## In-Office Urgencies and Emergencies: Are You Ready?

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Disclosures: Optos Advisory Board

## 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>Ocular Emergencies</th>
<th>Chest pain</th>
<th>Systemic Emergencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retinal Detachment</td>
<td>Seizure</td>
<td>Suspected Cardiac Arrest</td>
</tr>
<tr>
<td>CRAO</td>
<td>Stroke</td>
<td>Respiratory Distress</td>
</tr>
<tr>
<td>Giant Cell Arteritis</td>
<td>Anaphylaxis</td>
<td>Syncope</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?
- Will you call to warn provider?

## Systemic Emergencies

- Suspected Cardiac Arrest
- Respiratory Distress
- Syncope
- Suspected Stroke

- Anaphylaxis
- Hypertensive Crisis
- Seizure
- Diabetic emergencies

## Are you liable if you help and something goes wrong? Are you liable if you don’t?

- A basic axiom in US law
- No duty to rescue unless you placed the victim in the peril from which he needs rescued
- No legal obligation to help
- 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 laws – state law

## California Law

- **1799.102.** (a) No person who in good faith, and not for compensation, renders emergency medical or nonmedical care at the scene of an emergency shall be liable for any civil damages resulting from any act or omission. The scene of an emergency shall not include emergency departments and other places where medical care is usually offered. This subdivision applies only to the medical, law enforcement, and emergency personnel specified in this chapter.
- (b) (1) It is the intent of the Legislature to encourage other individuals to volunteer, without compensation, to assist others in need during an emergency, while ensuring that those volunteers who provide care or assistance act responsibly.
- (2) Except for those persons specified in subdivision (a), no person who in good faith, and not for compensation, renders emergency medical or nonmedical care or assistance at the scene of an emergency shall be liable for civil damages resulting from any act or omission other than an act or omission constituting gross negligence or willful or wanton misconduct. The scene of an emergency shall not include emergency departments and other places where medical care is usually offered. This subdivision shall not be construed to alter existing protections from liability for licensed medical or other personnel specified in subdivision (a) or any other law.

- https://law.oneclsc.com/california/health/1799.102.html
Chest pain

<table>
<thead>
<tr>
<th>Etiologies</th>
<th>Pain described as</th>
</tr>
</thead>
</table>
| Cardiac Chest Pain | • Angina pectoris – chronic, recurrent  
|                   | • MI – acute, more severe                |
| Non-cardiac Chest Pain | • Muscle strain  
|                   | • Indigestion                            |
|                   | • Intestinal gas                         |
|                   | • Pericarditis                           |

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

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

Heart stops Sudden collapse

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:

Patient Down - Initiating Emergency Assistance

**Responsive**
- Breathing but not awake
- Activate emergency response:
  - Call 911
  - Send for AED
- Patient in recovery position

**Unresponsive**
- Gasping, No breathing/pulse
- Activate emergency response:
  - Call 911
  - Send for AED
- Perform CPR until...
  - Patient responds, or
  - AED is ready
  - Proceed until emergency responders arrive and take over

CPR Procedure - PEARLS

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

- Video based course followed by instructor led, hands-on session and practical exam
- Initial training then certification every 1-2 years
- Cost – depends on training center
- [http://cpr.heart.org/AHAEDC/CPRAndAED/FindACourse/Courses/UCM_473164_Courses.jsp](http://cpr.heart.org/AHAEDC/CPRAndAED/FindACourse/Courses/UCM_473164_Courses.jsp)
Choking – can escalate quickly

- Adult/big kid - Heimlich
- Infant/small toddler - back blows/abdominal thrusts until

1. Object comes out
2. Patient is unresponsive, then begin CPR
3. If CPR - check back of throat for object at each set of 30 compressions before 2 rescue breaths

Emergency Oxygen

- Improves hypoxia
- Reduces pain and breathing discomfort

Consider for:
- Asthma attack
- Anaphylaxis
- Heart Attack
- Stroke

Abnormal Respirations:
- ADULT: <12 or >20 bpm
- CHILD: <15 or >30 bpm
- INFANT: <25 or >50 bpm

