In-Office Urgencies and Emergencies: Are You Ready?

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What is an emergency?
- Acute threat to life
- Acute threat to vision
  - Vision loss
  - Permanent structural damage
  - Pain or discomfort
- Safety emergency
  - Natural disaster
  - Fire
  - Active Shooter

Barriers to effective management:
- Lack of preparedness
  - Supplies
  - Information
- Lack of confidence
  - Unfamiliarity with protocol, procedures
  - Fear
  - Denial
  - Apprehension
- Patient resistance

Plan of Action for...

<table>
<thead>
<tr>
<th>Systemic Emergencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain</td>
</tr>
<tr>
<td>Seizure</td>
</tr>
<tr>
<td>Collapse</td>
</tr>
</tbody>
</table>

- Do you know what to do?
- Do you have what you need?
  - Where will you send the patient after you stabilize?
  - Phone number/hours of operation?
  - Will you call to warn provider?

Emergency Supply Check List

- OHSAn approved first aid kit
- And/or first responder kit
- Epi-Pen
- AED
- In-office Oxygen tank
- Eyewash station
- Ocular irrigation system
- pH strips
- Updated CPR training
- Safety map showing exits, fire extinguishers, etc

- Phone numbers
  - Needlestick emergency
  - Poison control
  - Hospital (ER)
- Drugs to keep in office
  - Acetazolamide oral 250mg
  - Iopidine
  - Timolol, 0.5%
  - 1-2% pilocarpine
  - CAI
  - Predinosolone
  - Atropine
  - 10% Phenylephrine
OSHA Approved First Aid Kit

- Based on American National Standard (ANSI) Z308.1-1998 “Minimum Requirements for Workplace First-aid Kits”

- **Recent changes – required effective June 1, 2016**
  1. The introduction of two new classes of first aid kit
     a. regular workplace with risk of common workplace injuries
     b. high-risk work environments
  2. Contents are different
  3. Quantity of each item have been updated

---

First Aid Kit Contents per OSHA

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand-sanitizer (62% etOH)</td>
<td>1</td>
</tr>
<tr>
<td>Adhesive bandages 1x3 in</td>
<td>16</td>
</tr>
<tr>
<td>Triangular bandages 40x40x56in</td>
<td>1</td>
</tr>
<tr>
<td>Sterile pad 3 x 3 in</td>
<td>1</td>
</tr>
<tr>
<td>Roller bandage 2in x 4 yd</td>
<td>2</td>
</tr>
<tr>
<td>Antibiotic Application 1/57oz</td>
<td>10</td>
</tr>
<tr>
<td>Antiseptic 1/57 oz (e.g. providone sticks)</td>
<td>10</td>
</tr>
<tr>
<td>Adhesive tape 2.5 yd</td>
<td>1</td>
</tr>
<tr>
<td>Cold pack</td>
<td>1</td>
</tr>
<tr>
<td>Trauma pad 5 x 9 in</td>
<td>2</td>
</tr>
<tr>
<td>Medical exam gloves</td>
<td>2 pr</td>
</tr>
<tr>
<td>Scissors , Tweezers</td>
<td>1 pr ea</td>
</tr>
<tr>
<td>Eye pads</td>
<td>2</td>
</tr>
<tr>
<td>Eye/skin wash (1 fl oz)</td>
<td>1</td>
</tr>
<tr>
<td>Burn dressing (gel soaked)</td>
<td>4 x 4 in</td>
</tr>
<tr>
<td>Burn treatment 1/32 oz</td>
<td>10</td>
</tr>
<tr>
<td>Breathing barrier</td>
<td>1</td>
</tr>
<tr>
<td>First Aid Guide</td>
<td>1</td>
</tr>
</tbody>
</table>

Other Recommended Emergency Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose Gel</td>
<td>Hypoglycemic episodes</td>
</tr>
<tr>
<td>Analgesic (e.g. Tylenol, ibuprofen)</td>
<td>Pain management</td>
</tr>
<tr>
<td>Aspirin</td>
<td>Suspected heart attack</td>
</tr>
<tr>
<td>Antihistamine (e.g. Benadryl)</td>
<td>Allergic reactions</td>
</tr>
<tr>
<td>Epi-Pen</td>
<td>Anaphylaxis</td>
</tr>
<tr>
<td>Ammonia inhalants (i.e. smelling salts)</td>
<td>Syncope</td>
</tr>
<tr>
<td>Disposable gown</td>
<td>Personal Protection Items (PPI) for splash of bodily fluids</td>
</tr>
<tr>
<td>Eye goggles</td>
<td></td>
</tr>
<tr>
<td>Biohazard bag</td>
<td>Disposal of bodily fluid waste</td>
</tr>
<tr>
<td>AED</td>
<td>Cardiac arrest</td>
</tr>
<tr>
<td>Emergency Oxygen Device</td>
<td>Respiratory emergency</td>
</tr>
</tbody>
</table>
### Vital Signs: Tips/Pearls

