus, trauma)or chronic
4	Ask if pain relieved by bowel movements(may be related to colonic distension (by air or stool) or inflammation (colitis)
5	Ask about duration of pain (acute versus chronic illness)
6	Ask about history of pica
7	Ask about pain radiation (certain entities characteristically have radiation of pain i.e., pancreatitis to the back, appendicitis to the right lower quadrant)
8	Ask about emesis whether bilious, blood stained, or projectile
9	Ask about bowel habits(diarrhea or constipation)
10	Ask about worms in bowel movements
11	Ask about frank hematochezia (colonic bleeding or massive upper GI bleeding) or malena
12	Ask about recent weight loss(IBD, malignancy)
13	Ask if it is associated with fever (infectious colitis, IBD)
14	Ask about rash(Henoch-Schönlein purpura), IBD (erythema nodosum)
15	Ask about recent exposure to mumps(pancreatitis)
16	Ask about history of pharyngitis(mesenteric adenitis, EBV-associated splenic distention)
17	Ask about history of chronic cough

18	Ask about history of abdominal surgery(obstruction from adhesions)
19	Ask about family history of IBD, Abdominal migraines, Sickle cell disease
20	Ask about flank pain, hematuria, dysuria, polyuria or any change in urine color(UTI, hepatitis, diabetes mellitus)
21	Ask about joint pains(Henoch-Schönlein purpura)
22	Thank the parents and child
	INVESTIGATIONS
23	CBC with differential
24	GUE
25	GSE
26	U/S Abdomen
27	Plain X-ray abdomen

HISTORY ANSWER 2

Suggested checklist of a 15- year- old student with weight loss for the last 6 months.

1	Greet the parents , child ,and Introduce himself
2	What do you mean by loss of weight?
3	Ask about diet habit and appetite
4	Ask about vomiting, abdominal pain or any change in bowel habit
5	Ask about fear of fatness, distorted body image and dental caries
6	Ask about psychological problem(mood, sleep pattern, loss of interest)
7	Ask about drug history(laxative, diuretic)
8	Ask about signs of puberty(breast, pubic hair and menstrual cycle)

9	Ask about fever, activity
10	Ask about cough, dyspnea and night sweating
11	Ask about pallor, bruising, bone and joint pain, skin rash
12	Ask about headaches, especially early morning
13	Ask about family history(renal, IBD)
14	Ask about past medical and surgical Hx
15	Ask the parent if they need to add or explain anything more
16	Thank the patient and parents

Differential Diagnoses

1	Eating disorders
2	DM
3	Thyroid disorder
4	Renal disease
5	Chronic infection, TB
6	Neoplasm
7	Collagen vascular disease IBD
8	Psychological

HISTORY ANSWER 3

Suggested checklist of a 6- year- old child presented with history of dark color urine for the last 2 days.

1	Greet the father and Introduce himself
2	Ask if the color red or tea color
3	Ask if this is the 1st attack or recurrent
4	Ask if there is recent Hx. Of infection(sore throat or skin infection)
5	Ask about headache
6	Ask about puffiness of eye or edema
7	Ask about dysuria, frequency or urgency

8	Ask about fever
9	Ask about renal colic or abd. pain
10	Ask about skin rash or joint manifestations
11	Ask about bleeding from any other site(gum, GIT)
12	Ask about family Hx. Of the same condition
13	Ask about family Hx. Of deafness
14	Ask about puffiness of eye or edema
15	Ask about dysuria, frequency or urgency
16	Ask about trauma or heavy exercise
17	Ask the father if he need to add or explain anything more
18	Ask if the father has any further comment
19	Thank the patient and father

Work up

1 2	Measure BP, Pulse, Weight Examine fundi
3	Collect 24 hour urine
4	Send for GUE,24 hour urine protein
5	Send for CBP, ESR, Renal function tests
6	Send for protein albumin, globulin, cholesterol
7	Send for ANF, Complement
8	Send for CXR,U/S

HISTORY ANSWER 4

Suggested checklist of a 5- year- old child presented fever for the last 2 weeks.

