Management of Medical Emergencies in the Office

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Objectives

• Understanding that the standards of anesthesia care and patient monitoring are the same regardless of location.
• Remember that the key to efficient and safe remote anesthetic relies on open communication between the anesthesiologist and non-operating room personnel.
• Realize that remote locations have different safety concerns, such as radiation and powerful magnetic fields.

Content outline, joint council on in-training exam

• Monitored anesthesia care and sedation: ASA guidelines for sedation, sedation guidelines for non-anesthesiologists.
• Ambulatory anesthesia: office-based anesthesia (special considerations), safety requirements (equipment, emergency plan).
• Electroconvulsive therapy
• Radiologic procedures; CT scan; MRI: anesthetic implications/management, anesthesia in locations outside the operating room.
Remote anesthesia

- Anesthesiologists are increasingly being asked to provide anesthetic care in locations outside of the OR.
- These locations include: radiology suites, cardiac labs, psychiatric units, GI lab, CT, MRI, and PACU and Physicians Offices
- It is the responsibility of the anesthesiologist to ensure that the location meets the ASA guidelines for safety.

2010 Guidelines for non-operating room anesthetizing locations.

- Reliable oxygen source with backup.
- Suction source.
- Waste gas scavenging.
- Adequate monitoring equipment.
- Self-inflating resuscitator bag.
- Sufficient safe electrical outlets.
- Adequate light and battery-powered backup.
- Adequate space.
- Emergency cart with defibrillator, emergency drugs, and emergency equipment.
- Means of reliable two-way communication.
- Compliance with safety and building codes.

Remote monitoring

- Qualified anesthesia personnel must be present for the entire case.
- Continuous monitoring of patient’s oxygenation, ventilation, circulation, and temperature.
- Oxygen concentrations of inspired gas: low concentration alarm.
- Blood oxygenation: pulse oximetry.
- Ventilation: end-tidal carbon dioxide detection and disconnect alarm.
- Circulation: EKG, ABP (q 5min), invasive BP, and oximetry.
Remote facilities and equipment

• Know the physical layout of the location, unfamiliar anesthetic equipment, and anesthetic implications of the procedure being performed prior to the induction of anesthesia.
• Verify the availability of assistance.
• Check piped-in gases and gas tanks.
• Check suction.
• Check power outlets (i.e. grounding and electrical requirements).

Remote personnel

• Nurses and radiology techs are often less familiar with the management of anesthesia, therefore they are often unable to provide skilled assistance in an emergency

Remote recovery care

• Patient must be medically stable before transport.
• Patient must be accompanied to the recovery area.
• Provisions for O₂ delivery and monitoring on the transport cart are required.
• Appropriate recovery facilities and staff must be provided.
Office-based anesthesia

• ASA and JCAHO guidelines
  – Use of appropriately trained and credentialed anesthesia personnel.
  – Availability of properly maintained anesthesia equipment.
  – Complete documentation of the care provided as required at other surgical sites.
  – Use of standard ASA monitoring.
  – Provision of a PACU that is staffed by trained nursing personnel.
  – Availability of emergency equipment.
  – Establishment of a written plan for emergency transport of the patient to a comprehensive care center if a complication occurs.

Office-based anesthesia, (contd.)

• Patient requires a full preoperative workup.
• Potentially difficult airways are not good candidates.
• Procedures often involve local anesthesia plus IV sedation or light general anesthesia with a mask or LMA.
• Agents of choice include: propofol, sevo, des, and N\textsubscript{2}O.

Radiology suite

• Includes: US, CT, MRI, RFA, and neuro-coiling.
• The rooms are often crowded with bulky equipment.
• Patients are often required to hold still for long periods of time.
• Unique hazard: radiation exposure.
  – Leukemia and fetal abnormalities.
  – Dosimeters are required (maximum exposure 50 mSv annually).
  – Lead aprons, thyroid shields, leaded glass screens, and video monitoring.
Radiology suite, contd.

