

ER/Clinic (When The Poop Hits The Fan) Cheat Sheet

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DRUG ASSISTED INTUBATION

PREOXYGENATE X 3 minutes with 100% Oxygenated Non-Rebreather

INDICATIONS FOR PRETREATMENT MEDS = "ABC": Asthma (RAD), Brain (Head Trauma) & Cardiovascular

- **Fentanyl** [For Elevated ICP, AAA, Aortic Dissection & CAD] 3 mcg/kg IV push over 1 minute (O 3 min/D 30-60m) Give **3 minutes** before sedative
[Avoid in PEDS, Shock, HypOTensive or HypOVolemic]
- **Albuterol** Nebulizer – Give **10 minutes before** intubation to help **prevent acute bronchospasm**
- **Lidocaine** 1.5mg/kg – Give **3 minutes before** intubation; For **patients with asthma/COPD** to **decrease hypertensive response and bronchospasm (No need to give if Albuterol was given)**
- **Infants < 1 year** or anyone **5 or under** using **Sux** or **> 5** using **2nd dose of Sux**:
Atropine 0.03 mg/kg, Max 0.5mg IV 2 minutes before intubation (**May help prevent Bradycardia**)

THEN SEDATION [Onset -" O"/Duration -" D"]

Etomidate 0.3 mg/kg (O 15-45s/D 3-12m)

- [Use in HypOTensive pts] [May cause **Seizures**; Avoid in **Sepsis**]

Propofol 2-3 mg/kg (O 15-45s/D 5-10m)

- [Good for **RAD**] [Avoid in TBI & HyPOtension]

Midazolam 0.2 mg/kg (O 30-90s/D 15-30m)

- [Good to use for **Seizures**] [Avoid in TBI; **Decreases BP**]

Ketamine 2-4 mg/kg (O 45-60s/D 10-20m)

- [Good for **Asthma Patients/Sepsis**/Bronchodilator/Maintains RR/**Increases BP**]
- [Avoid in **Hypertensive Patients w Ischemic Cardiac Disease**]

CHOICE OF INDUCTION AGENT

TBI or CVA

- **Etomidate (Best for HypERTensive pt)** or **Ketamine (Best for HypOTensive pt)**
AVOID Ketamine in Cerebral Herniation [Dilated pupils/HA/AMS/SZ/Decreased Reflexes]

Status epilepticus

- **Propofol (Best)** or **Etomidate (2nd choice)** or **Midazolam (3rd)**; AVOID Ketamine

Reactive airway disease

- **1st line: Ketamine & Propofol**
- **2nd line: Etomidate & Midazolam**

Cardiovascular disease

- **Etomidate**

Shock & Sepsis

- **Ketamine 1 mg/kg** or **Etomidate 0.15 mg/kg (Lowest dose to help prevent hypotension)**

THEN PARALYTIC

Succinylcholine 0.6-2 mg/kg (O 30-60s/D 5-10 min)

[**CONTRA** – K >5.5; **Burns** >24H; **Crush Injury** >3 days; **CVA** >72H; (**MS/ALS**)/**Spinal Cord Injury**; H/O **MH**]

Rocuronium 0.6-1.2 mg/kg (O 45-60s/D 30-60 min)

- [Use for **Burns/Dialysis/Crush Injury**]

Vecuronium 0.1 mg/kg (O 1.5-3 min/D 30-60 min)

Post-Intubation Maintenance Meds

(Sedation) **Midazolam** 0.1-0.4 mg/kg/HR; **Ketamine** 0.5 mg/kg/min; **Propofol** 0.6 mg/kg/HR
* **Etomidate** should **NOT** be used as an **infusion** or in **repeated bolus doses** for maintenance of sedation after intubation*

(Paralysis) **Vecuronium** 10-15 mcg/kg IV q12-15min prn or 1 mcg/kg/min

Rocuronium 0.1-0.2 mg/kg IV prn or 4-16 mcg/kg/min

(Analgesia) **Fentanyl** 0.3 to 1.5 mcg/kg/HR; **Morphine** 0.01 to 0.15 mg/kg/HR

DAI Peds

PREOXYGENATE X 3 minutes with **100% Oxygenated** Non-Rebreather

THEN SEDATION

Hypovolemic – **Etomidate** 0.1mg/kg or **Midazolam (Best for Peds)** 0.1mg/kg **3 minutes** before procedure

Normovolemic – **Etomidate** 0.3mg/kg or **Midazolam** 0.05-0.3mg/kg

Fentanyl 1mcg/kg per dose, max 4mcg/kg

Propofol 0.5mg/kg Q 3-5 min, max 1.5mg/kg

Ketamine 1-2 mg/kg loading dose IV; 1 mg/kg IV Q 10-15min; **give slowly** (not to exceed 0.5 mg/kg/min)

THEN PARALYTIC

Succinylcholine <10 kg: 2mg/kg; >10kg: 1mg/kg [O 30-60s/D 5-10 min]

Rocuronium 0.6 – 1.2mg/kg [O 60s/D 30 min]

Vecuronium 0.1mg/kg [O 2.5-3 min/D 30-60 min]

DAI CHECKLIST

1. **Oral Pharyngeal Airway**
2. **Laryngoscope** with **Macintosh** Blade, **Miller** Blade or **GlideScope**
3. **Endotracheal tube** w **Stylet**
4. **Gel, syringe** and **bougie**
5. **IV** both arms with **NS** 1,000/HR
6. **Non-rebreather mask** with **100% Oxygen**
7. **Towel roll** under patient's shoulders– **RAMP** Position (Tragus of ear to sternal notch level)
8. **Inspect** patient's oral airway and **Suction**
9. **Ventilator** and **CO2** detector
10. **Assistant** for **C-Spine** stabilization and **Cricoid** pressure if needed
11. **Pre-oxygenate** patient for **3 minutes 100% O2** before procedure
12. Estimate **patient** weight
13. **LMA Laryngeal Tube, King Tube** or **Combitube** available
14. **Pretreatment medications** if indicated, e.g. **Lidocaine, Atropine, Albuterol, Fentanyl, Atropine**
15. **SEDATION:**
 - **Etom** 0.3mg/kg; **Prop** 2mg/kg; **Vrsd** 0.2mg/kg; **Ket** 2mg/kg; **Fntyl** 2mcg/kg
16. **PARYLITIC:**
 - **Roc** 1mg/kg, **Sux** 0.6-2mg/kg, **Vec** 0.1mg/kg

CARDIOVERSION, DEFIBRILLATION & PACING

Cardioversion Sedation

Propofol (Diprivan) 1-2 mg/kg IV

Etomidate (Amidate) 0.2 mg/kg IV bolus x 1-3 doses

Midazolam (Versed) 5 mg IV; PEDS 0.1-0.6mg/kg

Diazepam (Valium) 2-10mg IM/IV

Midazolam and Diazepam have a significantly **longer** recovery time, and can produce confusion in the recovery period as well.

Cardioversion and Defibrillation Joules

BIPHASIC (use device-specific energies when known)

Defibrillation is 200 J

Synchronized **Cardioversion** for atrial rhythms is 50-75-120 J; (**200 J** may be used for **obese** patients)

Synchronized **Cardioversion** for v-tach is 120-150-200 J

PEDIATRIC

First shock **defibrillation**, use **2 J/kg**; Additional defibrillation attempts are at **4 J/kg**

Pediatric **cardioversion** gets **1 J/kg first** shock

Additional cardioversion shocks are at **2 J/kg**

Cardioversion VTE Prophylaxis for A-Fib/A-Flutter/A-Tach/SVT

** Perform **Transesophageal Echocardiography (TEE)** before cardioversion, if possible, to lower risk of dislodging a **left atrial thrombus** **

Enoxaparin (Lovenox) 1 mg/kg SC q **12 hours** (Onset of action **3-5 hours**)

OR

Apixaban (Eliquis) 5 mg PO **BID** (Onset of action **3-4 hours**)

OR

Rivaroxaban (Xarelto) 20 mg PO **daily** (Onset of action **3-4 hours**)

Transcutaneous Pacing

Pacer Rate – **70 BPM**

Output – **Start** at **40 mA** and increase until capture

CARDIAC ARRHYTHMIA PROTOCOL

Asystole/PEA

CPR per ACLS Protocol; Advanced Airway

Epinephrine 1 mg IV/IO Q 3-5 minutes

Atrial Fibrillation/Atrial Flutter [Unstable = CARDIOVERSION]

Diltiazem (Rate control **NOT** Rhythm control) [**CONTRA** – LVEF < 40%]

- 0.25 mg/kg (average adult dose - 20 mg) direct IV over 2 minutes; after 15 minutes, may give second dosage of 0.35 mg/kg over 2 min (average adult dose - 25 mg)
- Maintenance 5-15 mg/HR IV

Metoprolol (Mainly Rate control) [**CAUTION** – Asthma/COPD/Hypoxia]

- 5 mg IV every 5 minutes; MAX 6 doses
- Maintenance 25-100 mg po Q12HR

Digoxin (Adjust dose based on Creatinine/GFR/Elderly)

- Possible **synergistic effect** when used with **CCBs** and **B-blockers**
- 0.125-0.25 mg IV X 1 [2.4-3.6 mcg/kg IV]; May repeat in 6 hours X 1 dose
- Maintenance 0.125-0.25 mg IV QD
- Check Digoxin level 6-8 hours after last dose given; Target: < 1 ng per mL

AV Block Second Degree Type II (Symptomatic) & Third Degree

[**ATROPINE** - **NOT** effective for treatment of second-degree type II or third-degree AV block]

