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…

Retinal Detachment	**Orbital Trauma**
CRAO	**Alkali Burn**
Giant Cell Arteritis	**Angle Closure**

- 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?

Ocular Emergencies

Chest pain	**Diabetic Emergency**
Seizure	**Stroke**
Collapse	**Anaphylaxis**

- Do you have what you need?
- Do you know what to do?
  - Will you call 911?

Systemic Emergencies

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.onecle.com/california/health/1799.102.html*

Chest pain

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

	Etiologies	Pain described as…
Cardiac Chest Pain	• Angina pectoris – chronic, recurrent • MI – acute, more severe	"crushing, squeezing" sensation not affected by breathing or movement
Non-cardiac Chest Pain	• Muscle strain • Indigestion • Intestinal gas • Pericarditis	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

Figure 3-2. Men and women often experience heart attacks differently.

American Red Cross 2016 First Aid Guide

Cardiac arrest: Cardiac Chain of Survival

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:**

American Red Cross 2016 First Aid Guide

Patient Down - Initiating Emergency Assistance

Responsive	Unresponsive

• Breathing but not awake
• Activate emergency response:
  • Call 911
  • Send for AED
• Patient in recovery position
	• 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!

30 2

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

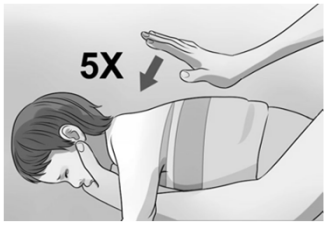
- Video based course followed by instructor led, hands-on session and practical exam
- Initial training then certification every 1-2 years
- Cost – depends on training center
- http://cpr.heart.org/AHAECC/CPRAndECC/FindACourse/Courses/UCM_473164_Courses.jsp

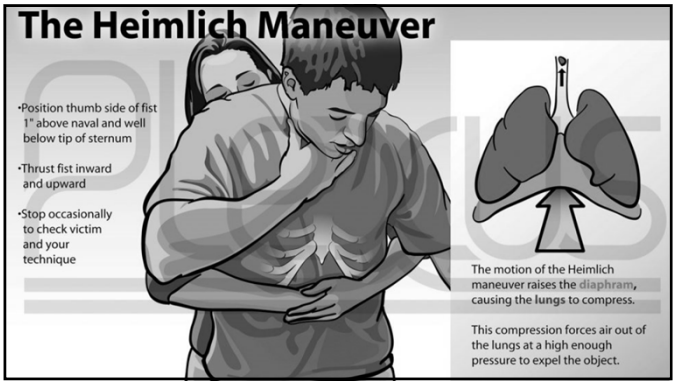
Choking – can escalate quickly

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

1. Object comes out
2. Patient is unresponsive, then begin CPR

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





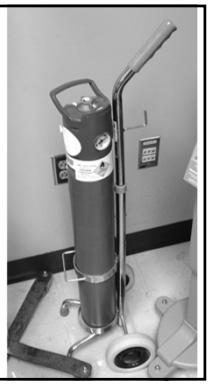
Emergency Oxygen

- Improves hypoxia
- Reduces pain and breathing discomfort

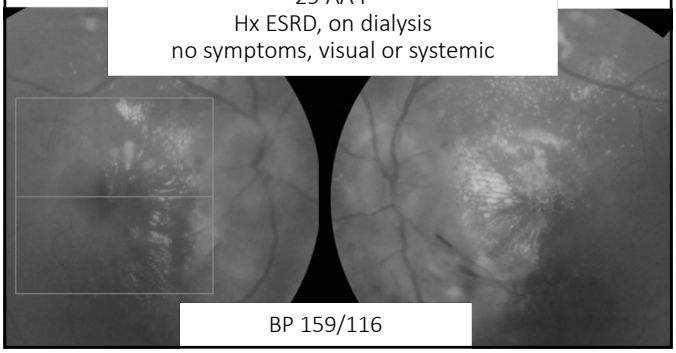
- Consider for:
  - Asthma attack
  - Anaphylaxis
  - Heart Attack
  - Stroke

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

Administering Oxygen Fact Sheet, American Red Cross 2011



29 AA F
Hx ESRD, on dialysis
no symptoms, visual or systemic



BP 159/116

Blood Pressure Classifications and Referral Guidelines

(*adapted from the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure – JNC 7, 2003*)