1	Greet the father and Introduce himself
2	What have the temperatures been and how were they measured (tympanic, oral, axillary, and rectal)?
3	Travel history, including past residence? (Malaria, endemic fungi (e.g., coccidioidomycosis, blastomycosis), tuberculosis)
4	Ingestion of unpasteurized milk? (brucellosis)
5	Pica or dirt ingestion? (Toxocara canis or Toxoplasma gondii)
6	Change in behavior or activity? (Brain tumor, TB, EBV)
7	Pattern of fever?
8	Medications (including over-the-counter medications and eye drops)?(Drug fever, atropine-induced fever)
9	Well-water ingestion? (Giardiasis)
10	Does the patient has conjunctivitis(Kawasaki, adenovirus)
11	Does the patient has nasal discharge or halitosis(Sinusitis)
12	Does the patient has Pharyngitis (Kawasaki syndrome, EBV, SBE)
13	Does the patient has Tachypnea (SBE, pneumonia)
14	Does the patient has joint pain or swelling (JRA, IBD)
15	Does the patient has bony pain or tenderness (JRA, leukemia, osteomyelitis)
16	Does the patient has bloody diarrhea on and off (IBD)
17	Does the patient lose weight (Collagen vascular disease, malignancy, IBD)
18	Ask the father if he has any further comment and thank him

Examiner questions

Q_1-What is the definition of PUO?

A_1- Fever of unknown origin (FUO) implies: (1) A febrile illness (38.3˜°C on multiple occasions); (2) present for >14 days; and (3) no apparent source despite careful history taking, physical examination, and preliminary laboratory studies.

Q_2-Enumerate 6 non-infectious causes of PUO?

A_2-

1. Collagen vascular disease (juvenile rheumatoid arthritis, JRA; systemic lupus erythematosus, dermatomyositis, sarcoidosis, vasculitis syndrome)
2. Malignancy
3. Kawasaki syndrome
4. Inflammatory bowel disease (IBD)
5. Drug fever
6. Hyperthyroidism
7. Factitious fever or Munchausen syndrome by proxy
8. Centrally mediated fever
9. Periodic fever syndrome

HISTORY ANSWER 5

Suggested checklist of a 3- year- old child presented with vomiting for the last 2 days.

1	Greet the father and Introduce himself
2	Ask about fever? (Infectious causes of vomiting)
3	Ask about abdominal pain and frequent, forceful, or bilious emesis?(anatomic or obstructive intestinal disorder)
4	Ask about mental retardation and patchy baldness?(hair ingestion and the development of a gastric bezoar)

5	Ask about pica?(Foreign body)
6	Ask about nausea and epigastric pain related to meals?(gastritis, gastric emptying delay, or gallbladder disease)
7	Does the pain alleviated by meals? (Gastroesophageal reflux and gastric ulcer disease)
8	Does vomiting alternate with lethargy. (Intussusception)
9	Is there a history of chronic headaches, fatigue, weakness, weight loss, and early morning vomiting? (Neurologic causes of vomiting secondary to increased intracranial pressure)
10	Is the pain right- or left-sided abdominal pain? (Renal disease, inflammatory bowel disease)
11	Does the patient have dysuria or frequency?
12	Does the patient have diarrhea, constipation or blood in the stool?
13	Does the patient have earache?
14	Does the patient have cough or sore throat?
15	Is there any discoloration of skin and sclera? (Jaundice (liver/gallbladder or metabolic disease)
16	Is the vomiting recurrent or chronic? (Evidence of neurologic dysfunction, including nystagmus, head tilt, papilledema, abnormal reflexes, and weakness)
17	Is the patient upset psychologically? (Psychogenic)
18	Does the patient have polyuria , polydipsia or hematuria? (Diabetic ketoacidosis , Glomerulonephritis)
19	Does the patient have helminthic infestation? (Ascaris)
20	Ask the father if he has any further comment and thank him

Examiner Questions

Q_1-What are the neurological causes of vomiting?