Transcutaneous Pacing Start **70 BPM** and **40 mA**

Epinephrine IV Drip 0.1-0.5 mcg/kg/min (70kg adult: 7-35 mcg/min)

Dopamine IV Drip 5-10mcg/kg/min

Bradycardia [Transcutaneous Pacing if drugs are ineffective]

Atropine 0.5 mg Q 3-5 minutes; Max 3 mg

Epinephrine IV Infusion 2-10 mcg/minute; titrate to patient response

Dopamine IV Infusion 5-10 mcg/kg/minute; titrate to patient response

SVT/PSVT Narrow Complex [Unstable = CARDIOVERSION]

Adenosine (1st line for SVT; 2nd line for PSVT) [**Contra** – Drug induced tachycardia]

- 6 mg rapid IV push; May repeat with 12 mg IV 1-2 minutes X 2

Diltiazem (1st line for PSVT; 2nd line for SVT) (Rate control **NOT** Rhythm control) [**CONTRA** – LVEF < 40%]

- 0.25 mg/kg (usual adult dose, 20 mg) direct IV over 2 minutes; after 15 minutes, May repeat dosage of 0.35 mg/kg actual body weight over 2 min (average adult dose - 25 mg)

Verapamil [**CONTRA** – LVEF < 40%]

- 5 mg IV over 2 minutes; may repeat 5-10 mg IV in 15-30 minutes PRN

Metoprolol (Mainly Rate control) [**CAUTION** – Asthma/COPD/Hypoxia]

- 5 mg IV over 5 minutes; MAX 6 doses
- Maintenance 25-100 mg po Q12HR

Torsades de Pointes [Unstable or Pulseless = DEFIBRILLATION]

*TdP is a **COMBINATION** of **polymorphic** ventricular tachycardia **PLUS** prolonged QT-interval > **475ms***
Labs **CMP & Magnesium** levels - **Low Potassium, Magnesium & (Calcium - less common)** can cause TdP

Offending Drugs:

Class 1a - Quinidine, Procainamide, Disopyramide

Class 1c – Flecainide, Propafenone

Class III – Amiodarone, Sotalol (Betapace), Bretylium, Ibutilide, Dofetilide, Dronedarone

Also - Phenothiazines, Tricyclic Antidepressants, lithium, Ziprasidone, Haldol, Antiretroviral drugs, Methadone, Anthracycline chemotherapeutic agents (Doxorubicin, Daunomycin), Celexa & Lexapro

Consider **Antifungals & Macrolides, large amount of Loperamide (Imodium) or Cocaine**

Fluoroquinolones (In order of greatest risk):

1-Moxifloxacin (Avalox, Vigamox)

2-Levaquin, Gemifloxacin, Ofloxacin

3-Cipro (Lowest risk)

TREATMENT

***DO NOT** use **Amiodarone, Procainamide, Beta-blockers**, or most other Antiarrhythmics*

1) Magnesium Sulfate

- **[w/ cardiac arrest]**

Dose: 2-4 g IV over 1-2 min x 1; may follow w/ 3-20 mg/min IV

- **[w/o cardiac arrest]**

Dose: 2-4 g IV over 15 min x 1; may follow w/ 3-20 mg/min IV

2) Remove offending drugs

3) IV Potassium (Adjunct med) targeting a high-normal potassium level (>4.5 mEq/L)

4) Sodium Bicarb (For Quinidine-induced TdP) [1-2 mEq/kg IV x 1]; may repeat dose x 1 PRN

5) Transcutaneous/Transvenous Pacing at 90-140 bpm (If bradycardic)

6) Other medications may be considered (Isoproterenol (For acquired/drug-induced TdP), Esmolol, Mexiletine, & Dilantin) but a Cardiologist MUST be consulted FIRST.

Lidocaine is no longer recommended for Torsades. Occasionally, it can have an initial beneficial effect, but Torsades recurs in all cases.

V-Fib or Pulseless V-Tach [ACLS Protocol including CPR and Defibrillation]

CPR and Defibrillation 200 Jules per ACLS Protocol

- **Epi 1 mg Q 3-5 min**
- **Amiodarone 300 mg may repeat with Amiodarone 150 mg once**
- **Lidocaine (2nd line – Use if Amiodarone is unavailable) 1-1.5 mg/kg slow IV bolus over 2-3 minutes; Max 3 mg/kg**

Chest compressions and maintain airway

ROSC - If successful then use maintenance dose of:

- **Epinephrine 0.1- 0.5 mcg/kg/min**
- **Amiodarone of 1 mg/minute**
- **Lidocaine 1-4 mg/min**

V-Tach with Pulse

Stable with pulse

- **Amiodarone** 150 mg over 10 minutes; then maintenance dose of 1 mg/minute

Unstable with Pulse

- **Synchronized Cardioversion** 100 Jules

Wide Complex *Stable* Tachycardia Infusion Meds [Unstable = CARDIOVERSION]

Procainamide IV

- 20-50 mg/min until arrhythmia suppressed; Max 17mg/kg; Maintenance 1-4 mg/min

Amiodarone IV

- 150 mg over 10 minutes; Repeat PRN; Maintenance 1mg/min X 6 hours

Sotalol IV (Betapace)

- 100 mg (or 1.5 mg/kg) over 5 minutes; **Avoid** if prolonged QT

WPW [Unstable = CARDIOVERSION]

AV node-specific antiarrhythmic drugs that are normally used to control the ventricular rate during atrial fibrillation, e.g. Beta-blockers, CCBs (Verapamil - MOST DANGEROUS), Adenosine, Amiodarone, & Digoxin, are CONTRAINDICATED for WPW patients with preexcited A-Fib or for any rate >200 bpm.

*Administering these drugs for WPW under the **WRONG** circumstance can lead to **V-FIB!***

***ALWAYS** consult a **CARDIOLOGIST** before administering pharmacological treatment for WPW*

VAGAL MANEUVERS is **FIRST** option then use **pharmacological treatment** if **urgent** treatment is required

WPW MEDICATIONS

Ibutilide IV (Class III antiarrhythmic drug): 1 mg over 10 minutes

Procainamide IV - Loading dose: Infuse 20 to 50 mg/minute until arrhythmia is controlled, hypotension occurs, QRS complex widens by 50% of its original width, or total of 17 mg/kg is given. **1st Choice** for WPW preexcited AF or atrial flutter

Verapamil IV: 5 mg Q2-3 minutes; max 15 mg; **2nd Choice** for WPW preexcited AF or atrial flutter

Adenosine IV: 6 mg rapid IV push; May repeat with 12 mg IV 1-2 minutes X 2

Amiodarone IV: 150 mg over 10 minutes then 1 mg/min

Digoxin IV: 500 mcg over 20 minutes

Magnesium IV: 2-4 grams over 15 minutes

TOXINS

Drug Overdose Protocol – POISON CONTROL (800) 222-1222

ABCDs, Early Airway Protection, GCS, O2, IV, EKG, CXR, Telemetry, Suicide Precautions

Consider Gastric Lavage if appropriate

LABS - CBC, CMP, UA, UDS, Urine HCG, Lipase, ABG, Acetaminophen, Salicylate, ETOH, PT/INR, PTT,
Drug Levels of offending drug if appropriate

HISTORY:

- **AMPLE**
- **Agents** ingested; **Amount** of ingestion; **Time** of ingestion
- Cause and/or **reason for ingestion** (e.g., accidental, intentional, suicide attempt, recreational)

HIGHLY DANGEROUS DRUGS – Propranolol, Verapamil, TCA (Elavil, Pamelor, Doxepin, Tofranil), **Colchicine**

GASTRIC LAVAGE (w/wo **Sorbitol**) may be performed if the patient presents **obtunded** within **1-2 hours of ingestion** when there is **no good antidote** of therapy or if the patient **rapidly deteriorates** while in the emergency department.

Activated Charcoal: (Adults) 1-2g/kg X 1, Max 100g, Minimum 30g

- Considerable **morbidity** is associated with **charcoal aspiration**. Its use **should be limited** to substances that would be well absorbed and have a high likelihood of toxic dose ingestion. It is **not recommended** in instances in which **GHB or GBL** are known to be the only intoxicants.
- **Multi-dose** activated charcoal (30-50 g q4h) is recommended for overdoses with **barbiturates** (Phenobarbital), the hypnotic sedative **Glutethimide** (Doriden, Elrodorm, Noxyron) and the tranquilizer **Meprobamate** (Miltown or Equanil)

Bilateral *Pinpoint* Pupils Under 2mm (Miosis) Causes

1. **Opioid Overdose [Fentanyl, Heroin, Codeine, Hydrocodone, Oxycodone, Morphine, Hydromorphone]**
2. **Organophosphate** (Insecticide) & Acetylcholinesterase Inhibitors (**SLUDGE**)
 - Increased saliva and tear production, diarrhea, vomiting, small pupils, sweating, muscle tremors, and confusion
 - **SLUDGE** (salivation, lacrimation, urination, diarrhea, GI upset, emesis)
 - **DUMBELS** (diaphoresis and diarrhea; urination; miosis; bradycardia, bronchospasm, bronchorrhea; emesis; excess lacrimation; and salivation)
3. **Pontine Hemorrhage**

1. Opioid Overdose

[Fentanyl, Heroin, Codeine, Hydrocodone, Oxycodone, Morphine, Hydromorphone]

Naloxone 0.4 - 2 mg in the adult **IV/IO/IM/SC**

Slowly administer 0.4 - 2 mg of IV every **1-2 minutes** for a more controlled reversal of opiate effect.

Assisted **bag-valve-mask** breathing can be provided until the patient is ventilating adequately.