	Hypotension	normal	Pre- HTN	Stage 1	Stage 2	**Critical High Point**
Systolic	< 90	< 120	120-139	140- 159	≥160	>180
Diastolic	< 60	< 80	80 - 89	90-99	≥100	>110
				⇧ Refer within 2 months	⇧ Refer within 1 month	⇧ Evaluate or refer immediately or within 1 week

The JAMA Network

From: **2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8)**

Clinical Practice Guideline

2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

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

Table 6. Categories of BP in Adults*

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

All values ~10mmHg lower than JNC

Hypertension Guidelines: Clear as Mud

Seth Bilazarian, MD

DISCLOSURES | January 30, 2014

"Hypertensive Crisis"

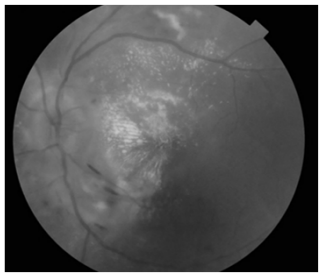
Systolic	>180
Diastolic	>110

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

Meetz RE, Harris TA. The optometrist's role in the management of hypertensive crises. Optometry. 2011 Feb;82(2):108-16.

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



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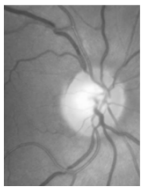
Same BP – 2 different situations

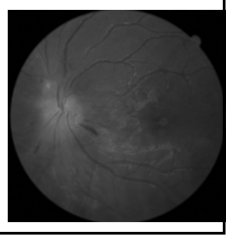
BP 190/112

- 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

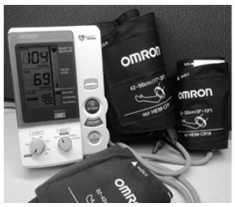
- Most have known Hx HTN
  - Compliance
  - Recent medication changes
  - Drug interactions
- Pregnancy
- Recreational Drug Use (cocaine, amphetamines)
- Head Trauma

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

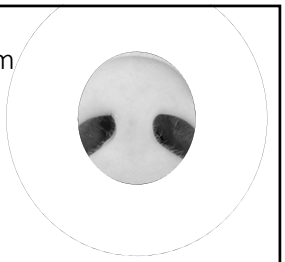
Automated BP Monitors – the low down…

- 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



J Hypertens. 2016 Aug 10. [Epub ahead of print]
Threshold for diagnosing hypertension by automated office blood pressure using random sample population data.
Wohlfahrt P[1].

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 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)

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

Akdemir B, et al. Indian Pacing and Electrophysiology Journal, 2015.
Blanc JJ, et al. Journal of Cardiovascular Electrophysiology, 2016.

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

Recognize

- Urgency ??
- Emergency ??

Low Risk:
-known syncope hx with clear precipitating factors

High Risk:
-Hx or FHx CV disorder
-lack of syncope hx or precipitating factors
-risk of falls at home

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

Anderson I, et al. Pediatric Neurology, 2016.

Could this one be "just" syncope?

- 61 year old male, here for routine exam
- Medications:
  - alprazolam (Xanax)
  - amlodipine (Ca^{2+} 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 these within next 48 hours
     - 33% in the next year

- Imaging considerations…..
  - MRI/MRA
  - With DWI if acute
  - CT/CTA

⇨ ***All are medical emergencies!***

CDC 2015
AHA 2015
Johnston WC, et al. *Lancet*. 2007; 369: 283-292.

Acting F.A.S.T. to improve outcomes…

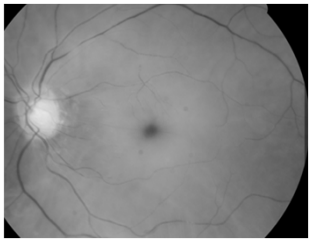
- Starting medical treatment within 24 hrs reduces the risk of stroke within 3 mos by 80%

- Act F.A.S.T.!!
  - **F**ace → ask patient to smile—notice any droop?
  - **A**rms → ask patient to raise both arms – does one drift downward?
  - **S**peech → ask patient to repeat a phrase – notice any slurring/strange qualities
  - **T**ime → if any of the above are noticed…call 911 immediately!

Johnston WC, et al. *Lancet*. 2007; 369: 283-292.