- Iodinated contrast media.
  - Older ionized contrast media were hyperosmolar and toxic.
  - Newer non-ionized contrast media have lower osmolality and improved side-effects.
  - Predisposing factors to adverse reactions from contrast media include a history of: bronchospasm, allergy, cardiac disease, hypovolemia, hematologic disease, renal dysfunction, extremes of age, anxiety, and medications (beta-blockers, aspirin, and NSAIDs).

Radiology suite, contd.

- Reactions to iodinated contrast media.
  - Mild: nausea, perception of warmth, headache, itchy rash, and mild urticaria.
  - Severe: vomiting, rigors, feeling faint, chest pain, severe urticaria, bronchospasm, dyspnea, arrhythmias, and renal failure.
  - Life-threatening: glottic edema/bronchospasm, pulmonary edema, arrhythmias, cardiac arrest, and seizures/unconsciousness.

- Treatment: O₂, bronchodilators, epi, corticosteroids, and antihistamines.

CT

- Two-dimensional, cross-sectional image.
- Each cross-section requires a few seconds of radiation exposure.
- Pt immobility is required.
- It is often noisy, warm, and claustrophobic.
- CT can be used for diagnostic and therapeutic purposes.
- Number one problem: inaccessibility to the patient.
MRI

- Able to obtain images in any plane.
- Excellent soft tissue contrast.
- Does not produce ionizing radiation, is non-invasive, and does not produce biologically deleterious effects.
- Is often very time-consuming and any patient movement, including physiologic motion, can produce artifacts.
- Obese patients can often not fit within the magnet.
- Hearing protection is mandatory (produces loud noises >90 dB).
- Thermal injury has been reported at site of EKG electrodes and areas where skin contacts the machine.
- Most significant risk in the MRI suite is the effect of the magnet on ferrous objects.

MRI magnet

- Contraindications for MRI include:
  - Shrapnel, vascular clips and shunts, wire spiral ETT's, pacemakers, mechanical heart valves, recently placed sternal wire, implanted biological pumps, tattoo ink with high concentrations of iron-oxide (permanent eyeliner), and intraocular ferromagnetic foreign bodies.
  - Ferromagnetic items should never be allowed in the vicinity of the MRI magnet, including scissors, pens, keys, gas cylinders, anesthesia machine, pro-pak monitor, syringe pump, beeper, phone, and steel chairs.
  - Cards with magnetic strips will be de-magnetized, including credit cards and ID badges.
  - *There is a yellow line within the MRI room which cannot be crossed with any ferromagnetic materials. Your syringe pump, pen, and monitor can be within this room as long as they are behind this line.
MRI roadtrip

- What to bring:
  - Cart (peds vs. adult)
  - Anesthesia machine/circuits (adult and peds)
  - Monitors
    - Noninvasive BP cord and cuffs
    - End-tidal CO2 monitor and window
  - Airway
    - N/LEMA/ETT
    - MRI adapter
    - Long corrugated ventilation tubing
    - Jackson-Rees/Mapleson tubing
  - Syringe pump and 3 extension sets (this stays at the foot of the MRI table, far from the machine)
  - Meds: propofol, remi, ketamine, midazolam, fentanyl, sux, NDMB, ephedrine, and precedex as needed
  - IV tubing and IV fluids
  - Paper charts: pre-op, OR records, charge sheet, and PACU order forms
MRI roadtrip, contd.

- Induce the patient in the holding area on the MRI-safe cart, and then transport the patient to the MRI.
- Do not take metal into the MRI room! Initial workup: vital signs, pre-op, set up your equipment in the far corner of the holding area, and familiarize yourself with physical layout, location, verify availability of assistance, check gases, suction, and MRI monitors.

Radiology RFA

- Often done in CT but occasionally MRI.
- Kidney, lung, and liver.
- Currently requesting general anesthesia with ETT secondary to prone positioning and the need to lay still for extended periods of time.
- It is our job to check pressure points and padding. Radiology techs are not trained to be concerned.
- Bring a face pillow in addition to the MRI road trip list.
**Interventional Radiology**

- Embolization of cerebral and dural AVM’s, coiling of cerebral aneurysms, angioplasty of sclerotic lesions, and thrombolysis of acute thromboembolic stroke.
- These procedures often require deliberate hypotension and deliberate hypocapnia.
- Radiologist may request rapid transition between deep sedation and an awake responsive state.