The onset of effect following IV Naloxone administration is typically **1-2 minutes**; maximal effect is observed within **5-10 minutes**. For partial response Narcan can be repeated **as often as needed**.

**** If NO IMPROVEMENT** after giving **10mg of Narcan**, then **Opioid overdose** is an **UNLIKELY CAUSE.****

- **Naloxone - PEDIATRIC [IV/IO/IM/SC/ETT]**

[<1 mo]

0.1 mg/kg IV q2-3min prn; Alt: 0.1 mg/kg IM q3-8min prn; Info: may repeat q1-2h if sx recur

[1 mo-5 yo and <20 kg]

0.1 mg/kg IV q2-3min prn; Alt: 0.1 mg/kg ETT/SC/IM/IO q3-8min prn; Info: SC/IM/IV administration preferred; may repeat q1-2h if sx recur

[>5 yo or >20 kg]

1-2 mg IV q2-3min prn; Alt: 2 mg ETT/SC/IM/IO q3-8min prn; 0.005 mg/kg IV x1, then 0.0025-0.16 mg/kg/h IV; Info: SC/IM/IV admin. preferred; may repeat q1-2h if sx recur; reassess tx if no response after 10 mg

2. Organophosphate or Carbamate Insecticide Poisoning - ADULT

Decontamination; **AVOID Succinylcholine**

Atropine- doubling approach with escalation of doses from 1 mg to 2 mg, 4 mg, 8 mg, 16 mg, etc.

OR

Give weight-based **Atropine** dosage:

[>41 kg] **Atropine**

2 mg IM x1 for mild SX; may repeat q10min x2 if SX progress; give 2 mg IM x3 for severe SX

[18-41 kg] **Atropine**

1 mg IM x1 for mild SX, may repeat q10min x2 if SX progress; give 1 mg IM x3 for severe SX

[7-18 kg] **Atropine**

0.5 mg IM x1 for mild SX; may repeat q10min x2 if SX progress; give 0.5 mg IM x3 for severe SX

2. Organophosphate or Carbamate Insecticide Poisoning - PEDS

[<2 yo] **Atropine**: Continue atropinization until muscarinic SX gone

0.05 mg/kg IM or 0.02 mg/kg IV q10-30min prn; Info: doses <0.1 mg assoc. w/ paradoxical bradycardia

[2-10 yo] **Atropine**: Continue atropinization until muscarinic SX gone

1-2 mg IM/IV q10-30min prn; Start: 1 mg IM/IV x1

[>10 yo] **Atropine**: Continue atropinization until muscarinic SX gone

1-2 mg IM/IV q10-30min prn; Start: 2 mg IM/IV x1

Bilateral DILATED Pupils

1. **Cocaine**, Atropine, **Meth**, Wellbutrin, **Benadryl**, Vistaril, **Atrovent**, Detrol, **DM**
2. **Anticholinergics: ANTI**histamines, **ANTI**depressants, **ANTI**psychotics, **ANTI**spasmodics, **ANTI**parkinsons
3. Head injury, **Stroke**, Seizures

1. Cocaine or Meth Overdose

Give **Benzodiazepines**:

- **Ativan** 4 mg/dose slow IV at 2 mg/min or 0.1 mg/kg (May give IM if no IV access)
- **Diazepam** 5-10 mg IV/IM q5-10min; not to exceed 30 mg
- **Midazolam (Versed)** 0.5-1 mg given over 2 minutes (not to exceed 2.5 mg/dose); wait 2-3 minutes to evaluate sedative effect after each dose (Can give IM if no IV access)

2. Anticholinergic Overdose

1) Hot as Hades, 2) Blind as a Bat, 3) Dry as a Bone, 4) Red as a Beet, 5) Mad as a Hatter

Dilated non-reactive pupils, hypertension, tachycardia, flushed dry skin, fevers, seizures, hallucinations

Give **Benzodiazepines**:

- **Ativan** 4 mg/dose slow IV at 2 mg/min or 0.1 mg/kg (May give IM if no IV access)
- **Diazepam** 5-10 mg IV/IM q5-10min; not to exceed 30 mg
- **Midazolam (Versed)** 0.5-1 mg given over 2 minutes (not to exceed 2.5 mg/dose); wait 2-3 minutes to evaluate sedative effect after each dose (Can give IM if no IV access)

Give **Physostigmine** 0.5-2 mg slow IVP (not to exceed 1 mg/min); keep **Atropine** nearby for immediate use

If no response, repeat **q20min** PRN

If initial dose effective, may give additional **1-4 mg q30-60min** PRN

RARELY USED; indicated **ONLY** when life-threatening symptoms related to anticholinergic toxicity

Benzodiazepine Overdose (Valium/Xanax/Ativan/Klonopin)

[Dizzy, Confusion, Drowsiness, Blurred vision, Anxiety, Agitation, Nystagmus, Hypotension]

Flumazenil **RISKS USUALLY OUTWEIGH BENEFITS**

0.2-0.5 mg IV q minute (Has very short half-life); Up to 3mg/hour or 5 mg total

Flumazenil:

- Flumazenil competitively and reversibly **binds benzodiazepine receptors** (i.e., GABA).
- The use of Flumazenil for suspected benzodiazepine overdoses is **CONTROVERSIAL**. Some sources would go so far as to suggest that Flumazenil has no role in the routine treatment of a coma unless the patient is known **NOT** to be **benzodiazepine dependent** and the **overdose** is known to result **ONLY** from **benzodiazepines**. If used, Flumazenil should be administered **slowly (0.2 mg/min up to 3-5 mg)** because large doses cause agitation and withdrawal. Serious risk of inducing **seizures** exists, particularly in patients with **co-ingestions or long-term use of benzodiazepines**.
- Flumazenil is **contraindicated** in patients with increased intracranial pressure (**ICP**) or closed head injury (**CHI**), those with a history of **epilepsy**, or those known to have ingested a tricyclic antidepressant (**TCA**) agent.

Beta-Blocker Overdose

Bradycardia, **hypotension**, depressed level of consciousness, **seizures** (Propranolol), bronchospasm (rare)

Treatment:

- **Glucagon 50-150 mcg/kg IVP** over 1 minute, **THEN 3-5 mg/hr** or **50-100 mcg/kg/hr IV**; titrate infusion to achieve adequate clinical response. **Glucagon** enhances **myocardial contractility, heart rate, and AV conduction**; **Drug of choice** for beta-blocker toxicity. Because a **glucagon bolus** can be **diagnostic** and **therapeutic**, Empirically administer glucagon and check for a response
- **Atropine (for severe bradycardia) 0.5 mg Q5 minutes; Max 3 mg**
- **IV Fluids**
- **Gastric lavage** if within **2 hours** of ingestion
- Multi-dose **activated charcoal** (MDAC) may reduce bioavailability of **Nadolol** and **Sotalol**
- **Levophed** or **Dopamine** if severely **hypotensive refractory to IV fluids**
- **Epinephrine** for **severe bradycardia - Unresponsive to atropine: 2-10 mcg/min** by **IV infusion** or **0.1-0.5 mcg/kg/min (7-35 mcg/min in 70 kg patient)**; titrate to patient response
- **Cardiac pacing**
- **Benzodiazepines** (in patients with **seizures**)
- **High dose Insulin: 1 U/kg** bolus followed by continuous infusion of **1-10 U/kg/h**; considered for **overdoses** that are **refractory to crystalloids, glucagon, and vasopressor** infusions
- **Hemodialysis** in **severe cases** of **Atenolol, Nadolol** and **Sotalol** overdose. **Propranolol, Metoprolol, and Timolol** cannot be removed by hemodialysis
- Consider **Extracorporeal membrane oxygenation (ECMO)**

Salicylate Overdose

Treatment includes **ABCs, limiting absorption, enhancing elimination, correcting metabolic abnormalities, and providing supportive care. No specific antidote** is available for **salicylates**.

Consider **EARLY** ventilatory support (**Intubation**) if needed

Gastric lavage & Activated Charcoal with **Sorbitol** may be beneficial up to 60 minutes after salicylate ingestion. **Warmed (38°C) isotonic LR or NaCl solution** may be used. Protect the airway **before** gastric lavage.

Concomitant **alkalization of blood** and **urine** keeps **salicylates** away from **brain tissue** and **in the blood**, in addition to **enhancing urinary excretion**. When the **urine pH** increases from 6.1 to 8.1, **renal clearance** of **salicylate** increases **18-fold**.

Initial IV bolus of **1 mEq/kg** of **sodium bicarbonate** then start **sodium bicarbonate IV infusion** by adding 3 ampules of sodium bicarbonate (each ampule containing **44 mEq** of sodium bicarbonate) to a liter of **DSW**. **Urine output goal** is **1-1.5ml/kg/hr** & titrated to keep the **urinary pH** **greater than 7.5**.

Consider **Hemodialysis** if:

- Serum salicylate level greater than **120 mg/dL** acutely **or** greater than **100 mg/dL** 6 h post-ingestion
- Refractory acidosis
- Coma or seizures
- Pulmonary edema

- Volume overload
- Renal failure

When **enteric-coated aspirin** has been ingested or when **salicylate levels do not decrease** despite treatment with charcoal, **Whole Bowel Irrigation (WBI)** with the laxative **polyethylene glycol (Miralax)** should be used in addition to charcoal therapy.

