American Academy of Emergency Medicine Resident and Student Association

50 DRUGS EVERY EMERGENCY PHYSICIAN SHOULD KNOW

Thanks for using this guide. Please note that this is not meant to represent every drug an EP should know. This is simply a quick guide to many of the common and life saving drugs that we use every day. It does not include antibiotics and it does not include many important pediatric drugs. Use this with care and remember that every patient does not weigh 70kg.

Enjoy

Steven Elsbecker D.O. and Aryan Rabbar PharmD

AAEM/RSA

With you all the way.

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Special thanks to the University of Nevada Department of Emergency Medicine for their assistance with the flashcards.

Acetylcysteine - Mucomyst

MOA: replenishes glutathione stores, serves as glutathione substitute, and enhances sulfate conjugation of acetaminophen (Tylenol)

PO Dose: 140 mg/kg x 1, then 70 mg/kg q 4 hours x 17 doses (72 hours total)

IV Dose: 150 mg/kg in 200ml D5W over 1 hour, 50 mg/kg in 500ml D5W over 4 hours, 100 mg/kg in 1 liter D5W over 16 hours (21 total hours, may need to continue until LFTs and APAP level normalize)

Emergent Indications: acetaminophen (Tylenol) overdose

Where you'll get in Trouble: hypersensitivity reaction (stop infusion, switch to PO or slow infusion rate), while rare, you can also see hypersensitivity with PO as well, Preg B

Adenosine - Adenocard/Adenoscan

MOA: acts on A1 receptors in AV node causing temporary heart block

Dose: 6mg IV RAPID push, may give 12mg IV q 2 minutes if no effect x2

Emergent Indications: stable SVT, stable narrow complex tachycardias

Where you'll get in Trouble: prodysrhythmic, do not give in preexisting 2nd or 3rd degree block, Preg C

Albuterol - Proventil, ProAir, Ventolin

MOA: selective beta2 agonist

Dose: 2.5 - 5 mg q 20 minutes for 1st hour, then 2.5-10 mg q 1-4 hours prn (alt, 10-15 mg over 1 hour)

Emergent Indications: acute bronchospasm, hyperkalemia

Where you'll get in Trouble: tachycardia, hyperglycemia, hypokalemia, Preg C

Amiodarone - Pacerone

MOA: blocks K efflux (Class III antidysrhythmic); also has Na channel blocking (class I), beta blocking (class II), and Ca channel blocking (class IV) properties

Dose: Pulseless VF/VT: 300mg IV rapid push followed by 150mg IV rapid push if necessary at next pulse check

Stable wide complex tachycardias: 150mg IV over 10 minutes, followed by infusion of 1mg/min x 6hours, then 0.5 mg/min thereafter

Emergent Indications: pulseless VF/VT, Wide complex tachydysrhythmias

Where you'll get in Trouble: Causes hypotension, prodysrhythmic, Preg D

Atropine - AtroPen

MOA: direct anticholinergic

Dose: Organophosphate/carbamate toxicity: 1-6 mg IV q 3-5 minutes PRN, until dry secretions (can double dose each time until adequate response achieved)
Peds Bradycardia: 0.02 mg/kg IVx1; 0.5 mg maximum single dose; 1 mg max cumulative dose
Adult bradycardia: 0.5 mg IV, 3 mg max cumulative dose

Emergent Indications: Organophosphate/carbamate toxicity, bradycardia

Where you'll get in Trouble: hyperthermic patients, tachydysrhythmias, Preg C

Calcium Gluconate/Chloride

MOA: increases serum calcium, stabilizes cardiac myocytes

Dose: 10% IV solution (gluconate or chloride) contains 1 gram per 10 mL

Emergent Indications: hyperkalemia, hypocalcemia with dysrhythmia

Where you'll get in Trouble: dysrhythmia, tetany, calcium chloride 3x more potent than calcium gluconate (severe phlebitis with peripheral administration of calcium chloride), Preg C

Diazepam - Valium

MOA: enhances inhibitory effects of GABA

Dose: 2-10 mg PO/IV/IM q 6 hours PRN

Emergent Indications: Seizure abortion, alcohol withdrawal, agitation, muscle spasm

Where you'll get in Trouble: respiratory depression, hypotension, Preg D

Diltiazem - Cardizem

MOA: inhibits calcium influx in myocardium > vascular smooth muscle; prolongs AV nodal conduction