A_1-1.Intracranial mass lesions

- Tumor
- Cyst
- Subdural hematoma

2. Cerebral edema
3. Hydrocephalus
4. Pseudotumor cerebri
5. Migraine (head, abdominal)
6. Seizures

Q_2-When should you refer or admit a patient with vomiting?
A_2-

1. Chronic vomiting (2 to 3 weeks)
2. Weight loss
3. Severe abdominal pain or irritability
4. Gastrointestinal bleeding
5. Evidence of intestinal obstruction
6. Serum electrolyte abnormalities
7. Abnormal neurologic examination
8. Dehydration
9. Signs of an acute abdomen
10. Lethargy

HISTORY ANSWER 6

Suggested checklist of a 3- year- old allergic child.

1	Greet the father and Introduce himself
2	Does your child have food or drug allergies?
3	Has your child ever been stung by a bee, and, if so, what was the reaction?
4	Does anyone in your family have hay fever (allergic rhinitis), asthma, or eczema?
5	Do you have a basement? (Damp basements are a source of mold spores.)
6	Are there any damp areas in your home? (Damp areas serve to propagate mold growth in the home.)

7	How do you cool your home? (Opening outside windows lets the pollens from outside into the house.)
8	Do you have a humidifier? (Molds can grow in the water, and increased ambient humidity will raise the dust mite population in the home.)
9	Are there any smokers in the home?
10	Are there any pets in the home, at school, or in day care?
11	Are there many stuffed animals or books in the bedroom?
12	Does the bedroom have carpeting?
13	How often do you wash the bedding, what type of pillow do you have, and is the mattress encased in plastic? (To keep the dust mite population under control the bedding should be washed in hot water at least once every 2 weeks (hot water kills dust mites), the pillow should be fiber filled, and the mattress should be encased in plastic.)
14	Where does the patient spend most of his time?
15	Does the patient attend day care? (Day care is a major source of upper respiratory tract infections, which can mimic allergies and exacerbate reactive airway disease.)
	FATHER QUESTIONS
16	**Q_1:** Do children outgrow allergies? **A_1:** In general, environmental allergies that cause rhinitis and asthma persist into adulthood. However, most children outgrow food allergies to milk, egg, soy, wheat, and other foods. Children may rarely outgrow peanut, tree nut, or shellfish allergy.
17	**Q_2:** Can allergic children acquire more allergies? **A_2:** Allergic children have the biologic potential to become sensitized to many environmental allergens. The goal should be to limit exposure to these antigens to prevent sensitization.
18	**Q_3:** If a parent is allergic to a specific allergen, can the child inherit this allergy? **A_3:** Children inherit the tendency to be allergic, but they do

	not inherit specific allergies.
19	Ask the father if he has any further comment and thank him

HISTORY ANSWER 7

Suggested checklist of an 11- year- old child with back pain

1	Greet the patient and Introduce himself
2	Onset, duration, and frequency of pain?
3	Interference with activity?
4	Physical activity and trauma history? (Spondylolysis and spondylolisthesis are more commonly seen in children who repeatedly twist, bend, or hyperextend their spine (e.g., participate in gymnastics, diving, tennis, contact sports, weight lifting, etc.). Heavy lifting may contribute to Scheuermann kyphosis. Trauma causes one third of herniated disc injuries.)
5	Use of backpack? (Carrying a backpack with >15% of one's body weight may cause back pain.)
6	Radiation of pain? (Pain that shoots down the legs is suggestive of a herniated disc, spondylolisthesis, epidural abscess, or osteoid osteoma.)
7	Motor, sensory, or bowel/bladder symptoms?
8	Growth history? (Adolescents during growth spurts are more prone to musculotendinous strain.)
9	Previous history of scoliosis? (Idiopathic scoliosis is rarely painful or functionally limiting.)
10	Pain that awakens the child from sleep and/or relief with NSAIDs. (Osteoid osteoma and osteoblastoma often present with nighttime back pain and/or recurrent back pain relieved by NSAIDs.)
11	Pain aggravated by prone position is suggestive of an epidural

	abscess.
12	Ask about fever, malaise, and rigor?
13	Ask the patient if he has any further comment and thank him