Tricyclic Antidepressant (TCA) Overdose

Includes - Amitriptyline, Amoxapine, Doxepin, Imipramine (Tofranil), Nortriptyline (Pamelor)
S/S - Confusion, delirium, hallucinations, arrhythmias, hypOTension, sinus tach, seizures, and signs of Anticholinergic toxicity (e.g. - hyperthermia, flushing, dilated pupils)

ECG, Labs, POC Blood Glucose; IV Fluids if hypotensive

Treatment includes **ABCs, limiting absorption, enhancing elimination, correcting metabolic abnormalities, and providing supportive care.**

Consider **EARLY** ventilatory support (**Intubation**) if needed

Gastric lavage & Activated Charcoal may be beneficial up to 60 minutes after ingestion. **Warmed (38°C)** isotonic **LR** or **NaCL solution** may be used. Protect the airway **before** gastric lavage.

Sodium Bicarbonate [1-2 mEq/kg Rapid IV Push x 1]

Info: for pts w/ **QRS >100ms** or serum **pH <7.45**; subsequent doses based on response and serum pH

Diazepam 5 mg IV or **Lorazepam 2 mg IV** for TCA-induced **seizures**

SECONDARY THERAPIES FOR TCA OD IF S/S ARE REFRACTORY TO SODIUM BICARBONATE TREATMENT

Gastric lavage & Activated Charcoal

Consider vasopressors **Norepinephrine, Dopamine** or **Phenylephrine** for **hypotension refractory to Sodium Bicarbonate** and **aggressive IV fluid** resuscitation therapy

- **Norepinephrine 0.1-1 mcg/kg/min IV; Start: 0.1-0.5 mcg/kg/min IV, then titrate** to effect
- **Dopamine 10-15 mcg/kg/min IV**
- **Phenylephrine [0.1-0.5 mg IV q10-15min prn] Max: 0.5 mg/dose IV**

Consider **3% Hypertonic Saline** - used only when **hypotension** is **refractory to all other first line treatments**, including **Sodium Bicarbonate**, **aggressive fluid resuscitation** and **vasopressors**

For **Arrhythmias refractory to Sodium Bicarbonate**:

- **Magnesium 1-2 g IV over 15 min x 1; may follow w/ 3-20 mg/min IV**
- **Lidocaine bolus dose (1 to 1.5 mg/kg IV), followed by an infusion (1 to 4 mg/minute)**

Intravenous Lipid Emulsion Therapy (ILE)

Intralipid - 1 to 1.5 mL/kg given **over one minute** of a **20 percent lipid emulsion solution**. **Same dose** may be **repeated** in cases of **cardiac arrest** every **three to five minutes**, for a total of **three bolus doses**.

Following the **initial bolus**, an **infusion** is started at a rate of **0.25 to 0.5 mL/kg per minute** until **hemodynamic** recovery occurs; **Maximum 8 mL/kg**

Drugs to Avoid

1. Despite prominent **anticholinergic toxicity** in some patients with **TCA poisoning**, **Physostigmine** is **CONTRAINDICATED** as it is associated with **cardiac arrest** in the setting of **TCA toxicity**
2. **Flumazenil** is **CONTRAINDICATED** in patients with known or suspected TCA use

Tylenol Overdose

Most patients who **overdose** on **acetaminophen** will **initially be asymptomatic**, as clinical symptoms of end-organ toxicity do not manifest until **24-48 hours** after an acute ingestion.

Minimum toxic doses of **acetaminophen** for a single ingestion, posing significant **risk of severe hepatotoxicity**, are as follows:

Adults: **7.5-10 g**

Children: **150-200 mg/kg**

Use the **Rumack-Matthew Nomogram** (acetaminophen toxicity nomogram) to interpret serum acetaminophen concentrations in relation to time since ingestion, in order to **assess potential hepatotoxicity**. Can only be used **4 hours** or more **after** ingestion.

Treatment includes **ABCs**, **limiting absorption**, enhancing **elimination**, correcting **metabolic abnormalities**, and providing **supportive care**.

Consider **EARLY** ventilatory support (**Intubation**) if needed

Gastric lavage & Activated Charcoal may be beneficial up to 60 minutes after ingestion. **Warmed** (38°C) isotonic **LR** or **NaCl solution** may be used. Protect the airway **before** gastric lavage.

Patients with **acetaminophen** concentrations **below** the "**possible**" line for **hepatotoxicity** on the **Rumack-Matthew** nomogram may be **discharged home** after they are **medically cleared**.

Admit patients with **acetaminophen** concentration **above** the "**possible**" line on the **Rumack-Matthew** nomogram for treatment with **N-acetylcysteine (NAC)**. NAC is nearly **100% hepatoprotective** when it is given **within 8 hours after an acute acetaminophen ingestion**, but **can be beneficial** in patients who present more than **24 hours after ingestion**. NAC is approved for both **oral and IV** administration.

NAC's treatment effectiveness did **not depend** on whether it was started **0-4** or **4-8** hours after ingestion.

NAC [PO/NG route] (IV Reglan or Zofran as needed)

140 mg/kg PO/NG x1; then 4h later, **70 mg/kg** PO/NG q4h x 17 doses; Start: w/in 24h of ingestion. Repeat dose if vomited w/in 1h

NAC [IV route] (IV Reglan or Zofran as needed)

150 mg/kg IV x1 over 60min; then **50 mg/kg** IV x 1 over 4h; then 100 mg/kg IV x1 over 16h; Start: w/in 24h of ingestion, w/in 8h for max benefit; Pts >100 kg, **cap weight at 100 kg** for dose calculations.

Because **NAC** can be beneficial for acetaminophen-induced hepatic failure when **patients present more than 24 hours after a single ingestion**, medical toxicologists recommend initiating treatment with NAC in patients who present **after 24 hours** if an **acetaminophen concentration is detected** and if **hepatic injury is evident from liver function studies**.

ANTICOAGULANT REVERSAL TREATMENT

Anticoagulant

Antiplatelets (Aspirin, Plavix, Brilinta, Ticlid)
Coumadin
Lovenox & Heparin
Dabigatran Etxilate (Pradaxa)
Rivaroxaban (Xarelto, Janssen) & Apixaban (Eliquis)

Treatment

Platelets (Mixed study results)
FFP, Vitamin K, Kcentra, Factor VIIa
Protamine Sulfate
Idarucizumab (Praxbind)
Andexanet alfa (Andexxa, Portola)

MEDICAL EMERGENCIES & CONDITIONS

ACE-Inhibitor Induced Angioedema (ACEI-AAG)

****Antihistamines, steroids & epinephrine DO NOT WORK for ACEI-AAG****

- Although ACEI-AAG **usually occurs soon after starting ACEi**, it may occur years later. Higher incidence among **women** and a **five-fold** higher incidence among **African Americans**
- ACEI-AAG is due to **excessive** accumulation of **bradykinin**
- **Lack of allergic trigger** (in contrast, ACEI-AAG may occur after minor trauma)
- Starts with **focal swelling** (e.g. isolated swelling of **tongue** or **lips**, often asymmetric)
- Evolves over **hours** (**slower progression** than **histamine-mediated angioedema**)
- **Absence** of urticaria or itching
- **Failure to respond to antihistamines, steroid, epinephrine**

Treatment: FFP 2-4 units (FFP contains enzymes which metabolize bradykinin)

***Ecallantide** and **Icatibant** are potential **alternative treatments** but are **rarely used** meds due to their **high cost**– **Ecallantide** (\$15,000 per treatment) and **Icatibant** (\$4,000-\$11,000 per treatment)*

Agitation

Ativan [2-6 mg/day PO/IM/IV divided bid-tid]

Haldol lactate [0.5-10 mg PO/IM q1-4h] Max: 20 mg/day; Info: switch to PO ASAP; Monitor WBC and ANC

Benadryl [25-50 mg PO/IM/IV q4-6h prn] Max: 300 mg/day

Geodon [10 mg IM q2h prn] Max: 40 mg/day x 3 days; Monitor WBC and ANC

Allergic Reaction & Anaphylaxis Adult [Remove source of offending antigen if possible]

Decadron (Dexamethasone) 8mg or **Solu-Medrol** (Methyl Prednisolone) 250mg IV Q4H; **IV Fluids**;

Pepcid 20mg po/IV or **Zantac** 50mg IV or 150mg po; **Benadryl** 25-50mg IV; **Duoneb** Nebulizers;

Epinephrine SC/IM: 0.3 mg – may repeat dose X 1 after 5-15 min PRN

SEVERE [Profoundly Hypotensive and/or Cardiopulmonary Arrest]

- **Epinephrine IV 1-4 mcg/min (1-4 mg Epi in a 1,000 mg bag of NS at 1 cc/min)** increase 1 mcg/min PRN; Infuse **continuously** connected with a second bag of **high flowing NS/LR**
- **Racemic Epi 2.25%/0.5ml Nebulizer Q 3 hours to reduce laryngeal swelling (Adjunct to IV/IM Epi)**
- **Glucagon 3-5mg/HR IV (Beneficial only for beta-blocker/CCB overdose. Should be used in addition to epinephrine, NOT as a substitute)**
- **Glucagon 2 mg Nebulizer to reverse severe bronchospasm (Adjunct to Duoneb)**
- **Dopamine 20-50 mcg/kg/min IV (high dose): WILL increase BP and stimulate vasoconstriction; May increase infusion by 1-4 mcg/kg/min at 10-30 min intervals until optimum response obtained**

Anaphylaxis Peds [Remove source of offending antigen if possible]

Epinephrine 1:1000 Solution

- <30 kg: 0.01 mg/kg (0.01 mL/kg) SC/IM, not to exceed 0.3 mg (0.3 mL) per injection, repeated q5-10 min as necessary
- ≥30 kg: 0.3-0.5 mg (0.3-0.5 mL) SC/IM, not to exceed 0.5 mg (0.5 mL) per injection, repeated q5-10 min as necessary

Epinephrine Prefilled Autoinjector [0.1mg/0.1mL; 0.15mg/0.15mL; 0.3mg/0.3mL]