Dose: 0.25 mg/kg IV x1; may give 0.35 mg/kg IV x1 after 15 minutes; continuous infusion 5-15 mg/hr

Emergent Indications: stable Afib with RVR, stable SVT

Where you'll get in Trouble: iatrogenic hypotension, bradycardia, Preg C

Dobutamine

MOA: beta1 agonist > beta2 agonist

Dose: 2-20mcg/kg/min IV

Emergent Indications: decompensated heart failure, refractory hypotension

Where you'll get in Trouble: tachycardia, hypotension if not euvolemic, PVCs, Preg B

Dopamine

MOA: alpha1, beta1, and dopaminergic agonist

Dose: < 5 mcg/kg/min IV dopaminergic effects (not recommended)
5-10 mcg/kg/min IV primarily beta effects
10-20 mcg/kg/min IV primarily alpha effects

Emergent Indications: decompensated heart failure, hypotension

Where you'll get in Trouble: tachydysrhythmias, tissue necrosis if extravasation or arterial administration therefore needs to be given through central venous line, Preg C

Droperidol - Inapsine

MOA: antagonizes dopamine and alpha adrenergic receptors

Dose: 1.25 - 2.5mg IV q 4 hours PRN

Emergent Indications: vomiting prevention, migraine abortion

Where you'll get in Trouble: QT prolongation (Torsades), NMS, extrapyramidal side effects, Preg C

Epinephrine - EpiPen, Adrenalin

MOA: alpha and beta receptor agonist

Dose: ACLS: 1 mg 1:10,000 IV PALS: 0.01 mg/kg 1:10,000 IV
Anaphylaxis: 0.1-0.5 mg 1:1,000 IM/SQ (IM preferred)
Peds anaphylaxis/asthma: 0.01 mg/kg 1:1,000 IM/SQ (max single dose 0.3 mg)
Hypotension refractory to IVF: 1-10 mcg/min IV

Emergent Indications: anaphylaxis, ACLS arrest, PALS/NRP arrest, severe asthma

Where you'll get in Trouble: dosing errors (10 fold errors), tissue necrosis (needs to administered via central venous line), dysrhythmias, Preg C

Enoxaparin - Lovenox

MOA: binds to antithrombin III and inactivates factor Xa > thrombin

Dose: 1 mg/kg SQ q 12hours OR 1.5 mg/kg SQ q 24hours

Emergent Indications: PE, NSTEMI, unstable angina

Where you'll get in Trouble: monitor anti Xa levels in renal impairment or obesity (> 150 kg actual body weight), concomitant use with spinal anesthesia/analgesia or spinal puncture is an absolute contraindication (black box warning), Preg B

Esmolol - Brevibloc

MOA: selective beta1 antagonist

Dose: 500 mcg/kg loading dose, then continuous infusion of 50-300 mcg/kg/min

Emergent Indications: aortic dissection

Where you'll get in Trouble: precipitated CHF, hypotension, bronchospasm, Preg C

Esomeprazole - Nexium

MOA: inhibits parietal cell hydrogen-potassium ATPase (PPI)

Dose: 80 mg IV bolus followed by 8 mg/hour

Emergent Indications: Upper GI bleed (non-variceal)

Where you'll get in Trouble: fairly benign when used acutely, Preg B

Etomidate - Amidate

MOA: GABA-like effects on brain stem reticular formation causing hypnosis

Dose: 0.3 mg/kg IV

Emergent Indications: RSI induction

Where you'll get in Trouble: cortisol depression (questionable clinical significance for single administration), lowers seizure threshold, Preg C

Fentanyl - Sublimaze

MOA: opioid agonist producing analgesia with adjunctive sedative effects

Dose: 25-100 mcg IV q 1-2 hours; recommended dose 1 mcg/kg

Emergent Indications: pain control, sedation adjunct

Where you'll get in Trouble: respiratory depression, vasodilation (hypotension), laryngospasm, Preg C

Fomepizole - Antizol

MOA: inhibits alcohol dehydrogenase

Dose: 15 mg/kg IV loading dose, then 10 mg/kg q 12 hours x 4 doses,
then 15 mg/kg q 12 hours until ethylene glycol levels < 20 mg/dL and patient asymptomatic with normal pH

Emergent Indications: methanol or ethylene glycol toxicity

Where you'll get in Trouble: fairly safe, Preg C

Fosphenytoin - Cerebyx

MOA: stabilizes voltage dependent neuronal Na channels to stop seizure activity

Dose: 15-20 mg/kg IV loading dose administered at 150 mg/min

Emergent Indications: status epilepticus

Where you'll get in Trouble: rapid administration can cause hypotension or dysrhythmias, give with patient on monitor, Preg D