Blood Pressure Classifications and Referral Guidelines

<table>
<thead>
<tr>
<th>Hypotension</th>
<th>normal</th>
<th>Pre-HTN</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Critical High Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic</td>
<td>&lt; 90</td>
<td>&lt; 120</td>
<td>120-139</td>
<td>140-159</td>
<td>≥160</td>
</tr>
<tr>
<td>Diastolic</td>
<td>&lt; 60</td>
<td>&lt; 80</td>
<td>80-89</td>
<td>≥90</td>
<td>≥100</td>
</tr>
</tbody>
</table>

Refer:
- within 2 months
- within 1 month
- Evaluate or refer immediately or within 1 week

Emergency Oxygen

- Improves hypoxia
- Reduces pain and breathing discomfort

Consider for:
- Asthma attack
- Anaphylaxis
- Heart Attack
- Stroke

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- INFANT: <25 or >50 bpm

Blood Pressure Classifications and Referral Guidelines


A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

Table 6. Categories of BP in Adults

<table>
<thead>
<tr>
<th>BP Category</th>
<th>SBP</th>
<th>DBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120 mm Hg</td>
<td>&lt;80 mm Hg</td>
</tr>
<tr>
<td>Elevated</td>
<td>120-129 mm Hg</td>
<td>&lt;80 mm Hg</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Stage 1</td>
<td>130-139 mm Hg</td>
</tr>
<tr>
<td></td>
<td>Stage 2</td>
<td>≥140 mm Hg</td>
</tr>
</tbody>
</table>

All values ~10 mmHg lower than JNC 7, 2013.
Hypertension Guidelines: Clear as Mud

Systolic: >180
Diastolic: >110

“Hypertensive Crisis”

• URGENT vs. EMERGENT
• JNC 7
  “Evaluate and treat immediately or within 1 week depending on clinical situations and complications.”
• Systemic symptoms
• Ocular findings

Hypertensive Crisis Emergencies – indicated end organ damage

• 1-year death rate is >79%
• median survival is 10.4 months if the emergency is left untreated
• actual BP level may not be as important as the rate of BP rise

Same BP – 2 different situations

BP 190/112
• Feeling “fine”
• Forgot his medicine today
• Denies H/A, etc
• DFE: crossing changes

BP 190/112
• (+) “migraine” since yesterday
• DFE: disc edema, flame heme

The breaking point of autoregulation

• Autoregulation helps control retinal blood flow
• Retina vs. choroid vs. nerve
• Operates within a certain range
• Critical point: breaks down → vessels no longer protected
  • Too high=Malignant hypertension / hypertensive crisis
  • Too low=Arteriolar hypotenstion

Subjects retina to ischemic damage

Causes of Hypertensive Crisis

• Most have known Hx HTN
  • Compliance
  • Recent medication changes
  • Drug interactions

• Pregnancy
• Recreational Drug Use (cocaine, amphetamines)
• Head Trauma
Other potential considerations

- Interpretation
- Medication compliance
- Patient’s reaction
- Recommendations
  - Use of topical 2.5% PE ± NLO
  - Post-dilation BP
  - Aggressive but SLOW lowering of BP

Automated BP Monitors – the low down...

- Easy for technicians to use
- At home monitoring is crucial for HTN patients
- Proceed with caution...
  - Underestimates systolic by ~10, and diastolic by ~5mm
  - Less accurate in extreme high/low ranges

Not so typical slit lamp exam...

- 30 year old male
- Corneal abrasion from landscaping work
- Verbalizing findings to student intern who is looking through the teaching tube....
- Next thing you know....
  Nostrils 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

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/swaty
- 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
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

Low Risk:
- Known syncope hx with clear precipitating factors

High Risk:
- Vit or Fitz CV disorder
- Lack of syncope hx or precipitating factors
- Risk of falls at home

Syncope in Kids

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

- Common associations
  - Fitz syncope
  - Growth spurts
  - Menstrual cycle
  - Rapid weight loss

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

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 those within next 48 hours
  - 33% in the next year
- Imaging considerations.....
  - MRA/MRI
  - With DWI if acute
  - CT/CTA

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!
Are You Ready for This?

- 60 year old male longhaul trucker
- Smoker, hx CVD
- Sudden unilateral decrease vision (within 2 hours of event)
- Hx of 20/50 amblyopia in other eye

CRAO – management considerations

- Look for emboli
  - Nd:YAG laser embolysis
- Ocular massage – firm
  - Patient looks down
  - Trendelenburg position – patient supine with feet up
  - 10 seconds pressure, followed by 20-30 seconds without pressure
  - repeat for up to 20 minutes
  - increases IOP, encouraging retinal arteriole pressure to overcome IOP
- r/o GCA in elderly
  - Considered a stroke of a major artery

Are You Ready for This?