- 7.5-15 kg: 0.1 mg SC/IM once
- 15 to <30 kg: 0.15 mg SC/IM once; may repeat dose q5-15min if symptoms persist
- ≥30 kg: 0.3 mg SC/IM once; may repeat dose q5-15min if symptoms persist

Anxiety

Ativan 1-2mg po/IM/IV

Vistaril 25-100mg po or IM

Midazolam 2.5- 5mg IM or 1-2.5mg IV

Asthma

DuoNeb Nebulizer, Decadron (Dexamethasone) 10mg, MgSO4 2g/50ml IV (Adjunct med)

Racinephrine INH 2.25% 0.05ml/kg; MAX 0.5ml (For Croup) Q 3-4 hours

Prednisolone 40-80 mg/day PO divided qd-bid (PEDS 1-2 mg/kg/day PO)

Solu-Medrol (Methylprednisolone) 1-2 mg/kg IM/IV x 1 (Adult and Peds)

Terbutaline 0.25mg SC; Repeat in 15-30 minutes PRN

Epinephrine 0.3- 0.5 mg SC/IM

Bell's Palsy (CANNOT move forehead)

Labs - BMP, ESR, TSH, CBC, A1C, Borrelia burgdorferi IgM & IgG (only in endemic areas), RPR, HIV

Prednisone 60mg QD X 6 days then Medrol Dosepack

Valtrex 500mg BID X 10 days or Zovirax 400mg 5/Day X 10 days

Eye patch and Refresh Tears if needed

Dysphagia or Food Stuck in Throat

Glucagon 2mg IV and Valium 5mg IV

Headache

Reglan 10mg, Decadron 10mg, Benadryl 25mg, Toradol 30mg, Compazine 10mg, Thorazine 10-50 mg IM/IV, DHE-45 0.5mg, Magnesium 2 grams IV

Headache in Pregnancy

IV NS 1 Liter Bolus, Compazine 10mg IV, Benadryl 50mg IV, Tylenol PO or IV

Hiccups

Thorazine 25-50 mg IV or IM are effective in 80% of cases. To prevent or minimize **hypotension** caused by this agent, **preloading** the patient with 500-1000 mL of **IV fluid** is advised.

Also

Haldol 2-5 mg, Reglan 10 mg Q8 hours, or Baclofen 10mg po Q6hours

HypErglycemia (DKA)

Thirst, labored (Kussmaul) breathing, AP, N/V, AMS, tachycardia, hypotension,

Signs of dehydration (dry oral mucosa & abnormal skin turgor), polyuria & polydipsia, Acetone breath

1) Blood glucose >250 mg/dL

2) Bicarb < 18 mEq/L

3) pH < 7.3 (Metabolic acidosis)

4) Ketonemia & Ketonuria

Exams: CBC, CMP, UA & Urine Culture, ABGs, Blood Cultures, beta-hydroxybutyrate, Nitroprusside Ketone Reaction Test, Lactic acid, CRP, EKG, CXR, Cardiac Telemetry

Treatment Goals

- 1) Correction of fluid loss (DO NOT use Normal Saline as it can WORSEN metabolic acidosis)
- 2) Correction of hyperglycemia with insulin
- 3) Correction of electrolyte disturbance ESPECIALLY Potassium loss
NEVER administer insulin BEFORE checking Potassium levels FIRST
- 4) Treatment of concurrent infection
- 5) Address complications if warranted (Cerebral edema)

1) Fluid Correction with LR (Amount depends on degree of dehydration):

- 1-3 L during first hour
- 1 L during second hour
- 1 L during following 2 hours
- 1 L Q4H afterwards as needed

2) Insulin Therapy:

(Subcutaneous absorption of insulin is reduced in dehydration; therefore, IV insulin is preferred)

- Optimal rate of glucose decline is 100 mg/dl/hr
- Insulin bolus of 0.15 U/kg before starting infusion (Necessity of bolus is debatable)
- IV Insulin infusion with infusion pump at rate of 0.1 U/kg/hr
- Mix 24 units of regular insulin in 60 ml of NS at rate of 15 ml/hr (6 U/hr) until blood glucose drops below 180 mg/dl
- Then decrease to 5 ml/hr (2 U/hr) until ketoacidotic state resolves

3) Electrolyte Correction:

*Created by Mark Roman, PA-C, shared by EmpoweredPAs.com This is not medical advice, use at your own risk
Empowered PAs, LLC*

- Potassium level > 6 mEq/L: **DO NOT administer Potassium supplement**
- Potassium level 4.5 - 6 mEq/L: **Administer 10 mEq/hr of Potassium Chloride**
- Potassium level 3-4.5 mEq/L: **Administer 20 mEq/hr of Potassium Chloride**

4) Treatment of concurrent infection

- **Start empiric antibiotics if warranted (vital signs, CXR, CBC, CRP, Lactic Acid) and continue until Blood & Urine Culture results are back; then switch to antigen-specific therapy**

5) Cerebral edema (Occurs in 1% of children with a 21% mortality rate)

Cerebral edema is a **serious** complication that can occur **during treatment** of **DKA**. Deterioration of **mental status** despite **improved metabolic state** usually indicates **cerebral edema**.

- **Mannitol** 0.5-1 g/kg IV over 20 minutes; may repeat in 30-120 minutes if needed
- **3% Hypertonic Saline** 5-10 mg/kg over 30 minutes if no response to Mannitol
- **Dexamethasone** IV 2-4 mg q6-12hr if no response to Mannitol

HyPOglycemia

D50 Dextrose – 50% hypertonic glucose solution in 50 ml vial (500 mg/ml), for slow IV injection.

NEVER BY IM OR SC INJECTION

- Adult: **1 ml/kg by slow IV injection** (3 to 5 minutes) - **followed by at least LR 20 cc**
Check blood glucose level 15 minutes after injection. If blood glucose level is still < 60 mg/dl, administer a second dose or give oral glucose, according to the patient clinical condition.

Adverse effects & precautions

- **May cause:** Vein irritation; severe tissue damage (necrosis) in the event of extravasation. The solution is viscous: **use a large vein and a large caliber needle.**

HyPOglycemia - PEDS

PEDS Dextrose Administration: Age <1 use **D10%**; Age 1-7 use **D25%**; Age 8 and above use **D50%**

– 50% glucose solution is **too viscous, concentrated and irritant to be used in children.**

– In children use **10% glucose solution**. If ready-made 10% glucose solution is not available: **add 10 ml of 50% glucose per 100 ml of 5% glucose** to obtain a 10% glucose solution. The dose of 10% glucose to be administered is **5 ml/kg by IV injection** (over 2 to 3 minutes) or infusion.

HypERKalemia [ALWAYS check Ca and Mg levels]

1. **Dextrose** 50g in water and **Regular Insulin** 10 units [Use **5:1 ratio** Glucose to Insulin]
2. **Albuterol** 15 mg nebulizer (3 mg ampules X 5)
3. **Normal Saline** 1 liter **plus** IV **Lasix** 20 mg [**LIMIT NS to 100 ml** if pt has **renal failure**]
4. **Kayexalate** 15g po Q6H (**AVOID** in patients with **GI motility** problems)
5. **Metabolic Acidosis** – **Sodium Bicarb** 100 mEq IV over 5 min **or** 2-5 mEq/kg IV x 1
6. IV **Calcium Gluconate** 1g (10 mL of a 10 percent solution) over 3 minutes **or** IV **Calcium Chloride** 500 to 1000 mg (5 to 10 mL of a 10 percent solution) over 3 minutes [**BOTH** are **Adjunct** treatments]
Effects only lasts **30 to 60 minutes** and require **constant cardiac monitoring**
7. **Digoxin toxicity** - **AVOID Calcium**; instead, give **Magnesium Sulfate** (2 g over 5 minutes) for patients with cardiac arrhythmias from digitalis toxicity [**MUST** check **Mg** level **FIRST** before giving **MgSO4**]
8. **Discontinue** K-sparing diuretics, **ACE inhibitors** & ARBs, **NSAIDs** and other drugs that inhibit renal potassium excretion

HypOKalemia – K < 3.5 mEq/L; Moderate 2.5-3.0 mEq/L; Severe < 2.5 mEq/L

- Low **Magnesium** can cause low **Potassium**; Correct **Magnesium** level **before** administering KCL
- K increase of **0.25 mEq/L** for each **20 mEq IV KCl** on average; **IV K only** if **K is < 2.5mEq/L**
- Give no more than **10 - 20 mEq/h IV** at a time to avoid potential effects on cardiac conduction
- **Severe hypokalemia**, administer up to **40 mEq/h IV** through **Central Line**. Maintain close follow-up care, provide continuous **ECG monitoring**, and check serial potassium levels.
- **Remove** offending **meds** – **Beta2 agonists**, Digoxin, **Lasix**, Insulin, **Thiazides (HCTZ)**, Amphotericin B

HypERTensive Emergency/Pre-Eclampsia/Eclampsia

Labetalol 20 mg IV over 2 minutes, then 40-80 mg IV q10min; total dose not to exceed 300 mg

Hydralazine 20-40 mg IV/IM; repeat PRN [**Contra** – CAD]

Pregnancy associated [**Pre-eclampsia**] 5-10 mg IV/IM initially, **THEN** 5-10 mg q20 min PRN; **max** 30 mg **ALSO**

Clonidine 0.1mg po; **Metoprolol** 5mg IV; **Enalapril** 1.25mg IV; **Nitropaste** 1” on front and back

Nitroprusside or **NTG** may be needed to treat **severe hypertension**

- **Nitroprusside** 0.5 - 10 mcg/kg/min IV infusion; do not exceed 10 mcg/kg/min
- **NTG** 5 mcg/min; Increase by 5 mcg/min q3-5min up to 20 mcg/min