Furosemide - Lasix

MOA: inhibits Na and Cl reabsorption in distal renal tubule and ascending loop of Henle

Dose: usual dose in ED 20-40 mg IV, reassess, increase to desired effect (maximum single dose 200mg)

Emergent Indications: pulmonary edema, CHF exacerbation, hyperkalemia (if making urine)

Where you'll get in Trouble: volume depletion, hypokalemia, metabolic alkalosis, ototoxicity, Preg C

Glucagon - GlucaGen

MOA: stimulates cAMP production independent of beta receptor, increases gluconeogenesis and glycogenolysis

Dose: Beta-blocker/Ca channel blocker toxicity: 3-10 mg IV loading dose,
then 1-10 mg/hour IV continuous infusion if responsive to loading dose
Hypoglycemia: 1 mg IV/SQ/IM

Emergent Indications: beta-blocker toxicity, Ca channel blocker toxicity, hypoglycemia

Where you'll get in Trouble: anaphylactoid reaction, can cause hypotension, emesis (aspiration risk in altered patient), Preg B

Haloperidol - Haldol

MOA: Antagonist at D1 and D2 receptors

Dose: 5-10 mg PO/IM/IV q 2 hours (max 100 mg/day)

Emergent Indications: agitation, psychosis

Where you'll get in Trouble: do not give for dementia-related psychosis, NMS, EPS, QT prolongation, Preg C

Heparin

MOA: binds to antithrombin III thereby potentiating inactivation of thrombin and factors IX, Xa, XI, XII; prevents fibrinogen → fibrin; preferential inactivation of thrombin over other clotting factors

Dose: Venous thromboembolism: 80 units/kg IV x 1, then 18 units/kg/hour
ACS or Afib: 60 units/kg IV x 1, then 12 units/kg/hr

Emergent Indications: thromboembolism; ACS (enoxaparin preferred for NSTEMI)

Where you'll get in Trouble: bleeding (protamine may be given for reversal), dosing errors, Preg C

Hydrocortisone - SoluCortef

MOA: produces multiple gluco and mineralocorticoid effects

Dose: Adrenal insufficiency: 100mg IV bolus, then 50 mg IV q 6 hours x24 hours followed by a taper
Septic shock: 50 mg IV q 6 hours
Status asthmaticus: 1-2 mg/kg IV q 6 hours x24 hours followed by a maintenance regimen

Emergent Indications: acute adrenal insufficiency, status asthmaticus, vasopressor refractory septic shock

Where you'll get in Trouble: immunosuppression, hyperglycemia, Preg C

Hydromorphone - Dilaudid

MOA: opioid agonist producing analgesia with adjunctive sedative effects

Dose: 1-2 mg IV q 3-6 hours

Emergent Indications: Analgesia

Where you'll get in Trouble: Respiratory depression, vasodilation (hypotension), 1 mg of IV Dilaudid is approximately equal to 7 mg of IV morphine, Preg C

Insulin Regular

MOA: ↑ peripheral glucose uptake, increased inotropy, shifts potassium intracellularly

Dose: Hyperkalemia: 5-10 units IV x 1

CCB overdose: 1 unit/kg bolus given with 25 grams of dextrose if initial BG < 250 mg/dL; then initiate insulin drip at 0.1 – 1 unit/kg/hr titrated to SBP along with 0.5 g/kg/hr of dextrose titrated to maintain BG 100 – 200 mg/dL

DKA/HHS: 0.1 unit/kg bolus followed by continuous infusion 0.1 unit/kg/hour

Emergent Indications: hyperkalemia, DKA/HHS, CCB overdose

Where you'll get in Trouble: hypokalemia, hypoglycemia, only regular insulin can be given IV, Preg B

Ketamine - Ketalar

MOA: Acts on cortex and limbic system, NMDA receptor antagonist

Dose: Subdissociative: 0.1-0.5 mg/kg IV
Procedural sedation: 0.5-1 mg/kg IV
RSI induction: 2 mg/kg IV

Emergent Indications: analgesia, sedation, RSI induction

Where you'll get in Trouble: emergence reactions (treat with benzos or barbs), laryngospasm, IOP increase, ICP increase, tachycardia, hypertension, Preg D