- **Thermometer**
  - Digital with disposable covers
  - Disposable thermometer
- **BP**
  - Manual vs. automated
  - Wrist vs. bicep
- **Respiratory Rate**
  - Patient at rest, breathing normally
  - Number of chest rises per minute
- **Heart Rate**
  - Radial/brachial/carotid
  - Automated BP cuff
  - BPM
  - Heart rhythm
  - Pulse strength

### Vital Sign Normal Value Considerations

<table>
<thead>
<tr>
<th>Vital Sign</th>
<th>Normal Value</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>98.6°F (oral)</td>
<td>↑ when: infection, inflammation</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>&lt;120/&lt;80</td>
<td>↑ when: hypertension, arrhythmia</td>
</tr>
<tr>
<td>Respiration Rate</td>
<td>12-20 breaths/min</td>
<td>↓ when: heart attack, hypertension, many others ↑ when: respiratory distress, panic disorder</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>50-90bpm (adult)</td>
<td>↓ when: avid runner ↑ when: exercise, distress, fever, caffeine</td>
</tr>
</tbody>
</table>

### Making the Call....

- Type and nature of emergency
  - Medical
  - Criminal
  - Fire
- Specific location
- The handoff
  - S = situation
  - B = background
  - A = assessment
  - R = recommendation

### Details of Background ...

- S = Signs and symptoms.
- A = Allergies.
- M = Medications.
- P = Pertinent medical history.
- L = Last food or drink.
- E = Events leading up to the incident.

American Red Cross, 2016 First Aid Guide
Are you liable if you help and something goes wrong? Are you liable if you don’t?

- A basic axiom common law in the US
  - no duty to rescue unless you placed the victim in the peril from which he needs rescued
  - no legal obligation to help
    - Unless...
    - What about outside the US... ??

- Once you start to help....
  - You cannot leave the victim unless higher medical care arrives on the scene
  - Basic life support must be continued

Good Samaritan Law

- Provide legal protection for ordinary people who step up to help in an emergency
  - removing the threat of legal liability for injuries or other problems that could result from intervention

- Generally, the law states
  - that anyone providing emergency medical aid to an ill, injured or unconscious person at the scene of an accident or emergency cannot be sued for injuries or death caused by the rescuer’s actions — whether it is something they’ve done or neglected to do – as long as their actions were not grossly negligent.
  - no rigid definition for “grossly negligent”

Consent to help

- Expressed
- Implied
  - What would a reasonably prudent person want?

- Considerations
  - Age
  - Mental capacity
  - Consciousness
  - DNR

Systemic Emergencies

- Suspected Cardiac Arrest
- Respiratory Distress
- Syncope
- Suspected Stroke
- Anaphylaxis
- Hypertensive Crisis
- Seizure
- Diabetic emergencies
Chest pain

<table>
<thead>
<tr>
<th>Etiologies</th>
<th>Pain described as…</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiac Chest Pain</strong></td>
<td>• Angina pectoris – chronic, recurrent</td>
</tr>
<tr>
<td></td>
<td>• MI – acute, more severe</td>
</tr>
<tr>
<td></td>
<td>“crushing, squeezing” sensation not affected by breathing or movement</td>
</tr>
<tr>
<td><strong>Non-cardiac Chest Pain</strong></td>
<td>• Muscle strain</td>
</tr>
<tr>
<td></td>
<td>• Indigestion</td>
</tr>
<tr>
<td></td>
<td>• Intestinal gas</td>
</tr>
<tr>
<td></td>
<td>• Pericarditis</td>
</tr>
</tbody>
</table>

sharp, increasing with inspiration and decreases with exhalation, aggravated by movement, very localized

Differential diagnosis not always reliable!