HypOTension Adult

Norepinephrine (Levophed)

- [**Weight-based dosing**]

Dose: 0.02-1 mcg/kg/min IV; Start: 0.1-0.5 mcg/kg/min IV, then titrate to effect; Info: pts w/ septic shock may require higher doses

- [**Non weight-based dosing**]

Dose: 2-4 mcg/min IV; **Start:** 8-12 mcg/min IV, then titrate to effect; **Info:** pts w/ **refractory septic shock** may require **higher dosages** of **8 to 30 mcg/minute**

Dopamine 10-20 mcg/kg/min IV, Max: 50 mcg/kg/min; May increase 1-4 mcg/kg/min q10-30min

[100kg Patient = 2-5mg/kg/min] ****Inotrope of Choice for MI****

- **Lower dose (2-5 mcg)** stimulates dopamine receptors producing renal and mesenteric vasodilation
- **Higher dose** produces cardiac stimulation (**5-10 mcg**) and vasoconstriction (**10-20 mcg**)

Epinephrine 0.05-0.2 mcg/kg/min q10-15min to target; taper dose gradually to D/C

Phenylephrine 40-100 mcg q1-2 min PRN, not to exceed total dose of 200 mcg, then 40-60 mcg/min continuous IV infusion

Ephedrine [anesthesia-related] 5-10 mg IV prn; Max: 50 mg/total dose

HypOTension Peds

Dopamine 5-20 mcg/kg/min; not to exceed 50 mcg/kg/min

Lower doses primarily stimulate dopaminergic receptors that produce **renal and mesenteric vasodilation**.

Higher doses produce **cardiac stimulation and vasoconstriction** – **better** than Norepinephrine

Norepinephrine [2-12 yo] 0.1-2 mcg/kg/min IV; then titrate to effect; Max: 2 mcg/kg/min

Epinephrine 0.1 to 1 mcg/kg/minute continuous IV infusion; doses up to 5 mcg/kg/minute may be necessary in shock

Phenylephrine 5-20 mcg/kg IV bolus q10-15min

Ephedrine [anesthesia-related] 0.5 mg/kg **SC/IM** q4-6h prn

Malignant Hyperthermia

Occurs to particular medications used during general anesthesia (**Succinylcholine**)

Symptoms: **muscle rigidity, high fever, tachycardia.**

Complications: rhabdomyolysis and hyperkalemia.

Treatment: **Dantrolene** 2.5 mg/kg IV; repeated as necessary

Nausea/Vomiting

Zofran 4mg; **Reglan** 10mg; **Protonix** 40mg; **Compazine** 10mg; **Phenergan** 12.5-25mg;

Thorazine 12.5mg IM Q 30min; **Haldol** 1mg-5mg po or IM

Pre-Eclampsia

Fluids NS or LR - Total fluids should generally be limited to **80 mL/hr** or **1 mL/kg/hr**

Hypertension

- **Labetalol [5-10 min onset]** 20 mg IV with repeat doses every 10 minutes; **max** 300 mg
- **Hydralazine [20 min onset]** 5-10 mg IV/IM initially, **THEN** 5-10 mg q20 min PRN; **max** 30 mg
- **Nifedipine** 10 mg PO every 15-30 minutes; **max** of 3 doses

Magnesium

- **Pre-Eclampsia** 1-2 g/h IV for at least 24h
- **Eclampsia (Seizures)** 4 g IV infusion pump over 5-10 minutes, followed by an infusion of 1 g/hr maintained for 24 hours after the last seizure. **Recurrent seizures** with an additional bolus of **2 g** and increase in the infusion rate to **1.5 - 2 g per hour**

Pre-Term Labor [Is there a *REASON* for PTL?]

Tocolytics NOT indicated > **34 Weeks** and **Contraindicated:**

Symptomatic IAI includes a temperature greater than 38.0°C (100.0°F) and 2 of the 5 following signs:

- WBC count greater than 15,000 cells/mm
- Maternal tachycardia greater than 100 bpm
- Fetal tachycardia greater than 160 bpm
- Tender uterus
- Foul-smelling discharge

Magnesium 4-6 g IV over 20 minutes, followed by a maintenance dose of 1-4 g/h depending on urine output and persistence of uterine contractions

Indomethacin 100 mg PR followed by 50 mg PO every 6 hours for 8 doses

Nifedipine 20 mg orally, followed by 20 mg orally after 30 minutes. If contractions persist, continue with 20 mg orally Q 3-8 hours for 72 hours max 160 mg/d; **DO NOT** use with Magnesium

Terbutaline 0.25mg SC Q6 hours

Steroids

- Glucocorticoids is recommended in the **absence of clinical infection** whenever the gestational age is between **24 and 34 weeks**. An attempt should be made to **delay delivery for a minimum of 12**

hours to obtain clinical benefits of antenatal steroids. Late preterm glucocorticoids is **not indicated** in women with **clinical chorioamnionitis, multiple gestations, or pregestational diabetes**

- **Betamethasone** may be considered in women with a **singleton pregnancy** between 34 0/7 and 36 6/7 weeks gestation at **imminent risk** of preterm birth **within 7 days**
- **Betamethasone** 12 mg doses Q12 H X 2 doses and **Dexamethasone** 6 mg Q6H X 4 doses

Seizures

Ativan 4 mg/dose slow IV at 2 mg/min or 0.1 mg/kg; May repeat in 10 min; or 2 mg Q 30 min X 3

Diazepam 5-10 mg IV/IM q 5-10min; not to exceed 30 mg, **OR**

0.5 mg/kg, **THEN** 0.25 mg/kg in 10 minutes PRN

Phenobarbital 15-18 mg/kg IV loading dose infused at 25-60 mg/min; prepare to support ventilation; may repeat in 20-minute intervals PRN; not to exceed 30 mg/kg

Phenytoin 1 gram or 15-20 mg/kg at 100 mg/min (**USE FOR HEAD TRAUMA**)

** For TBI, **Diazepam** or **Lorazepam** can be used in addition to **Phenytoin** until seizure stops**

Magnesium [For **Eclampsia**] 4 g IV infusion pump over 5-10 minutes, followed by an infusion of 1 g/hr maintained for 24 hours after the last seizure. **Recurrent seizures** with an additional bolus of **2 g** and increase in the infusion rate to **1.5 - 2 g per hour**

Discharge on **Keppra** 500mg QD or **Ativan** 1mg QD

Tension Pneumothorax

Chest pain; Air hunger; Respiratory distress; Tachypnea; Hypotension; Tracheal deviation from side of injury; Unilateral absent breath sounds; Elevated hemithorax without respiratory movement; Neck vein distention; Hyperresonance of affected lung; Cyanosis (late finding)

Needle decompression [Needle length rule of thumb – “The longer the better”]

- **At least** 3.25-inch, **10-14 gauge** angiocath required to penetrate the chest wall and pleural cavity
- **4th** or **5th** intercostal space just **anterior** to **mid-axillary** line in **adults (ATLS 10th Edition)**

Thoracostomy

- **28-32 F** chest tube for pneumothorax/hemothorax **4th** or **5th** intercostal space just **anterior** to **mid-axillary** line (New **ATLS 10th Edition**)
- **PEDS** - **2nd** intercostal space **mid-clavicular** line

Thyroid Storm [**Fever**; **Profuse Sweating**; **Respiratory Distress**; **N/V**; **AP**; **AMS**; **SZ**]

Propylthiouracil (PTU) 400mg IV/PO/PR

Propranolol 1-3 mg IV x 1 **OR** 10-30 mg PO

Dexamethasone 1-9mg PO /IM **OR** 1-6mg IV

Cholestyramine 4g Q6H via NG Tube

Cooling methods; IV **D5W**; Correct **electrolyte abnormalities**; **Tylenol** (15 mg/kg orally or rectally Q 4 hours); address **cardiac arrhythmias**, if necessary

Traumatic Brain Injury (TBI)

- Hyperventilation should be used **ONLY** for **short periods** when immediate control of ICP is necessary
- Raise head of patient **unless** the patient has hypovolemia

Mannitol 20% solution (20g Mannitol per 100ml of solution)

IV Fluid NS or Ringers initially. Hypertonic saline 3%-23% can be used to reduce ICP

DO NOT USE Mannitol or Hypertonic saline in **hypotensive** or **hypovolemic** patients

TBI and Seizure Treatment - Peds

Phenobarbital 10-20 mg/kg/dose

Diazepam 0.1-0.2 mg/kg/dose, slow IV bolus

Phenytoin 15-20 mg/kg at 0.5-1.5ml/kg/min then 4-7 ml/kg/day maintenance

Hypertonic saline 3% at 3-5 ml/kg

Mannitol 0.5-1.0g/kg (Rarely requires, may **worsen** hypovolemia)

OTHER SITUATIONS

GC/Chlamydia

Rocephin 250mg IM X 1 **OR** **Cefixime** 400mg X 1

PLUS

Azithro 1g **or** **Doxy** 100mg BID X 10 days

IV Antibiotics

Rocephin 1-2g Q24H, **Vanco** 1g Q8H; **Cleocin** 600-1200 mg/day divided Q6-12h;

Azithromycin 500mg Q24H; **Zosyn** 3.75g or 4.5g Q6H; **Fortaz** 1g Q8H, **Unasyn** 3g Q6H;

Ancef 1g Q6H; **Meropenem** 1g Q8H; **Primaxin** 1g Q8H

Insulin Calculator

0.1units/KG/HR

OR

Current Blood Sugar – 100 = Units of Insulin

40

Lidocaine (Local Anesthesia Injections)