**Remote Cardiac Lab contd.**

- Cardiac RFA
  - IV sedation with NC to GA with ETT depending on the pt’s co-morbidities.
  - Bring same supplies as MRI road trip. (Poss. need for an arterial line setup)
  - Take lots of propofol with you.
  - Midazolam and fentanyl are used to titrate in during the more painful parts of the procedure. (esp. the ablation)

**GI Lab**

- Colonoscopy and upper GI scopes
- Pt’s are often already sedated, uncooperative or very sick.
- New studies now show better exams with propofol sedation.
- More payers reimbursing for anesthesia.
ECT

• Indications
  - Major depression
  - Mania
  - Certain forms of schizophrenia
  - Parkinson’s syndrome

• Contraindications
  - Pheochromocytoma
  - Increased ICP
  - Recent CVA
  - Cardiovascular conduction defects
  - High risk pregnancy
  - Aortic and cerebral aneurysms

Medical Emergencies in the Office

/ Allergic reactions / anaphylaxis
/ Oversedation / vomiting
/ Syncope
/ Severe hyperventilation
/ Bleeding disorders
/ Acute chest pain
/ Seizures
/ Strokes (CVA’s)
/ Acute asthma
/ Dystonic reactions
/ Hyperthermia
/ Hypertensive crisis
/ Foreign body aspiration
/ Diabetic hypoglycemia
/ Addisonian crisis
/ Obstetrical concerns
/ Mandibular dislocation

Allergic Reactions / Anaphylaxis

/ Definition:
  - Anaphylaxis = acute systemic allergic reaction that occurs after antigen-antibody interaction causing release of chemical mediators
Mediator Substances Causing Anaphylaxis

- Most released by mast cells & basophils:
  - Histamine
  - Bradykinins
  - Leukotrienes
  - Prostaglandins
  - Thromboxane
  - Platelet aggregating factor
  - Miscellaneous

Major Effects of Anaphylactic Mediators

- Vasodilation
- Smooth muscle spasm
- Increased vascular permeability
- Edema formation

Clinical Manifestations of Anaphylaxis

1. Cutaneous
   - Pruritis
   - Flushing
   - Urticaria
   - Angioedema

2. Respiratory
   - Throat "tightness"
   - "Lump in throat"
   - Hoarseness
   - Stridor
   - Dysphagia
   - Rhinorrhea
   - Brochospasm: wheezing, cough, dyspnea, chest tightness
### Clinical Manifestations of Anaphylaxis

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>- Weakness</td>
<td>- Cramps</td>
<td>- Sense of impending doom</td>
</tr>
<tr>
<td>- Hypotension</td>
<td>- Nausea</td>
<td>- Metallic taste</td>
</tr>
<tr>
<td>- Lightheadedness</td>
<td>- Vomiting</td>
<td>- Uterine contractions</td>
</tr>
<tr>
<td>- Shock (inadequate perfusion)</td>
<td>- Diarrhea</td>
<td></td>
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<tr>
<td>- Loss of consciousness</td>
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### Causes of Death from Anaphylaxis

<table>
<thead>
<tr>
<th>Upper airway edema: 70% of deaths</th>
<th>Circulatory collapse: 20%</th>
<th>Both: 10%</th>
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</table>

### Anaphylaxis: Causes

- Antibiotics: most common
- Local anesthetics
- Latex
  - Should question all patients about latex allergy; if allergic, use plastic or nitrile gloves, nozzles, etc.
Penicillin (Pcn) Allergy

1. Applies to pcn and all derivatives
2. Overall incidence : 2 %
3. Anaphylaxis in 1 to 5 cases / 10,000 courses of treatment
4. Fatal in 1 to 2 cases / 100,000 courses
5. ? 400 to 800 deaths / year in U.S.
6. 75 % of deaths in patient with no history of pcn allergy
7. Increased risk : multiple short courses, or topical treatment

Penicillin Allergy (cont.)