- LPO
  - Pale
  - Retina non-perfused
  - (-) embolus visible

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)

Atrial Fibrillation

- Most common cardiac arrhythmia
- Increased risk of mortality by 40-90%
  - TIA, stroke (≥5) and MI
- Screen for with RAO patients
  - ↑ risk of stroke
  - ↑ need for anticoagulant

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
• 1.6% of US population
• 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


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

Cost issue - Options Available

• EpiPen (Mylan Pharmaceuticals) - $600
• EpiPen, generic (Mylan Pharmaceuticals) - $300
• Auvi-Q (Kaleo Pharmaceuticals) - $360
• Adrenaclick -- $10 at CVS
• Or... Epi in a syringe....

• Considerations
  • Insurance
  • Patient assistance plans
  • Training

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

0.3mg: >66 lbs
0.15 mg: 33-66 lbs

Auvi-Q – Back on the Market 2018

• 93% of parents who had never previous 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

EAI’s – under-prescribed and under-used

• 11% used an EAI during most recent episode

• 52% reported never receiving Rx

• 16% could demonstrate proper procedure
Recognize

- Urgency ??
- Emergency ??

Action

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

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

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 him/her from injury Cushion head</td>
<td>• Restrain him/her</td>
<td>• You know it is the person’s first seizure</td>
</tr>
<tr>
<td>• Patient supine</td>
<td>• Put anything in his/her mouth</td>
<td>• The seizure lasts &gt; 5 min</td>
</tr>
<tr>
<td>• Maintain airway, monitor vitals</td>
<td>• Give them anything to eat or drink until they are fully recovered</td>
<td>• One seizure follows another without consciousness between</td>
</tr>
<tr>
<td>• Time the event(s)</td>
<td>• Attempt to move or &quot;wake&quot; him/her</td>
<td></td>
</tr>
<tr>
<td>• Speak calmly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Patient on side once the seizure has finished</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Look for an epilepsy identity card/jewelry</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Recognize
• Urgency ??
• Emergency ??

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

Drinking on the job?
• 28 year old Type 1 diabetic – working on installing new flooring
• Working for several hours, diet mountain dew on the floor beside him
• End of day
• Not making any sense
• Appears pale, sweaty

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

Symptoms

<table>
<thead>
<tr>
<th>Mild to moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Shaky or jittery</td>
<td>• Inability to eat or drink</td>
</tr>
<tr>
<td>• Sweaty, cold, clammy</td>
<td>• Unconscious</td>
</tr>
<tr>
<td>• Hungry</td>
<td>• Unresponsive</td>
</tr>
<tr>
<td>• Pale</td>
<td>• Seizure activity or convulsions</td>
</tr>
<tr>
<td>• Headache</td>
<td></td>
</tr>
<tr>
<td>• Blurry vision</td>
<td></td>
</tr>
<tr>
<td>• Sleepy/lethargic/weak</td>
<td></td>
</tr>
<tr>
<td>• Dizzy</td>
<td></td>
</tr>
<tr>
<td>• Confused/disoriented/un coordinated</td>
<td></td>
</tr>
<tr>
<td>• Inability to concentrate</td>
<td></td>
</tr>
<tr>
<td>• Changed personality/behavior (irritable, argumentative, combative)</td>
<td></td>
</tr>
</tbody>
</table>
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

AOA Clinical Practice Guidelines

- February, 2014
- Evidence-based vs. consensus-based
- 276 papers reviewed, critiqued and referenced by 20 peer experts
- Recognized as "outstanding scientific paper" by APHA
  - Covers the basics...
  - And beyond...
    - Use of O2T
    - Rapid-acting carbohydrates – need in office for hypoglycemic events

Treatment

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

Hyperglycemic Emergencies

<table>
<thead>
<tr>
<th>Condition</th>
<th>Blood Glucose</th>
<th>Mental State</th>
<th>Ketones in blood/urine</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic Ketaacidosis (DKA)</td>
<td>&gt;250 mg/dL</td>
<td>Alert to stupor/coma</td>
<td>Positive</td>
<td>Insulin</td>
</tr>
<tr>
<td>Hyperglycemic Hyperosmolar State (HHS)</td>
<td>&gt;600 mg/dL</td>
<td>Stupor/coma</td>
<td>Small</td>
<td>Fluids alone, often</td>
</tr>
</tbody>
</table>