Cardiac Emergencies

• Suspected heart attack
  • Males vs females

• If responsive:
  • patient should chew two 81mg or
  • one 325 mg aspirin

Cardiac arrest: Cardiac Chain of Survival

1 minute delay in CPR = 10% decrease in chance of recovery

• Brain damage can begin in 4-6 minutes
• Can be irreversible in 8-10

• Adult cardiac emergency:

• Pediatric cardiac emergency:

CPR Procedure - PEARLS

• General Rules
  • 30:2 (compressions : rescue breaths)
    • Adult
    • Child
    • Infant

• Breaths – only for trained healthcare professionals (non-breathing for laypersons)

• Always call for the AED and apply pads – machine will analyze and only shock if needed

• DISCLAIMER: get certified!
CPR Training

For you
- Basic Life Support for Healthcare Providers (BLS)
  - For wide variety of healthcare professionals
  - Covers CPR, use of an AED, and choking along with other life-threatening emergencies

For your non-medical staff
- Heartsaver® CPR AED
  - for anyone with limited or no medical training who needs a course completion card
  - Covers CPR, use of an AED, and choking adults

http://cpr.heart.org/AHAEC/CPRAndECC/FindACourse/Courses/UCM_473164_Courses.jsp
http://redcross.ca/training-and-certification

Choking – can escalate quickly

- Adult/big kid-Heimlich
  - Some say no to umbilical thrusts...
- Infant/small toddler-
  - Back blows/abdominal thrusts until
  1. Object comes out
  2. Patient is unresponsive, then begin CPR

- If CPR: check back of throat for object at each set of 30 compressions before 2 rescue breaths

The Heimlich Maneuver

- Position thumb side of fist 1" above naval and well below tip of sternal
- Thrust fist inward and upward
- Stop occasionally to check victim and your technique

Not so typical slit lamp exam...

- 30 year old male
- Corneal abrasion from landscaping work
- Verbalizing findings to student intern who it looking through the teaching tube....

- Next thing you know.... Nostrils instead of conjunctiva viewed in the slit lamp
It’s just episcleritis, man!

- 23 year old male
- Dx: Episcleritis
- Going over findings with patient at end of exam and...
- Patient: “oh no I’m going to faint”
  - Laid chair back
  - Turned back to type and patient starts rolling off chair
- Cold, clammy
- Vitals:
  - BP: 100/54
  - Pulse 115 bpm

Classification of Syncope

<table>
<thead>
<tr>
<th>VVS (60%)</th>
<th>Orthostatic (15%)</th>
<th>Cardiac (15%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolonged upright position</td>
<td>ANS failure</td>
<td>Arrhythmic or structural</td>
</tr>
<tr>
<td>Vagal stimuli (fear/anxiety/stress)</td>
<td>Drug induced</td>
<td>Sudden decrease in CO leading to cerebral perfusion</td>
</tr>
<tr>
<td>Dehydration</td>
<td></td>
<td>May have PHx or FHx</td>
</tr>
<tr>
<td>Other triggers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Syncope – Temporary insufficiency of blood flow to brain

- Causes range from relatively benign to potentially life-threatening
- 1/3 of those seen in ED are admitted into the hospital

1. Vasovagal syncope = most common type – 60%
2. Orthostatic – 15%
3. Cardiac – 15%
4. Other (e.g. psychogenic)

Pre-syncope:
- Patient is pale, clammy/sweaty
- Dizziness, lightheadedness, Nausea
- Patient feels warm
- Visual changes (tunnel vision, black out)
- Muffled hearing
- ↓ BP

Syncope:
- Irregular breathing (shallow or stopped)
- Pupils dilate
- Convulsive movements are common
- ↓ pulse (<50/min) — cardiac arrest is rare
- Airway obstruction by tongue should be ruled out

Fall in BP
- Cerebral Hypoperfusion
- Loss of Consciousness in 5-6 seconds
- Faint: Restores Blood Flow to Brain
- Recovery in <5min, total in <20min
- Post-syncope
  - Mental confusion
  - Predisposed to recurrence for next several hours

Syncope accounts for 1% of kids ED visits
- 15% of kids in 1st two decades
- Most are neurally mediated hypotension (i.e. VVS)
- Common associations
  - FHx syncope
  - Growth spurts
  - Menstrual cycle
  - Rapid weight loss
Recognize

• Urgency ??
• Emergency ??

Action

• Call 911 if (-)Hx syncope or without known trigger
• Patient supine (unless pregnant)
• Check vitals — respiration, BP, pulse
• Observation for 1.5 hours after recovery

Syncope in Kids

• 15% of kids in 1st two decades
• 1% ED visits
• Most are neurally mediated hypotension (i.e. VVS)

• Common associations
  • FHx syncope
  • Growth spurts
  • Menstrual cycle
  • Rapid weight loss

Patient Vital Signs

1. Body Temperature
2. Resting Pulse Rate
3. Respirations
4. Blood Pressure

Could this one be “just” syncope?