8. No predisposition if family member allergic
9. Parenteral route : reactions more frequent and severe
10. Skin test to prove allergy available (not usually relevant to non-life-threatening situation)
11. Should always observe in office 30 min. after dose

Cephalosporin Allergy

1. Much less likely to cause reactions than pcn
2. Cross reactivity : 2 to 5 % (with pcn)
3. Negative pcn skin test does not R/O allergy to cephalosporin
4. Low incidence of GI side effects
Erythromycin Allergy

- Allergic reactions uncommon
- Most common "allergy" symptoms reported is vomiting / GI upset
- Incidence of GI symptoms probably similar between different forms of erythromycin (base, stearate, estolate, ethylsuccinate, etc.)

Guidelines for Suspected Antibiotic Allergy

- If penicillin allergic: use erythromycin
- Usually OK to use cephalosporin if penicillin allergic (but not if anaphylaxis to penicillin)
- Tetracycline (doxycycline) may substitute for erythromycin in adults
- Chloramphenicol only indicated if multiple antibiotic allergies
- Clindamycin sometimes useful but increased incidence of pseudomembranous colitis

Allergy to Steroids

- Yes, it is real
- Rare however
- Usually sensitive to succinate ester
- If real: use acetate ester form
General Treatment of Allergic Reactions

1. Remove offending agent if possible
   - Stop drug being administered
   - Wipe off area if topical
   - Consider PO activated charcoal (if drug given PO)

2. If only local reaction (only localized redness, pruritis, swelling):
   - Often no treatment needed
   - Or PO antihistamine
     - Benadryl 1/2 mg/Kg
     - Atarax or Vistaril 25 to 50 mg (adults)

3. If systemic (diffuse pruritis, hives, any throat or chest symptoms):
   - Place IV or heparlock
   - Assess vital signs
   - If vital signs OK, treatment: SQ epi, PO or IV antihistamine, PO or IV steroid, Observe one hour
   - Emergent treatment if VS not OK
Emergent Treatment of Systemic Allergic Reaction

Start this sequence if VS not OK (increased HR, decreased BP, or any throat tightness, SOB or wheezing):

1. Place patient recumbent / supine & start FMO2
2. SQ epi 0.3 mg (0.01 mg / Kg) ; rub area ; If hypotensive : dilute epi (1:10,000) & give 0.1 to 0.2 mg IV slowly (never more than 0.1 mg IV at a time)
3. IV diphenhydramine or hydroxyzine 1 mg / Kg (50 mg in adults)
4. IV steroids (125 to 250 mg solumedrol)

Emergent Treatment of Systemic Allergic Reaction (cont.)

5. IV fluid bolus (LR or NS 1 liter or 20 cc / Kg)
6. Metaproteronol or albuterol aerosol if wheezing (0.2 to 0.5 cc in 3 cc NS)
7. Consider IV ranitidine
8. Atropine if bradycardic
   Dopamine if hypotensive despite IV fluids
   Racemic epi aerosol if throat swelling
   Early intubation if airway compromise
9. Call EMS unless rapid resolution with O2 / epi

Local Anesthetic Allergy

True allergy uncommon
True allergy more likely with esters
Most "allergies" reported by patients are really due to intravascular injection / vasodilation
If allergic to one ester, assume allergic to all ester forms
Amide Local Anesthetic Allergy

- True allergy rare
- May really be allergy to preservative
- Can use cardiac lidocaine (100 mg ampules) if allergy to preservative suspected (cardiac lido has no preservative)

Amide Local Anesthetics

- Lidocaine (Xylocaine)
- Bupivacaine (Marcaine, Sensorcaine)
- Ropivacaine (Naropin)
- Mepivacaine (Carbocaine, Polocaine)
- Dibucaine (Nupercaine, Nupercainal)
- Prilocaine (Citanest)
- Etidocaine (Duranest)