Hyperglycemia – Signs/Symptoms

<table>
<thead>
<tr>
<th>Hyperglycemia</th>
<th>Diabetic Ketaacidosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Red in appearance</td>
<td></td>
</tr>
<tr>
<td>• Increased thirst and/or dry mouth</td>
<td></td>
</tr>
<tr>
<td>• Frequent or increased urination</td>
<td></td>
</tr>
<tr>
<td>• Change in appetite and nausea</td>
<td></td>
</tr>
<tr>
<td>• Blurry vision</td>
<td></td>
</tr>
<tr>
<td>• Fatigue</td>
<td></td>
</tr>
<tr>
<td>• Dry mouth, extreme thirst, and dehydration</td>
<td></td>
</tr>
<tr>
<td>• Nausea and vomiting</td>
<td></td>
</tr>
<tr>
<td>• Severe abdominal pain</td>
<td></td>
</tr>
<tr>
<td>• Fruity breath (acetone odor)</td>
<td></td>
</tr>
<tr>
<td>• Deep, rapid breathing or shortness of breath</td>
<td></td>
</tr>
<tr>
<td>• Chest pain</td>
<td></td>
</tr>
<tr>
<td>• Increasing sleepiness or lethargy</td>
<td></td>
</tr>
<tr>
<td>• Depressed level of consciousness</td>
<td></td>
</tr>
</tbody>
</table>

Onset: over several days

Hyperglycemic Crises

<table>
<thead>
<tr>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Food intake that has not been covered adequately by insulin</td>
</tr>
<tr>
<td>• Decreased physical activity</td>
</tr>
<tr>
<td>• Severe physical or emotional stress</td>
</tr>
<tr>
<td>• Five “Is”</td>
</tr>
<tr>
<td>• Infection / illness / injury</td>
</tr>
<tr>
<td>• Infarction</td>
</tr>
<tr>
<td>• Indecision (e.g. cocaine use)</td>
</tr>
<tr>
<td>• Infant (i.e. pregnancy)</td>
</tr>
<tr>
<td>• Insulin – problem with pump, medication, compliance?</td>
</tr>
</tbody>
</table>

Increased BS Renal glucose threshold overwhelmed

Polyuria Polydipsia Dehydration

http://care.diabetesjournals.org/content/27/suppl_1/s94.full
Confirm Your Suspicions!

• Finger stick glucometry

• Urinalysis:
  • Glucose: kidney "maxes out" its capacity for re-absorption at 180-200 mg/dL
  • Ketones

Treatment

• Call 911
• Give extra water or non-sugar-containing drinks
• Recheck blood glucose every hour
• Consider carefully....
  • Does the patient wear a pump? Is it working properly?
  • Does the patient have insulin onsite?
  • Giving insulin when K+ is too low can cause life-threatening arrhythmia

Recognize

• Urgency ??
• Emergency ??

Action

• Call 911
• Confirm with finger stick
• Secure airway, give oxygen, fluids
• Re-check BS hourly, watch vitals

Other Emergencies/Urgencies ...

Focusing on the Eye Exam

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

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

85 WM, HTN, Smoker

• Black circle over vision x 2 days
• FB vision
• Pupils normal

Red-Free

Choroidal View
“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

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

Shafer’s Sign:
Pigment cells floating in anterior vitreous (just behind lens) indicates a retinal break—find it!!
Shafer sign video

63 year old with floaters x 1 week
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

4:30 on a Friday....

- 41 year old male – has never had an eye exam
- LPE: 11 years ago
- No medications
- C/o: severe headache and blurred vision x 2 weeks
- BCVA: 20/30, 20/60
- Pupils: appeared normal
- CFs: reduced OD, OS
- EOM: normal

Now what?

- Bilateral disc swelling
- SVP absent
- Presumed papilledema
- Sudden onset
- Severe headache
- Demographics don’t agree with IICHTN
- Outcome = large meningioma of brain, urgently operated

Pre/post-surgical RNFL scans

- can drive decisions for surgery (i.e. urgency)
  - ↓ing: become permanent
  - Stable: may wait even if VF shows loss
- Comparison of pre- vs. post- surgical scans in neuro cases
  - Meningioma can grow back, so useful for monitoring progression
What about Angle Closure?