• 61 year old male, here for routine exam
• Medications:
  • alprazolam (Xanax)
  • amlodipine (Ca²⁺ channel blocker)
  • losartan-HCTZ (angiotensin II antagonist / thiazide diuretic)
• BMI 36
• BP 130/82
• Post-dilation patient reports increasingly severe headache
  • H/A from 2 to 6, Not feeling well
  • Patient becomes dizzy, confused, faint and loses consciousness
Signs of Stroke

- Trouble with speech, language
- Drooling, difficulty swallowing
- Drooping of face
- Vision disruption
- Weakness/paralysis/numbness of face, arms, legs
- Sudden, severe headache
- Dizziness or loss of balance
- Confusion
- Loss of consciousness

Recognize

- Urgency ??
- Emergency ??

Action

- Call 911 if
- Patient supine
- Check vitals – respiration, BP, pulse
- Measure BS if able

3 categories of stroke

1. Ischemic (85%)
2. Hemorrhagic
3. Transient Ischemic Attack
   - Temporary disruptions in blood flow -- no permanent damage
   - Symptoms last 30 min to 2 hrs -- often same symptoms as stroke
   - Risk of stroke if untreated
     - 10-15% in 3 months – 50% of these within next 48 hours
     - 33% in the next year

Acting F.A.S.T. to improve outcomes...

- Starting medical treatment within 24 hrs reduces the risk of stroke within 3 mos by 80%
- Act F.A.S.T.!!
  - Face → ask patient to smile—notice any droop?
  - Arms → ask patient to raise both arms – does one drift downward?
  - Speech → ask patient to repeat a phrase – notice any slurring/strange qualities
  - Time → if any of the above are noticed...call 911 immediately!
    - And...at what TIME was the patient last normal?
**ABCD² Rule**


- Assessment for TIA
- ≥3 points = emergency
  - Age>60 (1 pt)
  - BP ≥140/90 on first assessment (1 pt)
  - Clinical features (unilateral weakness=2 pts or speech impairment w/o weakness=1 pt)
  - Duration (≥60 minutes=2 pts; 10-59 minutes=1 pt)
  - Diabetes (1 pt)

**Are You Ready for This?**

- 60 year old male longhaul trucker
- Smoker, hx CVD
- Sudden unilateral decrease vision
  - 2 hours w/in event
  - Your staff suggests he come in immediately
- Hx of 20/50 amblyopia in other eye
- LPO OS

**Acute Treatment Options**

- Look for emboli
  - Nd:YAG laser embolysis
- “standard” therapies – none more effective than placebo
  - ↓IOP, ↑ perfusion pressure
    - AC paracentesis
    - Topical CAIs, oral/IV acetazolamide
  - Dislodge embolus
    - Ocular massage / compression
- Increase blood O₂ to dilate retinal arteries
  - Sublingual dinitrate
  - Systemic pentoxifylline
  - Inhalation of carbogen
  - Hyperbaric O₂
- r/o GCA in elderly

**New Guidelines**

- National Stroke Association, 2011
- American Heart Association, 2013

- **Strokes of major arteries = must be sent immediately to an ER with stroke center**
  - RAO
  - Transient monocular vision loss
tPA for CRAO

- Dissolves embolism
- Oral or IV
- Some studies have shown tPA to be effective in improving VA for up to 60-70% cases
  - Other studies find no difference
  - Tx within 6 hours – better outcomes
- Adverse events with tPA
  - Cerebral stroke and hemorrhage (10%)

HOLD the mustard!!!

- 49 year old female staff member has known allergy to mustard
- Returns from lunch after eating a burger which mistakenly had mustard on it
- Within minutes
  - Face/neck flush
  - Throat itching, swelling
  - Tongue swollen

Anaphylaxis

- Potentially life-threatening event – can lead to cardiac arrest
- Systemic hypersensitivity
- Increasingly common, increasing hospital admissions
- Safest to make presumptive dx if sudden onset of....
  - Urticaria (esp face and neck areas)
  - Cool and pale/bluish skin
  - Tightness in chest/throat
  - Stomach cramps, nausea, vomiting, diarrhea
  - Respiratory distress
  - Alteration in consciousness
  - Hypotension and tachycardia

Epi Auto-injectors

- Delayed response can lead to cardiac arrest
- It’s safe: only 1% have adverse effects
- There are no absolute contraindications to epinephrine administration for an anaphylactic reaction

\[ 0.3 \text{mg: } >66 \text{ lbs} \]
\[ 0.15 \text{ mg: } 33-66 \text{ lbs} \]
Procedure