Warning signs of potentially serious causes of back pain in children include:

- Young age (less than 4 years old)
- Chronic interference with normal activity (e.g., school, sports, play)
- Duration of pain longer than 4 weeks
- Associated fever, weight loss, or other systemic symptoms
- Postural shift of trunk
- Any neurologic abnormality
- Limitation of spinal motion (e.g., bending forward, straight leg raise)
- Painful or left thoracic scoliosis

HISTORY ANSWER 8

Suggested checklist of a14- year- old student with chest pain

1	Greet the patient and Introduce himself
2	How severe, how often is the pain?
3	What is the type of pain? Its location?(Burning pain is associated with esophagitis. Sharp, stabbing pain relieved by sitting up or leaning forward is typical of pericarditis.)
4	When was the onset of pain? (Acute pain (<48 hours) is more likely to have an organic etiology. Chronic pain (>6 months) is more likely to be psychogenic, idiopathic. In an older child with sudden onset of pain consider an arrhythmia, pneumothorax, or musculoskeletal injury. In a young child with sudden onset of pain consider a foreign

	body (coin) in the esophagus, or injury.)
5	Is the pain induced by exercise? (Exercise-induced chest pain may be related to serious cardiac disease or asthma.)
6	Recent trauma or muscle overuse? (Musculoskeletal (chest wall) pain)
7	Eaten spicy foods? Taken tetracycline or other pills?
8	Recent leg trauma? (Pulmonary embolism. This is very rare in the pediatric age group.)
9	Recent significant stress (e.g., move, death of loved one, serious illness)?
10	Associated complaints? (Fever may imply pneumonia, myocarditis, pericarditis. Syncope, palpitations may imply cardiac arrhythmias or severe anemia. Joint pain, rash may relate chest pain to collagen vascular disease. Pain that resolves with parental attention may indicate an emotional etiology.)
11	Positive familial history? (Hypertrophic cardiomyopathy is often familial.)
12	Past medical history?(Previous Kawasaki disease, long-standing insulin-dependent diabetes mellitus, and sickle cell disease may have serious cardiac or pulmonary complications leading to chest pain. Marfan syndrome has increased risk for aortic dissection, pneumothorax. Asthma has increased risk for pneumonia, pneumothorax. Collagen vascular disease has increased risk for pleural effusion, pericarditis. Most underlying structural cardiac lesions rarely produce chest pain.)
13	Ask the patient if he has any further comment and thank him

Most Common Causes of Pediatric Chest Pain

1-Idiopathic

2-Musculoskeletal

Chest wall strain

Costochondritis

Direct trauma

3-Respiratory conditions

Asthma, cough, pneumonia

4-Gastrointestinal problems

Esophagitis, esophageal foreign body

5-Psychogenic and stress related

6-Cardiac pathology

HISTORY ANSWER 9

Suggested checklist of a 4-month- old infant with inconsolable cry

1	Greet the mother and Introduce himself
2	Ask about fever? (Potential need for evaluation of meningitis, other infections.)
3	Do attempts at consolation make the crying worse? (Paradoxically increased crying (especially with lifting, rocking) can be seen in meningitis, peritonitis, long-bone fractures, arthritis.)
4	Ask about stridor? (Implies possible upper airway obstruction <mechanical, functional>.)
5	Ask about expiratory grunting? (Higher likelihood of significant pathologic cause of crying <especially cardiac, respiratory, and/or infectious disease>.)
6	Cold symptoms and/or day-care attendance? (Increased likelihood of otitis media.)
7	Ask about vomiting?(Higher likelihood of pathologic gastrointestinal cause <e.g., obstruction, G-E reflux with possible esophagitis>,)
8	What is the pattern of feeding? (Over/underfeeding, excessive air swallowing, inadequate burping, improper formula preparation may contribute to excessive crying.)
9	Recent fall or trauma?
10	Ask about conjunctival redness, eye tearing, scratches near the eye? (Suggests corneal abrasion (fluorescein testing of eye warranted) or foreign body in eye (eversion of lid recommended).)