Ester Local Anesthetics

- Benzocaine
- Procaine (Novocaine)
- Chloroprocaine (Nesacaine)
- Cocaine
- Tetracaine (Pontocaine, Cetacaine)
- Butethamine (Monocaine)
- Proparacaine (Alcaine, Ophthaine, Ophthetic)
- Metabutethamine (Unacaine)
- Meprylcaine (Oracaine)
- Isobucaine (Kincaine)
"Toxic" Reactions to Local Anesthetics

/ Due to direct effects of the drug
/ Not due to allergy
/ Usually (but not always) occur in three phases:
  - Excitation phase
  - Convulsive phase
  - CNS / Cardiovascular depression phase

Phases of "Toxic" Reaction to Local Anesthetic

/ Excitation phase
  - Confusion
  - Restlessness
  - Sense of impending doom
  - Tinnitus
  - Perioral paresthesias
  - Metallic taste
  - Lightheadedness

Phases of "Toxic" Reaction to Local Anesthetic (cont.)

/ Convulsive phase
  - Loss of consciousness
  - Gran mal tonic-clonic seizure
/ CNS / Cardiovascular depression phase
  - Drowsiness
  - May be in coma
  - Respiratory depression / apnea
  - Hypotension
  - Bradycardia
  - Heart block
Treatment of Toxic Reaction to Local Anesthetic

- Stop infiltrating anesthetic if any Stage 1 symptoms
- Start an IV
- Support ventilation as needed
- Valium 2.5 to 5 mg IV (or 0.2 mg / Kg in children) for seizures
- Infuse normal saline or Lactated Ringers bolus if hypotensive (1 liter in adults, 20 cc / Kg in children)
- Atropine IV (0.5 mg) if bradycardic (often not effective however), and other standard ACLS measures as needed

Alternatives if Patient Has Multiple Local Anesthetic Allergies

- Injectable diphenhydramine (Benadryl) :
  - use 1 % solution (dilute 5% solution 50 mg vials with 4cc NS, limit dose to 10 cc)
- Injectable chlorpheniramine
- Slow normal saline infiltration (benzyl alcohol preservative)

Skin Testing for Local Anesthetic Allergy

- Unreliable (same for antibiotics)
- May have negative test and still have allergy
- May have positive test and tolerate drug OK
Treatment of Systemic Allergic Reactions

- Should observe patient with systemic reaction at least 2 hours before release
- Keep patient on 3 to 7 day course of steroids
- Keep patient on 3 to 7 day course of antihistamines
- Not necessary to taper steroid dose (unless patient on them repetitively)
- Advise patient of allergy; consider getting Medic Alert bracelet

Constituents of Emergency Self-Treatment Kits

<table>
<thead>
<tr>
<th>EpiPen Auto-Injector</th>
<th>Spring-loaded automatic injector with 0.3 ml (0.3 mg) of (1:1000) aqueous epinephrine</th>
</tr>
</thead>
<tbody>
<tr>
<td>EpiPen Jr. Auto-Injector</td>
<td>Spring-loaded automatic injector with 0.3 ml (0.15 mg) of (1:2000) aqueous epinephrine</td>
</tr>
<tr>
<td>Ana-Kit</td>
<td>Manually operated syringe with 0.6 ml (0.6 mg) of (1:1000) aqueous epinephrine; delivered as 0.3 ml to a locking point, with the ability to deliver a second identical dose if necessary</td>
</tr>
<tr>
<td>Chlorpheniramine</td>
<td>2 mg chewable tablets (#4)</td>
</tr>
</tbody>
</table>

Oversedation / Vomiting

- Major causes:
  - Anesthetic "sensitivity"
  - Anesthetic "overdose"
  - Narcotic effect
  - Drug (+ ETOH) interactions
- Best treatment: prevention
- Major risks:
  - Vomiting leading to aspiration, leading to airway obstruction, pneumonia, cardiovascular collapse
**Treatment of Oversedation**
- Discontinue anesthetic agent
- Place patient in head-down position (or turn head to side)
- Support ventilation: most important
  - O₂ high flow (10 to 15 L/min) by FM
  - BVM support
  - Attach O₂ saturation monitor