- Pull off safety cap
- Hold tip against outer thigh (90°)
- Push tip straight into outer thigh and hold in place
- Massage injection site for several seconds
- Watch vitals – respiration, BP, pulse
- Repeat if no improvement in 5-10 min

93% of parents who had never previously seen an Auvi-Q or a demo used it correctly on the first attempt (Umasunthar T, et al. Allergy, 2015)

Voice prompts
- Packaged with a trainer device
- Needle protected before and after
- Cost vs Epi-Pen

EAs – under-prescribed and under-used

- 11% used an EAI during most recent episode
- 52% reported never receiving Rx
- 16% could demonstrate proper procedure

For a suspected or active food allergy reaction

Recognize and Respond to Anaphylaxis

http://www.foodallergy.org/
Other Treatments

- Benadryl or H1 blocker
  - Not recommended as first line or sole therapy
  - Not life-saving
  - Better for slow skin predominance acute allergic reaction
- Steroid
  - For later after event is under control
  - Prevents recurrences

Other Respiratory Distress

- Shortness of breath
- Gasping
- Uncomfortable/painful breathing
- Hyperventilation
  - With consequential hypocapnia
  - Leading to decreased cerebral perfusion
  - Often display of pre-syncopal symptoms
  - Loss of consciousness is rare

Recognize

- Urgency ??
- Emergency ??

Action

- Inject with epinephrine
- Call 911
- Watch vitals carefully—respiration, BP, pulse
- 5-10 minutes later no response: administer 2nd dose

Bronchial Asthma

- Common causes
  - Known lung disease
  - Lung infection
  - Anaphylaxis
  - Heart attack
  - Panic disorder

Heart Failure/Acute Pulmonary Edema

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortness of breath</td>
<td>Likely hx of heart disease</td>
</tr>
<tr>
<td>Sensation “thickness”</td>
<td>Symptoms: weakness, fatigue, difficulty</td>
</tr>
<tr>
<td>Tightness in chest</td>
<td>breathing/shortness of breath</td>
</tr>
<tr>
<td>Cough</td>
<td>Signs: cold, clammy</td>
</tr>
<tr>
<td>Audible wheezing</td>
<td>cyanopsia</td>
</tr>
<tr>
<td>Inhale and exhale</td>
<td>prominent jugular veins</td>
</tr>
<tr>
<td>Patient apprehensive</td>
<td>pitting edema at ankles</td>
</tr>
<tr>
<td>HR &gt;110 bpm</td>
<td>Vitals: increased respirations, BP and pulse</td>
</tr>
<tr>
<td>&gt;30 respirations/min</td>
<td></td>
</tr>
<tr>
<td>BP = may be normal</td>
<td></td>
</tr>
</tbody>
</table>
Heart Failure/Acute Pulmonary Edema

- Likely hx of heart disease
- Symptoms: weakness, fatigue, difficulty breathing/shortness of breath
- Signs:
  - cold, clammy
  - cyanopsia
  - prominent jugular veins
  - pitting edema at ankles
- Vitals: increased respirations, BP and pulse

True Respiratory Distress

- Do not wait to see if improves – call 911
  - Eventually – patient will become unresponsive and heart will stop
- Encourage patient to sit down and lean forward
- Bronchodilator needed if patient has one (asthmatics)
- Administer oxygen if available
- Reassurance – reducing anxiety and can help
- Monitor vitals
- Prepared for CPR if becomes unresponsive

Hyperventilation

- With consequential hypocapnia
- Leading to decreased cerebral perfusion
- Often display of pre-syncopal symptoms
- Loss of consciousness is rare

Are you ready for this?

- 17 year old FM, new patient
- High school athlete – soccer and volleyball
- Student intern performing retinoscopy
  - Patient, “I feel funny”
- And then –
  - Hand posturing
  - Eyes rolling, head turn to side
  - Body rigid
  - Incoherent
  - (-) convulsion

- Confirmed later to be a tonic seizure
And this?

• 26 year old female front desk receptionist
• Hx traumatic brain injury from car accident, followed by medically-induced coma x 1 month (7 years previous)
• (-) hx seizure
• Suddenly falls to floor from desk
  • Bodily posture
  • Eye closed
  • Jaw clenched
  • Jerky movements all over
  
  Lasted about 3 minutes

Or this one...?