11	Ask about edema of individual toes, fingers, or penis? (Hair tourniquet syndrome)
12	Ask about tender swelling in inguinal or scrotal area? (Incarcerated hernia, testicular torsion)
13	Ask the mother if she has any further comment and thank her.

Factors that make this crying an emergency include:

- Suspicion of meningitis: stiff neck, bulging fontanel, fever
- Suspicion of intestinal obstruction: vomiting (especially bilious or projectile), mass on abdominal palpation, and/or bloody stools
- Suspicion of incarcerated hernia or testicular torsion
- Evidence of cardiac compromise (congestive heart failure [CHF], supraventricular tachycardia [SVT]): tachycardia, poor perfusion (capillary refill >3 seconds, poor distal pulses), rales
- Evidence of acute dehydration: weight loss, decreased urine output, orthostatic changes, poor perfusion
- Evidence of child abuse or neglect

Characteristic types of crying are

- High-pitched (shrill, piercing) crying in short bursts: associated with CNS pathology, especially with increased intracranial pressure
- High-pitched crying in longer bursts: seen in small for gestational age (SGA) infants, neonatal drug withdrawal
- Hoarse crying: seen in hypothyroidism, laryngeal diseases, hypocalcemic tetany

- Weak crying: may be seen in neuromuscular disorders, such as Hoffman-Werdnig syndrome, infant botulism, and/or the very ill infant
- Cat-like cry: as noted on every pediatric board exam for the last 35 years, a mewing cry can be associated with cri du chat syndrome (5p syndrome or absence of short arm of chromosome 5)

HISTORY ANSWER 10

Suggested checklist of a 7-year- old child with sore throat

1	Greet Mohammed and his mother, and Introduce himself
2	Sore throat in association with fever, headache, and/or abdominal pain? (Common association of symptoms presents in group A streptococci pharyngitis.)
3	Sore throat in association with fever, upper respiratory infection symptoms (cough, rhinorrhea, conjunctivitis)? (More suggestive of viral pharyngitis.)
4	Presence of drooling, voice changes? (Possibility of more severe infectious etiology, including retropharyngeal or peritonsillar abscess, epiglottitis.)
5	Foreign body exposure? (Retained foreign body (e.g., fishbone) or laceration/irritation from foreign body.)
6	Irritant exposure (e.g., dry air from heating or cooling system)? (Pharyngeal mucosal drying.)
7	Immunization status? (Possibility of diphtheria in the nonimmunized or incompletely immunized patient)
8	Tender cervical adenopathy? (Suggestive of infectious etiology; anterior cervical nodes described in classic GABS infection; posterior cervical nodes ĩ± hepatosplenomegaly suggest possibility of EBV.)

9	Ask Mohammed and his mother if they have any further comment and thank them.
	EXAMINER QUESTION
10	Q: When must antibiotic therapy begin in group A streptococci pharyngitis in order to prevent rheumatic fever?
	A: Antibiotics should be started within 9 days from the onset of symptoms in order to prevent this nonsuppurative complication of group A streptococci pharyngitis.

HISTORY ANSWER 11

Suggested checklist of a 3-year- old child with delayed speech

1	Greet the father and his child and Introduce himself
2	Ask about details of the developmental history? (Will allow one to determine if this is an isolated speech delay or global delay.)
3	Ask about trouble with chewing or excessive drooling for age? (Signs of oromotor dysfunction can be important in thinking about cause of delays and treatment.)
4	Ask about hearing and frequency of ear infections?(Children with undetected hearing loss are at higher risk for speech and language delays.)
5	Ask about the social abilities of the child? (Will help differentiate speech delays from autistic spectrum disorders.)
6	Ask about family history of speech/language delays, mental retardation and hearing loss? (Family history will encourage further exploration for less common causes of speech delay.)
7	Ask the father if he has any further comment and thank him

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THANKS FOR GOD

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