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**Treatment for Emesis / Oversedation**
- Head-down position or turn head to side
- Suction with Yankauer catheter
- EMS referral if:
  - Any obvious aspiration
  - Any chest symptoms (pain, SOB, cough, wheeze)
- Do not give steroids for treatment

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**Treatment of Oversedation (cont.)**
- Check VS (patient may have decreased response due to decreased BP instead of oversedation)
- Consider IV reversal agents
  - Naloxone (2 mg) for narcotics
  - Flumazenil (0.2 to 1 mg) for benzodiazepines
- Consider checking blood sugar (R/O hypoglycemia)
- Call EMS if does not resolve quickly or if patient hypotensive
Acute Dystonic Reactions

Definition:
An idiopathic reaction to major tranquilizers and related drugs such as phenothiazenes (i.e., Compazine or Prochlorperazine), haloperidol (Haldol), metaclopramide (Reglan), etc, consisting of abnormal muscle contractions.
- Can occur after single, first time dose, or in patients who have had the same medicine before without problem.

Features of Acute Dystonic Reactions
Any of these may be present:
- Protrusion of tongue
- Contorsion (spasm) of facial muscles
- Opisthotonos (painful extension of neck and back)
- Oculogyric crisis (eyes rolled back)
- +/- laryngospasm

Acute Dystonic Reactions

Treatment is very simple:
- Stop the offending drug
- Give 25 to 50 mg Benadryl IV (be sure to flush the dose in) : immediate relief
- Continue Benadryl 25 to 50 mg PO QID X 3 to 5 days to prevent recurrence
- Sometimes difficult to differentiate from psychotic reactions ; use Benadryl as “test dose” for this
- Only need to call EMS if does not resolve with IV Benadryl
**Ondansitron Reaction**

- Patient may appear to have seizures
- Exhibit combative or dystonic movement
- Unresponsive to verbal commands
- Bizarre behavior

**Ondansitron reaction treatment**

- Phenergan 25 mg iv or im
- Phenergan gel 25 mg topical
- Takes longer for effect.

**Hyperventilation: Associated Symptoms**

- Paresthesias (perioral, distal)
- Lightheadedness
- Chest pain
- Cramps / tetany
- Confusion
- Syncope
Hyperventilation: Differential Diagnosis

- Anxiety
- Idiopathic
- Pain response
- Pulmonary embolus
- Pneumonia
- Pneumothorax
- Acute MI
- Sepsis
- Acidosis
- Asthma

Severe Hyperventilation

- Most important is to make sure it is only due to anxiety; if not sure or possibly due to drug reaction or cardiac or pulmonary disease, call EMS
- Previously recommended rebreathing into a paperbag has been shown to cause significant hypoxia and probably should not be done; can have patient hold both their hands with fingers interdigitated in front of face to “pretend” to get same effect; this may have some placebo effect

Hyperventilation

- Consider use of PO or IM hydroxyzine (Vistaril or Atarax) 50 mg (or 1 mg / kg in children) as an anxiolytic or use Valium 2 to 5 mg PO or Ativan 1 mg IM or PO
- OK to use oxygen initially; does not exacerbate hyperventilation (and is important to use if cause is other than anxiety)
Hypoglycemia

- Usually IDDM patient
  - Decrease PO intake
  - Increase activity (exercise)
- Also in NIDDM patient
  - Oral hypoglycemic drugs cause longer duration hypoglycemia than does insulin excess

Hypoglycemia

- Can occur in non-diabetic patient:
  - ETOH ingestion
  - Toxic salicylate ingestion
  - Malnourished states
  - Insulin-producing tumors
- Patients on beta blockers susceptible

Hypoglycemia: Symptoms (any of these may be present)