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



LPO
Pale
Retina non-perfused
(-) embolus visible

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

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%)

ABCD^2 Rule

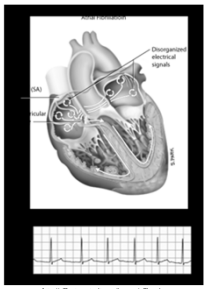
Johnston WC, et al. *Lancet*. 2007; 369: 283-292.

- 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 (x5) and MI
- Screen for with RAO patients
  - ↑ risk of stroke
  - ↑ need for anticoagulant

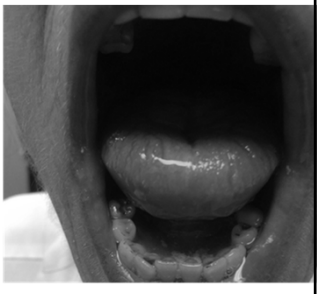
Plunkett O, et al. BMJ Sept 2014



http://afib.utorontoceit.com/images/afibmain.png

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

2015 update of the evidence base: World Allergy Organization **anaphylaxis guidelines**.
Simons FE, Ebisawa M, Sanchez-Borges M , Thong BY , Worm M , Tanno LK, Lockey RF, El-Gamal YM, Brown SG, Park HS, Sheikh A.
World Allergy Organ J. 2015 Oct 28;8(1):32. doi: 10.1186/s40413-015-0080-1. eCollection 2015.

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

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

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

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

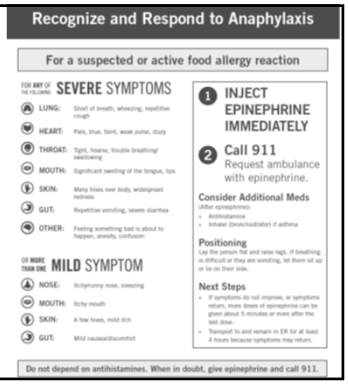
EAIs – under-prescribed and under-used

- 11% used an EAI during most recent episode
  - Wood, RA, et al. J Allergy Clin Immunol, 2014
- 52% reported never receiving Rx
  - Altman AM, et al. J Allergy Clin Immunol, 2015
- 16% could demonstrate proper procedure
  - Bonds RS, et al. Ann Allergy Asthma Immunol, 2015

All 2-packs of Epi-Pen come with a trainer device.

- Also staff awareness, consideration allergies , good in common areas

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

Recognize

- Urgency ??
- Emergency ??

Action

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

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

Lasted about 4 minutes

Vitals:
- 110 bpm
- BP: 108/62

- 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…?

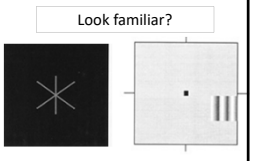
- 58 year old AA female
- In/out of consciousness for *35 minutes*

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…

Do…	Don't…	Call an ambulance if…
• Protect him/her from injury Cushion head • Patient supine • Maintain airway, monitor vitals • Time the event(s) • Speak camly • Patient on side once the seizure has finished • Look for an epilepsy identity card/jewelry	• Restrain him/her • Put anything in his/her mouth • Give them anything to eat or drink until they are fully recovered • Attempt to move or "wake" him/her	• You know it is the person's first seizure • The seizure lasts > 5 min • One seizure follows another without consciousness between

https://www.epilepsy.org

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:

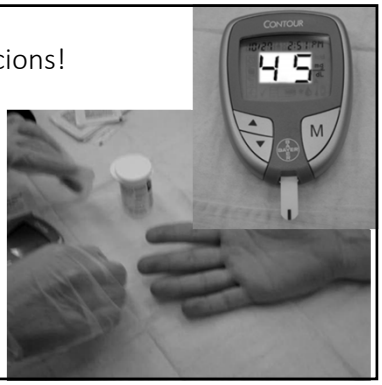
Cause of death in 3% of insulin dependent diabetics

Symptoms

Mild to moderate		Severe
• Shaky or jittery • Sweaty, cold, clammy • Hungry • Pale • Headache • Blurry vision • Sleepy/lethargic/weak	•Dizzy •Confused/disoriented/uncoordinated • Inability to concentrate • Changed personality/behavior (irritable, argumentative, combative)	• Inability to eat or drink • Unconscious • Unresponsive • Seizure activity or convulsions

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

Mild to Moderate	Severe
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

AOA Clinical Practice Guidelines

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

Hyperglycemic Emergencies

Condition	Blood Glucose	Mental State	Ketones in blood / urine	Treatment
Diabetic Ketoacidosis (DKA) • >100K hospitalizations in US each year • 2-10% mortality rate	>250 mg/dL	Alert to stupor/coma	Positive	Insulin
Hyperglycemic Hyperosmolar State (HHS) • Much less common • Greater mortality rate	>600 mg/dL	Stupor/coma	Small	Fluids alone, often

Table modified from McNaughton C, et al. Clinical Diabetes 2011.