Labetolol - Trandate

MOA: alpha1, beta1, and beta2 antagonist

Dose: Bolus dose: 20-80 mg IV q 10 minutes PRN
Continuous infusion: 1-8 mg/min titrated to effect

Emergent Indications: hypertensive emergency

Where you'll get in Trouble: precipitated CHF, bradycardia, bronchospasm, Preg C

Lorazepam - Ativan

MOA: Enhances inhibitory effects of GABA

Dose: Usual bolus dose: 1-2mg IV
Usual continuous infusion: 1-10 mg/hr

Emergent Indications: delirium tremens, status epilepticus, serotonin syndrome, agitation

Where you'll get in Trouble: respiratory depression, hypotension, Preg D

Magnesium Sulfate

MOA: participates in physiologic processes

Dose: Eclampsia: 2-4 grams IV over 5 minutes
Pulseless torsades: 2 grams IV push
Asthma exacerbation: 2 grams over 15 minutes

Emergent Indications: torsades, ventricular dysrhythmias, eclampsia, status asthmaticus

Where you'll get in Trouble: respiratory depression, hypotension, Preg A

Mannitol - Osmitrol

MOA: osmotic diuretic

Dose: 1 gram/kg IV x 1

Emergent Indications: elevated ICP, impending herniation

Where you'll get into trouble: may cause dehydration, osmotic nephrosis

Methohexital - Brevital

MOA: produces cortical and cerebellar sedation, hypnosis (ultra short-acting barbiturate)

Dose: 1mg/kg IV, then 0.5 mg/kg q 2-5 minutes PRN

Emergent Indications: procedural sedation

Where you'll get in Trouble: laryngospasm (give more brevital), respiratory depression, hypotension, Preg B

Methylprednisolone - SoluMedrol

MOA: multiple gluco and mineralocorticoid effects

Dose: Asthma: 1mg/kg IV
Hypersensitivity reaction: 1 mg/kg IV
PCP PNA: 30mg IV BID x 5 days followed by a gradual taper

Emergent Indications: severe asthma, PCP PNA with elevated A-a gradient or PaO2 < 70 mmHg, acute hypersensitivity reaction

Where you'll get in Trouble: immunosuppresion, hyperglycemia, Preg C

Metoclopramide - Reglan

MOA: antagonizes dopamine receptors in the chemoreceptor trigger zone

Dose: 10 mg IV q 6 hours PRN

Emergent Indications: vomiting prevention and treatment

Where you'll get in Trouble: tardive dyskinesia, extrapyramidal symptoms, dystonia, methemoglobinemia, Preg B

Midazolam - Versed

MOA: enhances inhibitory effects of GABA

Dose: RSI induction: 0.1 mg/kg IV
Usual continuous infusion: 1-10 mg/hour
Procedural Sedation: 0.02 - 0.04 mg/kg IV

Emergent Indications: seizure abortion, procedural sedation, ventilator sedation, RSI

Where you'll get in Trouble: respiratory depression, hypotensive effects, Preg D

Morphine sulfate

MOA: opioid agonist producing analgesia with adjunctive sedative effects

Dose: 2-10 mg IV q 2-6 hours PRN; recommended dose 0.1 mg/kg IV

Emergent Indications: pain control

Where you'll get in Trouble: respiratory depression, vasodilation (hypotension), Preg C

Nimodipine - Nimotop

MOA: Ca channel blocker that is selective for cerebral arteries

Dose: 60 mg PO qh4

Emergent Indications: SAH

Where you'll get in Trouble: hypotension although this is minimized due to its selectivity, Preg C

Nitroglycerin

MOA: venodilator, stimulates cGMP production

Dose: 5-200mcg/min, increase 10 mcg q 3-5 min until desired effect; higher doses are usually required for pulmonary edema therefore recommend starting at a dose > 5 mcg/min

Emergent Indications: CHF, angina

Where you'll get in Trouble: hypotension, methemoglobinemia, Preg C

Nitroprusside - Nipride

MOA: direct vasodilator, breaks down to release NO

Dose: Initiate at 0.3 mcg/kg/min IV and titrate to effect; maximum dose 10 mcg/kg/min; if blood pressure not controlled after 10 minutes at max dose, nitroprusside should be discontinued