- Anxiety
- Sleepiness
- Lethargy
- Cold, clammy skin
- Weakness
- Dizziness
- Lightheadedness
- Headache
- Any focal neuro sign
- May have seizure or coma
- Fatigue
- Confusion
- Palpitations
- Tremulousness
- Sweating
- Hunger
- Combativeness
Hypoglycemia: Diagnosis
- Confirm with fingerstick glucose (ChemStrip)
- Additional serum verification by lab not always required

Hypoglycemia: Treatment
- If reasonably alert and able to manage own airway, then give glucose-containing gel or fluid PO
- Otherwise start IV (draw red top or green top tube of blood if possible also so that diagnosis can be confirmed later in lab) and give 1 amp (50 cc) of 50% dextrose in water (for child give 1 gm/kg IV of 25% dextrose in water)
- May need to repeat dose once
- If unable to start IV: consider glucagon 1 mg IM (only works if glycogen stores OK in liver)
- Call EMS if patient not a known diabetic or if no rapid response to initial treatment with sugar
- Important to diagnose and treat quickly to prevent hypoglycemic neuronal damage

Hypertension Emergencies
- Hypertensive crisis (emergency): Severe elevation in blood pressure with rapid or progressive CNS, cardiac, renal, or hematologic deterioration
- Hypertensive "urgency": Elevated BP but no symptoms of end-organ damage
- BP reduction over 24 to 48 hrs. recommended
Hypertension: Treat, Refer, or Ignore?

- Level of BP requiring acute treatment in the asymptomatic patient is controversial among M.D.’s
  - Usually however does not need STAT Rx
- Be sure to repeat BP in both arms and after patient has relaxed for 15 minutes before considering referral
- Remember BP will increase in non-hypertensive patient due to pain, stress, anxiety, etc.
- Probably should document if patient advised of increased BP if checked in office

Specific Criteria for Hypertensive Crisis (Presence of Listed Item and BP)

- Start treatment and transfer to ED to admit
  - Encephalopathy (altered mental status)
  - Vomiting: protracted
  - Seizures
  - CVA / intracranial hemorrhage
  - Angina / MI / pulmonary edema
  - Aortic dissection
  - Eclampsia (toxemia)
  - ARF
  - grade III / IV retinopathy
  - hemolytic anemia / DIC
  - epistaxis

Conditions That May Mimic Hypertensive Crises

- Acute left ventricular failure
- Uremia from any cause, particularly with volume overload
- Cerebral vascular accident
- Subarachnoid hemorrhage
- Brain tumor
- Head injury
- Epilepsy (postictal)
Conditions That May Mimic Hypertensive Crises (cont.)
- Collagen diseases, particularly lupus erythematosus, with cerebral vasculitis
- Encephalitis
- Acute anxiety with hyperventilation syndrome
- Drug ingestion (phenacetin)
- Acute intermittent porphyria
- Hypercalcemia
- Malignant hyperthyroidism

Causes of Hypertensive Crises
- Accelerated hypertension
  - Hypertensive encephalopathy (malignant hypertension)
  - Uncontrolled primary hypertension
  - Renal vascular disease
  - Toxemia of pregnancy
  - Pheochromocytoma
  - Intake of catecholamine precursors in patients taking monoamine oxidase inhibitors
  - Head injuries
  - Severe burns or trauma
  - Rebound hypertension after withdrawal of antihypertensive drugs

Causes of Hypertensive Crises (cont.)
- Severe to moderate hypertension accompanying:
  - Acute left ventricular failure
  - Intracranial hemorrhage
  - Dissecting aortic aneurysm
  - Postoperative bleeding
  - Severe epistaxis
**Signs and Symptoms of Hypertensive Crises**

- Blood pressure
  - Diastolic usually greater than 130 mm Hg
- Funduscopic findings
  - Hemorrhages
  - Exudates
  - Papilledema
- Renal symptoms
  - Oliguria
  - Azotemia