Hyperglycemia – Signs/Symptoms

Hyperglycemia	Diabetic Ketoacidosis
• Red in appearance • Increased thirst and/or dry mouth • Frequent or increased urination • Change in appetite and nausea • Blurry vision • Fatigue	• 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 Crises

Increased BS

Renal glucose threshold overwhelmed

Urine diluted

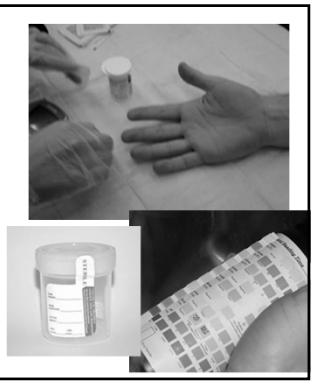
Polyuria
Polydipsia
Dehydration

- Causes
  - Food intake that has not been covered adequately by insulin
  - Decreased physical activity
  - Severe physical or emotional stress
  - Five "Is"
    - Infection / Illness / Injury
    - Infarction
    - Indiscretion (e.g. cocaine use)
    - Infant (i.e. pregnancy)
    - Insulin – problem with pump, medication, compliance?

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 to low can cause life-threatening arrhythmia

Recognize
- Urgency ??
- Emergency ??

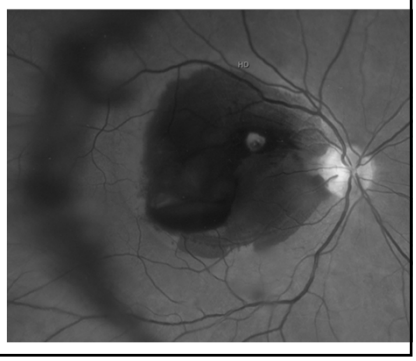
Action
- Call 911
- Confirm with finger stick
- Secure airway, give oxygen, fluids
- Re-check BS hourly, watch vitals

Other Emergencies/Urgencies … Focusing on the Eye Exam

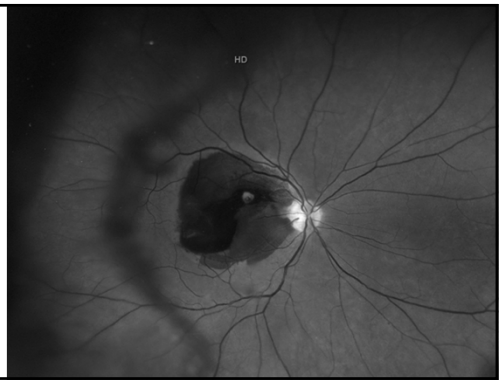
- Threats to life and/or threats to vision
  - Suspected Aneurysm
  - CRAO
  - Giant Cell Arteritis
  - Acutely swollen ONHs
  - Retinal Detachment
  - Acute Angle Closure
  - Corneal burn
  - Orbital cellulitis
  - Globe rupture

85 WM, HTN, Smoker

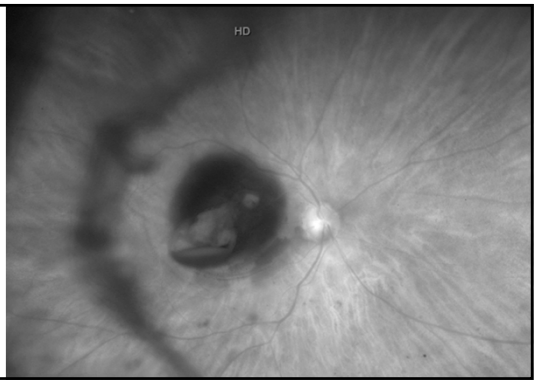
- Black circle over vision x 2 days
- FB vision
- Pupils normal