Lidocaine Safety and Toxic doses

- Peak blood levels of lidocaine usually occur **10-25 minutes after injection** – the point at which toxic effects are likely to be seen
- Maximum safe dose of lidocaine **without** vasoconstrictor (epinephrine) is **3 mg/kg** (duration of action 1 hour). No more than 300 mg (30 ml of 1% Lidocaine) at once
- Maximum safe dose of lidocaine **with** vasoconstrictor is **5 mg/kg** (duration of action 2-6 hours)

How to calculate Maximum safe dosage of Lidocaine

- 1% Lidocaine solution is **10 mg/mL**
- Example Calculation for a **70 Kg** man: Lido 1% with Epi: keep under 7 mg/Kg. $7 \times 70 = 490$ mg for 70 kg man. Divide 490 mg by 10 mg/ML = **49 ml**

Magnesium Sulfate

2 grams of IV **Magnesium Sulfate** = **0.2 mg/dL increase** in Serum Magnesium

Potassium Chloride

20Meq IV or PO = **0.25 increase** in Serum K

PRBC

1 Unit PRBC = Increases **hemoglobin** by **1 gm/dl** and **hematocrit** by **3%**

Platelets

1 Unit Platelets = Increases **platelet count** in an adult by **5,000–8,000/mm**

BANANA BAG

Folic acid 1 mg

Thiamine (VITAMIN B-1) 100 mg

Pyridoxine (VITAMIN B-6) 100 mg in sodium chloride 0.9% 100 mL IVPB; Administer over 60 Minutes

Give **DAILY** X 3 days; give 1st dose prior to any food or dextrose containing IV

OR

Folic acid 1 mg, **Thiamine** (VITAMIN B-1) 100 mg, **Pyridoxine** (VITAMIN B-6) 100 mg in sodium chloride 0.9% 100 mL IVPB

Intravenous, Administer over 60 Minutes, ONCE, for 1 dose

And

Folic acid tablet 1 mg

1 mg, Oral, DAILY, First Dose Tomorrow at 0900, for 2 doses

And

Thiamine (VITAMIN B-1) tablet 100 mg

100 mg, Oral, DAILY, First Dose Tomorrow at 0900, for 2 doses

And

Pyridoxine (VITAMIN B-6) tablet 100 mg

100 mg, Oral, DAILY, First Dose Tomorrow at 0900, for 2 doses

PLUS

Multivitamin

ENDOTRACHEAL DRUG DELIVERY

Follow all drug deliveries with **1-5 ml** (Peds - depending on size) or **10 ml** (Adult) of **Normal Saline** flush

ADULTS ONLY - Give all ETT drugs at **2 to 2.5 times** the recommended IV dose

PEDS – Various dosages depending on medication

Lidocaine: ETT lidocaine of **2 to 4 mg/kg**. For this ETT dose to reach therapeutic levels takes 5 minutes and to reach peak levels takes 20 minutes. The level remains therapeutic for 30 to 60 minutes

PEDS: ETT dose is **1mg/kg not to exceed 100 mg**

Epinephrine: ETT epinephrine 2 to 2.5 times the standard IV dose of 1 mg (ETT dose = **2 to 2.5 mg**)

PEDS: ETT dose is 0.1 mg/kg (1:1000 solution) ETT q3-5min prn; Max: 1 mg/dose

Atropine: ETT atropine be 2 to 2.5 the standard IV dose of 1 mg (ETT dose= **2 to 2.5 mg**)

PEDS: ETT dose is **0.04-0.06 mg/kg**; may repeat dose x1; flush ETT dose w/ 5 mL NS and follow w/ 5 ventilations. Maximum single dose, 0.5 mg for child, 1.0 mg for adolescent. This dose may be repeated once

Naloxone: ETT Naloxone 2 to 2.5 times the standard IV/IO dose of 0.4 to 2 mg (ETT dose = **1 to 5 mg**)

PEDS:

[<20 kg or <5 yo]

0.1 mg/kg **ETT/SC/IM/IO** q3-8min prn; SC/IM/IV administration preferred;

May repeat q1-2h if sx recur

[>5 yo or >20 kg]

2 mg **ETT/SC/IM/IO** q3-8min prn; SC/IM/IV administration preferred;

May repeat q1-2h if sx recur; Reassess tx if no response after **10 mg**

ER SITUATIONAL PROTOCOL

ACUTE CORONARY SYNDROME

Procedure (Perform ABC's and Vital Signs First)

Cardiac Monitor and 12-Lead EKG (**Right-sided EKG** if initial EKG shows **Inferior-lead** ST changes)
IV (**Both arms** if **Posterior MI**)
NTG po/Spray/Paste (If **Posterior MI**, Insert second IV & **Bolus** with **2 liters** of NS **FIRST**)
Targeted H&P
Thrombolytic Checklist if **CP > 15 min** or **< 12 hours** (Address BP if Systolic >180 or Diastolic >100)

Labs

CBC, CMP, Troponin, CK Total and MB, PT/INR, PTT, D-Dimer, BNP

Radiology

Portable CXR

Meds

Aspirin 324 mg chew and swallow
Morphine 1-2 mg IV if needed for pain and air hunger
O2 Nasal Cannula w 100% supplemental oxygen **ONLY IF** room air O2 < 94%
Nitro 0.4 mg SL, Spray **or** Paste 1"
(**AVOID NITRO** if Pt has taken PDE5 Inhibitors: **Viagra** - 24 hours, **Levitra** & **Cialis** – 48 hours)

If **EKG** shows **STEMI** then **IMMEDIATELY** prepare for **PCI (1st line)** and/or **Thrombolytics (2nd line** if PCI cannot be performed within **120 minutes** or is not available)

Interventional Criteria

Patients with **chest pain** suggestive of acute myocardial ischemia who present **up to 12** (and **possibly up to 24**) hours after onset of symptoms are candidates for **reperfusion therapy** with either **fibrinolytics** or **primary percutaneous coronary intervention (PCI)** if the following **ECG evidence** is present:

New ST-elevation at the **J point** in **two anatomically contiguous leads** using the following diagnostic thresholds:

- Men ≥ 40 years: ≥ **2 mm** V2 - V3 & ≥ 1 mm in all other leads
- Men < 40 years: ≥ **2.5 mm** V2-V3 & ≥ 1 mm in all other leads
- Women any age: ≥ **1.5 mm** V2-V3 & ≥ 1 mm in all other leads
- Men & Women **V3R** & **V4R**: ≥ **0.5 mm** (Men < 30 years: ≥ **1 mm** in V3R & V4R)

Patients with **CP** in the presence of a new **left bundle branch block** or a true **posterior** myocardial infarction (**ST depression in V1-V4**) are also considered **eligible** for **reperfusion therapy**.

Tenecteplase (TNKase) for STEMI

[<60 kg] Dose: 30 mg IV x1
[60-69 kg] Dose: 35 mg IV x1
[70-79 kg] Dose: 40 mg IV x1
[80-89 kg] Dose: 45 mg IV x1

[>90 kg] Dose: 50 mg IV x1

Heparin

Loading Dose: **60 units/kg** IV push up to **4000 units**

Infusion Dose: **12/units/kg/hr** in half NS; Draw PTT lab from IV site other than Heparin site; **PTT goal 50-65**

Enoxaparin (Lovenox) w ST elevation myocardial infarction (STEMI)

[<75 yo]

Dose: **1 mg/kg** SC q12h; Start: **30 mg IV plus 1 mg/kg SC x 1**, between 15min before and 30min after starting thrombolytic tx; Max: 100 mg/dose for first 2 SC doses; Info: give w/ aspirin; cont. for 8 days or until hospital D/C; D/C if Plt <100,000

[75 yo and older]

Dose: **0.75 mg/kg** SC q12h; Start: between 15min before and 30min after starting thrombolytic tx; Max: 75 mg/dose for first 2 doses; Info: give w/ aspirin; cont. for 8 days or until hospital D/C; D/C if Plt <100,000

Enoxaparin (Lovenox) w Non-ST elevation myocardial infarction (Non-STEMI)

- 1 mg/kg SC q12hr; **co-administer with antiplatelet therapy**; continue for duration of hospitalization or until percutaneous coronary intervention (PCI) performed

Nitro Infusion (25mg/250ml D5W)

5 mcg/min and increase dose by 5 mcg/min Q 5 minutes until CP is controlled

Clopidogrel (Plavix)

Start: 300 mg PO x1; Info: start dose optional for pts w/ STEMI; give w/ aspirin 75-325 mg PO qd; May use w/ heparin or Lovenox acutely

Beta-blocker (**Metoprolol**) and ACE Inhibitor (**Lisinopril**) as **early** as **possible**

Consider Targeted Temperature Management (TTP)/Therapeutic Hypothermia (TH)

Indications:

1. **Comatose** patients with ROSC after **OHCA** when the initial rhythm was **ventricular fibrillation (VF)** or **pulseless ventricular tachycardia (pVT)**
2. **May be beneficial** for patients with non-VF/non-pVT (nonshockable) **OHCA** or with in-hospital arrest

Guidelines:

1. The temperature should be maintained between **32°C and 34°C** (89.6 F and 93.2 F)
2. Maintain TTM for at least **24 hours**

Inclusion Criteria:

1. Intubated patients with treatment initiated **within 6 hours** after cardiac arrest
2. Patients able to **maintain a systolic BP >90 mm Hg**, with or without pressors, after CPR
3. Patients in a **coma** at the time of cooling

Exclusion Criteria:

1. **Recent major surgery** within 14 days (Possibly increases risk for infection and bleeding)
2. Systemic **infection/sepsis** (Slightly increases in risk of infection)
3. Coma from **other causes** (drug intoxication, preexisting coma prior to arrest)
4. Known **bleeding diathesis** or with active ongoing bleeding (Hypothermia may impair the clotting system)

CVA

Procedure (Perform ABC's and Vital Signs First)

ABCs, GCS, Vital Signs, POC Blood Glucose, Large Bore IV X 2, NS 1-liter 100ml/HR, EKG, Cardiac Telemetry, Supplemental O2, Foley Catheter with I&Os

Notify Tele-Stroke Team

Labs

POC Blood Glucose, CBC, CMP, Troponin, UA, UDS, Urine HCG, Ethanol, PT/PTT/INR
ABO Rh or Type & Screen/Cross (**Only** with Aneurysm), ABG

Radiology

CT Head (non-contrast); CXR; CTA Head and Neck

Meds (Maintain BP < 185/110)

Labetalol 10-20 mg IV over 1-2 minutes; May repeat X 1

Nicardipine 5 mg/HR IV; Titrate up by 2.5mg/HR every 5-15 minutes; Max 15mg/HR

Alteplase (tPA) *Within 3-4.5 hours of onset if pt is <81 years old*

0.09 mg/kg IV x 1, then 0.81 mg/kg IV over 60min

Give **ASAP** within 4.5 hours of SX onset; Max: **90 mg** total dose;

D/C if **pre-treated** or **INR >1.7** or **PTT >80 seconds**

MVA

Procedure (Perform ABC's and Vital Signs First)

Vital Signs, C-Spine Collar & Spinal Precautions, GCS, Large Bore IV X 2,
NS or LR 1-liter bolus, Supplemental O2, TDap, Foley Catheter with I&Os, FAST Exam,
EKG, Cardiac Telemetry, Remove from backboard as soon as possible (**Max 2 hours**)

Labs

CBC, CMP, Amylase, Lipase, UA, UDS, Urine HCG, ABO Rh or Type & Screen/Cross,
Ethanol, PT/PTT/INR

Radiology

XR Chest, C-Spine and Pelvis in ER

CT Head, C-Spine, T-Spine, L-Spine [**ALL non-contrast**]

CT Chest & Abdomen/Pelvis (**w contrast**)

PULMONARY EMBOLISM

Procedure

ABCs, Vital Signs, POC Blood Glucose, Large Bore IV or IO, LR or NS 1-liter bolus, EKG, Cardiac Telemetry, Supplemental O2

WELLS Score:

Clinical signs and symptoms of DVT; HR > 100; No alternative diagnosis better explains the illness; Immobilization at least 3 days OR surgery in the previous 4 weeks; Previous h/o DVT or PE; Hemoptysis; Cancer w/ treatment within 6 months

PERC Score:

Age >50; HR > 100; SaO2 < 95%; Unilateral leg swelling; Hemoptysis; Recent surgery or trauma < 4 weeks; Prior h/o DVT or PE; Hormone use

Labs

CBC, CMP, D-Dimer, CK, BNP, Troponin, ABG, UA, UDS, Urine HCG, PT/INR, IMA (Ischemia Modified Albumen Levels) which is 93% sensitive and 75% specific for pulmonary embolism

D-Dimer:

A **Wells Score** of **4 or less** combined with a **negative D-dimer** test was shown to **safely exclude** PE.

D-dimer testing is **most reliable** for excluding pulmonary embolism in **younger patients** who have **no** associated comorbidity or history of venous thromboembolism and whose symptoms are of **short duration**.

Use an **age-adjusted D-dimer cutoff** (patient's age in years × 10 mcg/L) for patients **over age 50 years** when evaluating for venous thromboembolism (VTE); it reduces false positives without substantially increasing false negatives.

D-Dimer is of **questionable value** in patients who are **older than 80 years**, who are **hospitalized**, who have **cancer** or who are **pregnant**, because nonspecific **elevation of D-dimer concentrations** is **common** in such patients.

Radiology

CXR; CTA Chest

V/Q scanning may be used when CT scanning is not available or if the patient has a contraindication to CT

Meds

Alteplase (tPA) [Use only if pt is unstable]

100 mg IV over 2h

Enoxaparin (Lovenox)

[1 mg/kg SC q12h]

Alt: 1.5 mg/kg SC qd; Continue for >5 days and overlap w/ **Warfarin** until INR 2-3; D/C if Plt <100,000

OR

Apixaban (Eliquis)

Start **10 mg PO bid x 7 days** then **5 mg PO BID**

OR

Rivaroxaban (Xarelto)

Start **15 mg PO bid x 21 days** then **20 mg PO daily**

SEIZURES

Procedure

ABCs, GCS, Vital Signs, POC Blood Glucose, Large Bore IV or IO, LR 1-liter bolus, EKG, Cardiac Telemetry, Supplemental O2, Foley Catheter with I&Os

Labs

POC Blood Glucose, CBC, CMP, CK, ABG, Troponin, UA, UDS, Urine HCG, Ethanol, PT/INR

Prolactin (Differentiates between **TRUE** epileptic seizure and **Pseudo-seizure**)

Salicylate, Acetaminophen

Drug Levels

- Gabapentin (Neurontin), Lamotrigine (Lamictal), Levetiracetam (Keppra), Oxcarbazepine (Trileptal), Phenobarbital (Luminal), Phenytoin (Dilantin), Primidone (Mysoline), Topiramate (Topamax)

Radiology

CT Head (non-contrast)

Meds

Ativan 4 mg/dose slow IV at 2 mg/min or 0.1 mg/kg; May repeat in 10 min; or 2 mg Q 30 min X 3

Diazepam 5-10 mg IV/IM q 5-10min; not to exceed 30 mg

OR

0.5 mg/kg, THEN 0.25 mg/kg in 10 minutes PRN

Phenobarbital 15-18 mg/kg IV loading dose infused at 25-60 mg/min; prepare to support ventilation; may repeat in 20-minute intervals PRN; not to exceed 30 mg/kg

Phenytoin 1 gram or 15-20 mg/kg at 100 mg/min (**USE FOR HEAD TRAUMA**)

** For TBI, **Diazepam** or **Lorazepam** can be used in addition to **Phenytoin** until seizure stops**

Magnesium [For **Eclampsia**] 4 g IV infusion pump over 5-10 minutes, followed by an infusion of 1 g/hr maintained for 24 hours after the last seizure. **Recurrent seizures** with an additional bolus of **2 g** and increase in the infusion rate to **1.5 - 2 g per hour**

Discharge on **Keppra** 500mg QD or **Ativan** 1mg QD

WARFARIN REVERSAL IN LIFE-THREATENING BLEEDING

Vitamin K: 10 mg IV over 30 minutes (starts to work in 2-3 hours, INR reversed within 24 hrs with adequate production of coagulation factors). Administer in 50 cc of Normal Saline over 30 min.

- **Anaphylaxis** with IV Vitamin K is **very rare** – do not withhold IV Vitamin K because of fear of anaphylaxis!

Plasma (FFP): 4-6 units typically required, large volume, need time for thawing, ABO compatibility, risks of transfusion – infection, TRALI (Transfusion-related acute lung injury), TACO (transfusion associated circulatory overload), etc.

Prothrombin Complex Concentrate (Kcentra, Octaplex, Beriplex – 4 factor PCC in Canada, with factors 2, 7, 9, 10)

- Works almost **immediately**
- Factor 7 has short half-life, so, PCC stops working effectively after 4-8hrs. Thus, **Vitamin K must be given with PCC.**
- Contraindicated in HIT, liver disease, recent thrombosis, MI, ischemic stroke, DIC
- Check INR immediately (within 15 min) and again in 6 hours

Dosing PCC

- Dosing may be INR or weight based. Check product monographs or institutional guidelines.
- Current Canadian recommendations:
 - **INR 3-5:** 2000 U PCC + Vit K
 - **INR >5:** 3000 U PCC + Vit K
- Dose may vary with extremes of weight
- Mix powder with provided solvent and administer as per manufacturer's monograph (slow push or mini-bag) or institutional guidelines.

TRAUMA - TREATMENT PRIOR TO TRANSFER

- **Airway**
 - 1) Insert airway or ET Tube in needed
 - 2) Provide suction
 - 3) Insert Gastric Tube to reduce risk of aspiration
- **Breathing**
 - 1) Administer supplemental oxygen
 - 2) Provide mechanical ventilation when needed
 - 3) Insert Chest Tube when needed
- **Circulation**
 - 1) Control external bleeding
 - 2) Establish two large-caliber IV lines each arm
 - 3) Restore blood volume with NS or blood products
 - 4) Insert Foley
 - 5) Cardiac monitor
- **Central Nervous System**
 - 1) Assist respiration in unconscious patient
 - 2) Administer Mannitol, if needed
 - 3) Immobilize head, neck, CTL spine injuries, extremity fractures
- **Diagnostic Studies**
 - 1) CBC, CMP, PT/INR, Blood type and cross, UA, HCG, ABG, ETOH, Urine Tox Screen
 - 2) XR C-Spine, CXR, Pelvis, extremities if needed
 - 3) EKG
- **Wounds**
 - 1) Clean and dress wounds after controlling external hemorrhage
 - 2) Administer Tdap
 - 3) Administer ABX when indicated
- **Fractures**
 - 1) Administer appropriate splinting and traction
 - 2) Pelvic binder if needed
 - 3) C-Collar and/or backboard if indicated
- **Other**
 - 1) Pain medications if needed
 - 2) Sedation and paralytic infusion when needed
 - 3) Keep WARM (Unless Therapeutic Hypothermia (TH) Protocol is initiated)