• 58 year old AA female
• In/out of consciousness for 35 minutes

Seizures

• Epilepsy
  • 0.5 – 1% of population
  • Require anti-epileptic drugs
• Non-epileptic Events
  • Sudden, involuntary changes in behavior, sensation, motor activity, level of consciousness, or autonomic function
  • Associated with psychologic stress
  • Not caused by abnormal electrical charges
  • Commonly misdiagnosed as epilepsy
  • 70% are in females

Triggers

• Noncompliance with medication
• Lack of sleep, stress
• Alcohol
• Hormonal changes
• Low blood sugar
• Flashing or flickering lights

• Photosensitive Epilepsy – 3% of epileptics
  • Seizure occurs at the time of, or shortly after exposure to lights, patterns
  • Usually before age of 20, more common in females
In the event of a seizure...

<table>
<thead>
<tr>
<th>Do...</th>
<th>Don’t...</th>
<th>Call an ambulance if...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protect patient; cushion head</td>
<td>Restrain patient</td>
<td>1st seizure</td>
</tr>
<tr>
<td>Patient supine</td>
<td>Put anything in patient’s mouth</td>
<td>lasts &gt; 5 min</td>
</tr>
<tr>
<td>Maintain airway, monitor vitals</td>
<td>Give food or drink</td>
<td>another follows without consciousness</td>
</tr>
<tr>
<td>Time the event(s)</td>
<td>Attempt to move or “wake” patient</td>
<td>between</td>
</tr>
<tr>
<td>Speak calmly</td>
<td></td>
<td>Regular breathing does not subside</td>
</tr>
<tr>
<td>Patient on side once the seizure has finished</td>
<td>Look for an epilepsy identity card/jewelry</td>
<td>Diabetic</td>
</tr>
<tr>
<td>Look for an epilepsy identity card/jewelry</td>
<td></td>
<td>Pregnant</td>
</tr>
</tbody>
</table>

Recognize
- Urgency ??
- Emergency ??

Action
- Time, document
- Patient supine and safe position
- Call 911 when...
- Watch vitals carefully—respiration, BP, pulse

Diabetic Emergencies
- 28 year old Type 1 diabetic – working on installing new flooring
- Working for several hours, end of day
- Not making any sense
- Appears pale, sweaty

Hypoglycemic Crisis:
*Cause of death in 3% of insulin dependent diabetics*

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Mild to moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shaky or jittery</td>
<td>Dizzy</td>
</tr>
<tr>
<td></td>
<td>Sweaty, cold, clammy</td>
<td>Confused/disoriented/un coordinated</td>
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<td>Hungry</td>
<td>Inability to concentrate</td>
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<td>Pale</td>
<td>Changed personality/behavior</td>
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<td>Headache</td>
<td>(irritable, argumentative,</td>
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<td>Blurry vision</td>
<td>combative)</td>
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<td>Unresponsive</td>
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<td>Seizure activity or convulsions</td>
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Confirm Your Suspicions!

- Hypoglycemia is defined according to the following serum glucose levels:
  - < 50 mg/dL in men
  - < 45 mg/dL in women
  - < 40 mg/dL in infants and children

http://www.diabetes.org

Treatment

<table>
<thead>
<tr>
<th>Mild to Moderate</th>
<th>Severe</th>
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</table>
| Provide quick-acting glucose (sugar) product equal to 15-20 grams of carbohydrates.  
- 3 or 4 glucose tablets  
- 1 tube of glucose gel  
- 4 ounces of fruit juice  
- 6 ounces of soda  
Recheck blood glucose level after 10-15 minutes, and repeat quick-acting glucose product if needed | Call 911  
Position patient on his/her side  
Do not attempt to give anything by mouth |

Recognize

- Urgency ??  
- Emergency ??

Action

- Call 911
- Confirm with finger stick  
- Give glucose if able to swallow  
- Secure airway, give oxygen, fluids  
- Re-check BS, watch vitals

Hyperglycemia – Signs/Symptoms

Hyperglycemia

- Red in appearance  
- Increased thirst and/or dry mouth  
- Frequent or increased urination  
- Change in appetite and nausea  
- Blurry vision  
- Fatigue

Diabetic Ketoacidosis

- Dry mouth, extreme thirst, and dehydration  
- Nausea and vomiting  
- Severe abdominal pain  
- Fruity breath (acetone odor)  
- Deep, rapid breathing or shortness of breath  
- Chest pain  
- Increasing sleepiness or lethargy  
- Depressed level of consciousness