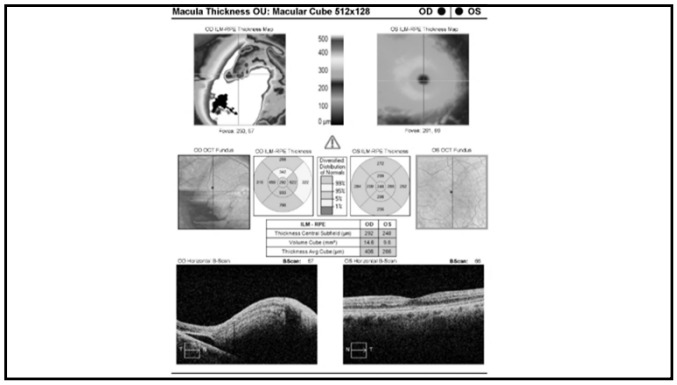


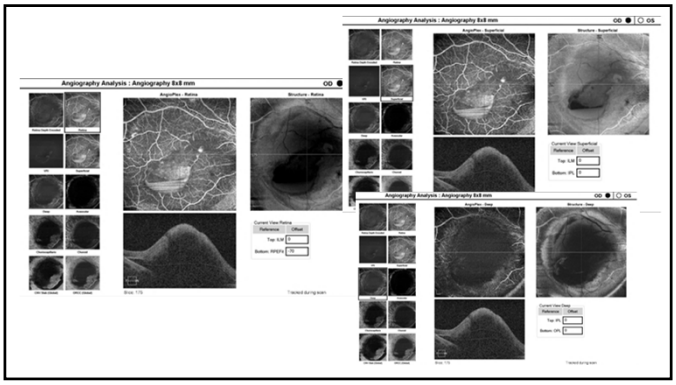
Red-Free



Choroidal View

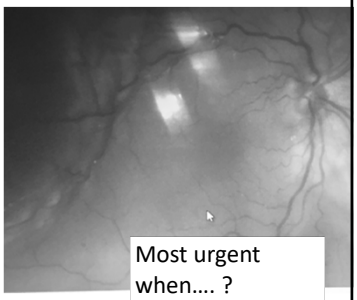




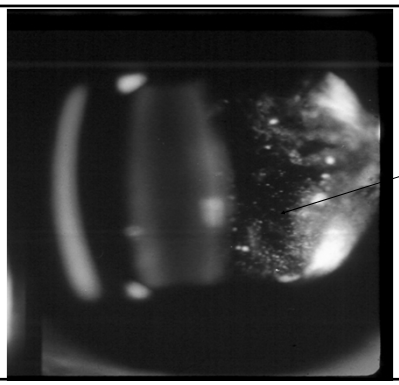


"vision a little blurry"

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



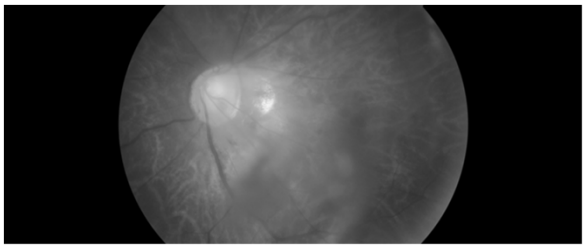
Most urgent when…. ?



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



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

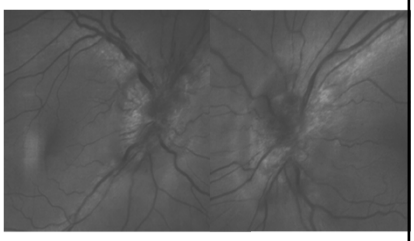
- Common cause of stroke in young, middle aged patients
- Headache (47%) – most common presenting symptom
- Visual manifestations associated with artery dissections
  - Photopsia
  - VF defect
- Urgent CTA or MRA required

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

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

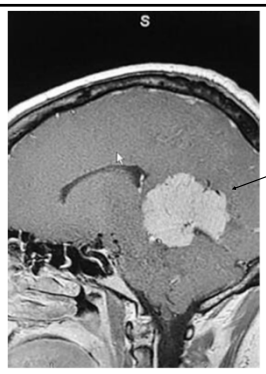
Recognize

- Urgency ??
- Emergency ??

- Sudden onset
- Severe headache
- Demographics don't agree with IICHTN
- Outcome = large meningioma of brain, urgently operated

Action

- Patient sent to ER
- Call ER to notify of findings



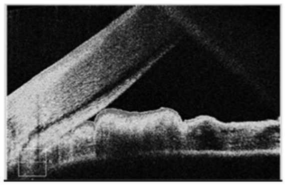
Large meningioma at base of skull

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:
  - 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

Than T, Smith H. http://www.reviewofoptometry.com/ce/10-must-have-oral-meds.