- In-office Readiness
  1. Necessary medications available
  2. Plan of action for referral for Laser PI

- Medication “kit”
  - Beta-blocker
  - Alpha agonist
  - CAI
  - Prostaglandin
  - Pilocarpine, 1-2%
  - Acetazolamide, 250 or 500 mg tablets
  - Prednisolone

Acetazolamide

- 125,250mg tablets, and 500mg SR capsules (Diamox Sequels, Duramed Pharmaceuticals)

- Contraindications:
  - Sulfite allergy?
  - Chemical structure different than antibiotics – little evidence of cross-sensitivity
  - Consider avoiding if history of severe reaction
  - Avoid in topiramate-associated angle closure
  - Long-term: liver, kidney disease, severe COPD
  - Caution with sickle cell patients

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
  - Fix
  - Refractive Error, based on axial length: hyperopes
  - Age, based on lens thickening and pupillary miosis: >50-60

Example Protocol– AACG

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

- timoptic, 0.5%
- brimonidine 0.1 or 0.2%
- prostaglandin

Laser Peripheral Iridotomy

- Tx for closed or narrow angles at risk
- Usually with YAG
- PI position...
  - Linear dysphotopsia?
BOYS!

- 12 year old female hit in eye with rubberband 1 week ago
- Has been to Emergence and ER, and now us
- Mom is giving her ibuprofen for pain
- C/o: eye pain, photophobia, headache
- 20/20-3 OD, OS
- Grade 1 hyphema
- 2+ iritis

Complications

- Increased IOP – 30%
- Re-bleed – up to 35% and usually 2-7 days later
- Corneal staining from blood – 2-11%
- Optic atrophy – secondary to:
  - Traumatic nerve contusion
  - Glaucoma

Treating traumatic hyphema

- Confirm closed-globe trauma
- Atropine
- Steroids – PF1% 2qh
- Antifibrinolytic agents
  - ↓ risk of re-bleeds but may slow clot absorption
  - Significant contraindications
  - Topical aminocaproic acid q 4 hours x 5 days
  - Topical tranexamic acid 5% q id x 5 days
- Fox shield (no patch!)
- Bed rest/head elevation
- Surgical Management
- RTC X ...?

Avoid...... ?

Orbital floor or blow out fracture

- Usually involves maxillary bone and posterior medial floor (weakest point)
- Orbital contents may prolapse or become entrapped in maxillary sinus
- Look for pain, diplopia, restricted EOM, crepitus, enophthalmos
- CT scan to rule-out orbital floor fracture
- If floor fracture is suspected, begin broad-spectrum oral antibiotic (Keflex, Augmentin) and nasal decongestant
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

Testing pH of ocular surface

- 30 minutes of continuous 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

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

Eyecap™ 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

Who needs to provide 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.”
  - OSHA does not set specifications for equipment
- Portable Eye Wash Station?
  - Easier to comply with OSHA requirements on placement
  - Easy transportation to the site of an emergency

Corneal Lacerations

- Note air bubbles in anterior chamber
- Partial-thickness laceration
- Full-thickness laceration
Deeper corneal injuries

- Differentiate with Seidel’s test!
- Lamellar laceration
  - Partial-thickness, closed globe, non-penetrating injury
- Corneal Laceration
  - Full-thickness, open globe, penetrating injury
  - Avoid unnecessary manipulation of the globe... the less done in office, the better!!
  - Gently shield the eye and refer patient immediately for surgical repair
  - If using any topical meds (anesthetic, antibiotic, etc.) open a fresh bottle!

Emergency Supply Check List

- OSHA approved first aid kit
- Phone numbers
- Needlestick emergency
- Poison control (National 1-800-462-0800)
- Hospital (911)
- Drugs to keep in office
  - Acetazolamide oral 250mg
  - Lopidine
  - Timolol, 0.5%
  - 1-2% pilocarpine
  - CAI
  - Prednisolone
  - Atropine
  - 10% Phenylephrine

First Aid Kit Contents per OSHA

- Based on American National Standard (ANSI) 2308.1-1998 "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
  2. Contents are different
  3. Quantity of each item have been updated
<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>
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