Onset: over several days
Hyperglycemic Emergencies

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<th>Condition</th>
<th>Blood Glucose</th>
<th>Mental State</th>
<th>Ketones in blood / urine</th>
<th>Treatment</th>
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|                                    | >250 mg/dL    | Alert to stu
Other Emergencies/Urgencies ... Focusing on the Eye Exam

- Threats to life and/or threats to vision
  - Suspected Aneurysm
  - CRAO
  - Giant Cell Arteritis
  - Acutely swollen ONHs

- Retinal Detachment
- Acute Angle Closure
- Corneal burn
- Orbital cellulitis
- Globe rupture

Examples of Ocular emergencies

**Emergency Conditions requiring immediate care**

- Arteritic Anterior Ischemic Optic Neuropathy
- Central Retinal Artery Occlusion
- Chemical injury
- Acute Angle Closure Glaucoma
- Globe rupture
- Orbital Cellulitis

**Emergency Conditions requiring care within hours**

- Acute loss of vision
- Acute iridocyclitis
- Corneal ulcer
- Hyphema
- Vitreous hemorrhage
- Retinal detachment
- Central Retinal Vein Occlusion
- Blunt trauma
- Acute diplopia
- Acute ptosis

Corneal Burn: Irrigation

- Start with minimal flow, then adjust
  - 30 minutes to 3 hours
    - Typical rate: 1 L of solution/30 minutes
  - Test pH after 5 minutes of no flow
  - Discontinue irrigation when pH is neutral

62 year old male
Pressure washing ceiling of an old house with bleach solution without eye protection
C/o ocular pain, photophobia

http://morganlens.com

What you will need...

- Molded Scleral lens with an aqueous lock that attaches to an IV bag
- IV bag with sterile 0.9% saline/lactated Ringer’s solution
- Emesis basin or fluid management system
- Litmus paper
Eye Irrigation Shield

- Eye irrigation adapter
- Fast, easy
- Holds eye open
- Non-invasive
- Water aims outward, defects off side walls and trickles down
- Pooled irrigation

Testing pH of ocular surface

- After 30 min of irrigation, wait an additional 5 minutes, then test
- Discontinue irrigation when pH is neutral.
  - Normal pH of tears: 6.2-6.9
  - Acidic: yellow - red
  - Basic: green - blue

Eye Wash Stations

- “suitable facilities for quick drenching or flushing within the work area for immediate use if an employee’s eyes or body may be exposed to corrosive materials.”

- OHSA / OSHA do not set specifications for equipment

What about Angle Closure?

Are you ready?

- Do you have what you need?
- Do you know where the items are stored?
- Do you know what to do?
- Do you know who you will send the patient to after IOP is under control?

Medication “kit”

- Topical Beta-blocker
- Topical Alpha agonist
- Topical Prostaglandin
- Topical Pilocarpine, 1-2%
- Oral Acetazolamide, 250 or 500 mg tablets
- Topical prednisolone
- Hyperosmotic - available IV only
**Acetazolamide**
- 125, 250mg tablets, and 500mg SR capsules (Diamox Sequels, Duramed Pharmaceuticals)
- C/I if Sulfa allergy?
  - chemical structure different than antibiotics – little evidence of cross-sensitivity
  - consider avoiding if hx of severe reaction
- Avoid in topiramate-associated angle closure (?)
- Long-term: liver, kidney disease, severe COPD
- Caution with sickle cell patients

**Common Side Effects**
- paresthesias
- metallic taste
- fatigue
- malaise
- gastrointestinal disturbances
- decreased libido
- metabolic acidosis
- electrolyte imbalance (including hypokalemia)
- renal calculi
- blood dyscrasias

**Primary Angle Closure**
- **Types**
  - Acute
  - Intermittent
  - Chronic/"creeping" closure
- **Prevalence**
  - Primary ACG – <10% all glaucomas in US
  - 2-8% of patients have an angle narrow enough to close
  - Only 5% of those will actually close
- **Risk Factors**
  - Race, based on shallow AC and crowded angles: Caucasians, Asians, Eskimos
  - FHx
  - Refractive Error, based on axial length: hyperopes
  - Age, based on lens thickening and pupillary miosis: >50–60

**Standardized Approach? Nope.**
- **AOA CPG (1994)**
  - 500 mg acetazolamide orally
  - One drop of 0.5% timolol
  - One drop of 2% pilocarpine
  - One drop of 1% apraclonidine.
- **AAOphthalmology (2013)**
  - Mild attacks - cholinergic agents (pilocarpine 1%–2%)
  - IOP above 40–50 mm Hg
    - β-adrenergic antagonists
    - α2-adrenergic agonists (apraclonidine should be avoided due to α1 binding)
    - prostaglandin analogs
    - oral, topical, or intravenous carbonic anhydrase inhibitors.
    - When necessary, a hyperosmotic agent