Emergent Indications: hypertensive emergency

Where you'll get in Trouble: CN toxicity, methemoglobinemia, hypotension, Preg C

Norepinephrine - Levophed

MOA: alpha1 agonist > beta1 agonist

Dose: 1-30 mcg/min IV

Emergent Indications: hypotension refractory to IVF

Where you'll get in Trouble: tachydysrhythmias, tissue necrosis if catheter infiltrates or administered through an arterial line therefore needs to be given via a central venous line, Preg C

Octreotide - Sandostatin

MOA: vasoconstricts vessels (more selective for GI vessels), reduces portal vessel pressure

Dose: Bleeding esophageal varices: 50 mcg IV bolus, then 50 mcg/hour IV
Sulfonylurea toxicity: 50 mcg SQ q 6 hours PRN

Emergent Indications: bleeding esophageal varices, sulfonlyurea overdose

Where you'll get in Trouble: Precipitated biliary dz, Preg B

Olanzapine – Zyprexa

MOA: antagonizes dopamine, histamine, alpha1, and 5HT2 receptors

Dose: 5-10mg IM/ODT (max 30mg/day)

Emergent Indications: agitation, psychosis

Where you'll get in Trouble: do not give for dementia-related psychosis, NMS, EPS, orthostatic hypotension, QT prolongation, not to be given IV, Preg C

Ondansetron - Zofran

MOA: antagonizes serotonin 5-HT3 receptors, centrally acting antiemetic

Dose: usual dose 4-8 mg IV q 4-6 hours PRN

Emergent Indications: vomiting prevention and treatment

Where you'll get in Trouble: QT prolongation, torsades (rare), Preg B

Phenobarbital

MOA: barbiturate, causes sedation, hypnosis and anesthesia

Dose: 20 mg/kg IV x 1, may repeat with an additional 5-10 mg/kg dose in 20 minutes (max dose 30 mg/kg); max infusion rate 50 mg/min

Emergent Indications: status epilepticus

Where you'll get in Trouble: respiratory depression, hypotension, Preg D

Prednisone

MOA: produces various gluco and mineralocorticoid effects

Dose: 1 mg/kg/day PO (usual dose 5-60 mg based on patient response)

Emergent Indications: Asthma exacerbation, PCP PNA with A-a gradient >35 or PaO2 < 70mmHg, allergic reaction

Where you'll get in Trouble: immunosuppresion, GI ulceration/perforation, hyperglycemia, Preg C

Propofol - Diprivan

MOA: GABAa agonist, Na channel blocker

Dose: Procedural Sedation: 1 mg/kg IV bolus then 0.5 mg/kg q 3 minutes to effect
RSI induction: 1.5-2.5 mg/kg IV x 1
Ventilator Sedation: 5-50 mcg/kg/min)

Emergent Indications: procedural sedation, RSI induction, ventilator sedation

Where you'll get in Trouble: hypotension, anaphylaxis, bradycardia, apnea, Preg B

Protamine sulfate

MOA: ionically binds heparin

Dose: 1 mg neutralizes 100 units of heparin (max dose 50 mg); administer at a rate of 5 mg/minute

Emergent Indications: heparin induced bleeding

Where you'll get in Trouble: anaphylaxis in previous use or fish allergy, rapid infusion can cause hypotension, Preg C

Rocuronium

MOA: non-depolarizing neuromuscular agent

Dose: 1mg/kg IV

Emergent Indications: RSI paralysis

Where you'll get in Trouble: prolonged paralysis, Preg B

Sodium Bicarbonate

MOA: increases serum bicarbonate (increases buffer stores)

Dose: Hyperkalemia or metabolic acidosis: 50 mEq IV x 1 (1 amp = 50 mEq)
TCA toxicity: 1-2 mEq/kg IV bolus to achieve a serum pH of 7.45-7.55 and QRS narrowing; effective serum alkalinization unlikely with continuous infusion
Salicylate toxicity: 3 amps (150mEq) in 1 liter D5W given as 10-20 ml/kg bolus, then 2-3ml/kg/hr; goal urine pH 7.5-8.0

Emergent Indications: hyperkalemia, TCA toxicity, salicylate toxicity, metabolic acidosis

Where you'll get in Trouble: caution in CHF, overshooting into metabolic alkalosis, hypernatremia, Preg C

Succinylcholine

MOA: depolarizing neuromuscular agent

Dose: 1.5 mg/kg (or 3-4 mg/kg IM)

Emergent Indications: RSI paralysis

Where you'll get in Trouble: hyperkalemia, subacute burn/crush with hyperkalemia, glaucoma (increases IOP), increases ICP, Preg C