**Gastrointestinal symptoms**
- Nausea
- Vomiting

**Gastrointestinal symptoms**
- Nausea
- Vomiting

**Signs and Symptoms of Hypertensive Crises (cont.)**

- Neurologic status
  - Headache
  - Confusion
  - Somnolence
  - Stupor
  - Visual loss
  - Focal deficits
  - Seizures
  - Coma

- Cardiac findings
  - Prominent apical impulse
  - Cardiac enlargement
  - Congestive heart failure

**Specific BP Levels For Emergent Treatment**

- Hypertensive encephalopathy
- Cerebral infarction
- Intracerebral hemorrhage
- Subarachnoid hemorrhage
- Eclampsia
- MI / CHF / Aortic dissection

- >200/130
- >140/90
- 130 to 140 / 90 to 100
  - >100
**Treatment of Hypertensive Crisis in the Office**

- High flow O2
- Call EMS
- Consider placing IV / heplock
- Consider IV narcotic or benzodiazepine
- Consider SL TNG to decrease BP acutely (0.4 mg)
- Recheck BP frequently till EMS arrives

**Options for Office Treatment of Hypertensive Emergency**

- Oral / SL Nifedipine 10 to 20 mg
- Clonidine 0.1 mg to 0.2 mg PO
- Labetolol 100 mg PO or 20 to 40 mg IV
- ± IV furosemide 20 to 80 mg
- TNG ointment 1/2” to 1”
- MgSO4 2 gms IV if eclamptic
- Morphine 2 to 4 mg IV (if CHF)

**Use of Esmolol (Breviblock)**

- IV cardioselective beta-blocker
- Chemically similar to metoproplol
- Elimination half-life : 9 min
- Duration of action : <30 min
- May try in ? CHF or ? asthma
- Preparation : 5 g dissolved in 500cc D5W
- Loading dose : 500 mcg/kg/min / 1 min
- Maintenance : 50 mcg/kg/min to 300 mcg/kg/min
- ± repeat loading dose before each increase in drip rate at 4 minute intervals
Antihypertensive Meds for Eclampsia

- Drugs of choice: Hydralazine, Labetolol
- Inhibit uterine contractions: Diazoxide, Calcium antagonists
- Use only if refractory to other agents: nitroprusside
- Contraindicated: Trimethaphan (meconium ileus), "Pure" beta blocker agents (decreased uterine blood flow), Diuretics (patient already volume depleted)
- Don't forget magnesium

Drug Induced Hypertensive Crisis

- Cocaine
- Amphetamines
- Phencyclidine (PCP)
- Diet pills
- OTC sympathomimetics
- MAO Inhibitors / Tyramine

Treatment of Drug Induced Hypertensive Crisis

- Labetalol: preferred
- Nitroprusside
- Nifedipine / Verapamil
- Phentolamine
- Since duration of HBP often brief, may not need treatment
- Note: Pure Beta blockers may cause increased BP (from unopposed alpha effect)
Recommended Minimal Emergency Drugs / Equipment for the Office

- Oxygen masks / nasal prongs
- Reliable O2 tank supply
- Suction catheters: flexible and Yankauer
- IV catheters: 20 g, 18 g (22 g if children treated)
- 500 cc or 1000 cc bags of NS
- IV tubing sets
- Epinephrine 1:1000 vials (1 mg per cc)

Recommended Minimal Emergency Drugs / Equipment for the Office (cont.)

- Atropine 1 to 2 mg vials or amps
- 50cc D50W amps (can dilute these 1:1 with sterile water for pediatric use)
- Benadryl 25 or 50 mg amps
- Valium 5 to 10 mg amps or Ativan 1 to 2 mg amps
- Narcan: 0.4 or 2 mg amps

Optional Meds for Office Emergencies

- Vistaril (or Atarax) 25 or 50 mg amps
- Alupent or albuterol solution for aerosols or MDI's
- Hydrocortisone 100 mg amps
- Glucagon 1 mg amps
Office Emergencies
Lecture Summary

- Be prepared and educate the office staff about management of emergencies
- Check office emergency equipment and meds regularly
- Know how to access local EMS for help