**Example Protocol– AACG**
- acetazolamide, 500 mg (or two 250mg)
- timoptic 0.5%
- brimonidine 0.1 or 0.2%
- prostaglandin
- pilocarpine, 1-2%
- timoptic, 0.5%
- brimonidine 0.1 or 0.2%
- prostaglandin

- Immediately administer
- Administer once IOP <40
- If IOP >40 for >30 minutes, re-administer

...but how close are you to a YAG laser?
Topicals to avoid (?)... 

- Topical CAI  
  - Not as potent to break pupillary block  
  - May cause slower resolution of corneal edema — compromises the delivery of laser energy if PI  
- Pilocarpine —
  - >2%: avoid when the pupillary block is lenticular  
  - Wait until IOP is < 40 for 1-2%  
- Apraclonidine — overlapping α-1 binding (brimonidine better)?  
- Prostaglandin — when inflammatory  
- Any others when otherwise contraindicated

Case Report –
Modified from International Ophth 2017  

- 32 year old FM reports with sudden onset eye pain and blurry vision  
- Taking topiramate for weight control — 25mg bid x 1 month  
- VA — 20/400, PH 20/40  
- Cornea: 1+ stromal edema  
- IOP: 56, 60mmHg  
- Angles – narrow!  
- AC – shallow  
- Refraction: -5.00 D shift OU

Topiramate toxicity to eye

- Acute angle closure
- Acute myopia
- Idiosynchratic — unpredictable
  - 78.5–81% of patients dose of topiramate was <75 mg/day  
  - 80-85% demonstrated the adverse reactions within first 2 weeks tx  
  - 11% more than 4 weeks later

Topiramate Induced Acute Angle Closure

- Bilateral  
- 50% are > 40 years old  
- Presents with:
  - H/A, nausea, vomiting  
  - Eye pressure/pain  
  - Stromal edema  
  - Shallow but flat AC  
- Also reported in......Other sulfadervatives...  
  - Acetazolamide  
  - HCTZ  
- AJO, Oct 2016
Primary vs. Topiramate Angle Closure

**Acute Angle Closure**
- Gonio: convex iris
- Iris bombé and pupil block

**Topiramate Angle Closure**
- Flat iris approach
- Ciliochoroidal effusion
- Forward displacement of the lens-iris diaphragm
- Extreme anterior chamber shallowning

Management

- Acutely
  - Reduction in IOP! Hit IOP with everything except...
    - Miotics – not useful
    - Avoid: acetazolamide (?)
  - Cycloplegic (e.g. atropine or homatropine)
    - Vascular permeability → reduces choroidal swelling
    - Helps relaxation of CB and lens-iris diaphragm
  - Topical steroid
  - Laser PI – not useful
- Cessation of Topamax results in resolution of both
  - Typically resolves within days to weeks with no permanent damage

“vision a little blurry”

- X 1 week
- 46 year old Asian male
- Hx -8.00OU, lattice w/ holes noted previously in record
- (+) recent floaters, (-) flashes

- 10% acute PVD have a break
  - Shafer sign
    - 70-90% have a retinal break
    - 52 x more likely to have a break
63 year old diabetic with floaters x 1 week

70-95% of symptomatic PVD with vitreous heme = RD/break

Run of the Mill Lattice Degeneration?

- 37 year old female c/o “flashes of light”
- PMH:
  - Krohn’s disease
  - 3 mos ago cerebral dissection discovered left side of brain with 3 week hospital stay
  - Treated with blood thinners
- Today: “flashes of light”
  - Pupils, CF normal
  - Pt unsure if flashes are a one eye or a two eye problem
  - Lattice w/o holes OU
- Readmitted shortly after visit

Cerebral Artery Dissections

- Common cause of stroke in young, middle aged patients
- Headache (47%) – most common presenting symptom
- Visual manifestations associated with artery dissections
  - Photopsia
  - VF defect
- Urgent CTA or MRA required

Bilateral flashes?

- Most common cause = migraine with aura
  - unilateral in up to 70% of patients
- Could also indicate ..
  - ischemia or edema to the cerebral cortex including the visual cortex
  - local cerebral edema to the temporal-occipital lesion
  - occipital AV malformation