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.

http://www.aoa.org/documents/optometrists/CPG-5.pdf

- AAOpthalmology (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

http://www.aao.org/bcscsnippetdetail.aspx?id=08d5ebde-046a-453b-bcb1-9f4a10ab4a2a

Example Protocol– AACG

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

} Immediately administer

- pilocarpine, 1-2%

} Administer once IOP <40

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

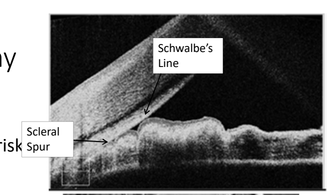
} If IOP >40 for >30 minutes, re-administer

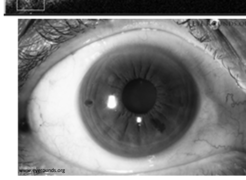
…but how close are you to a YAG?

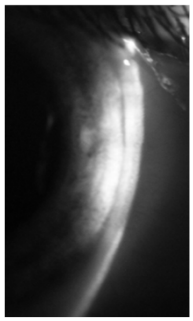
Laser Peripheral Iridotomy

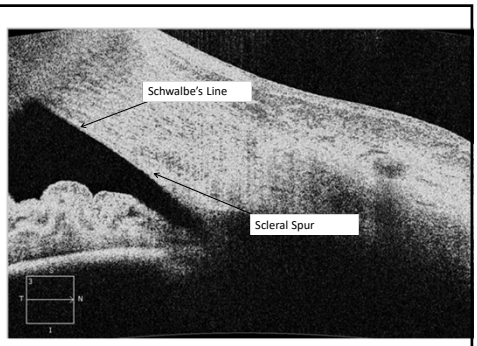
- Tx for closed or narrow angles at risk
- Usually with YAG
- PI position
  - Linear dysphotopsia ?

Vera V et al. Am J Ophthalmol, 2014.







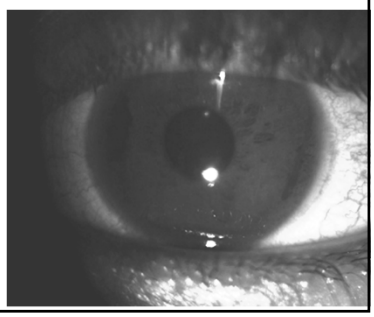


Ocular / Orbital Trauma…..

- Chemical Burn
- Hyphema
- Conjunctival laceration
- Intraorbital foreign body
- Open globe
- Orbital blow out fracture

BOYS!

- 12 year old female hit in eye with rubberband 1 week ago
- Has been to Emergecare 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

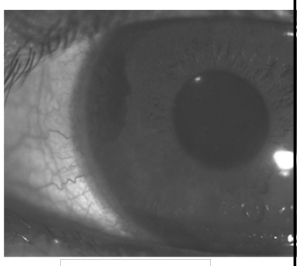


Complications

- 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 aminacaproic acid q 4 hours x 5 days
  - Topical tranexhamic acid 5% qid x 5 days
- Fox shield (no patch!)
- Bed rest/head elevation
- Surgical Management
- RTC X …??

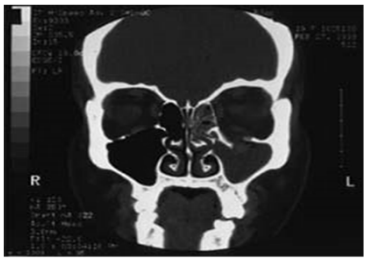


Avoid……. ?

Hosseini S. Iran J Sc Supplement. March, 2014.
Bansal et al. S of Ophth, 2015.

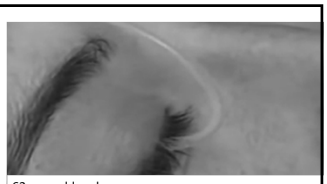
Orbital floor or blow out fracture

- 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



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

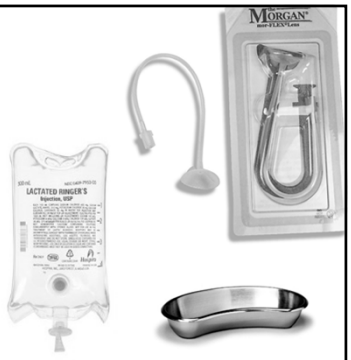
http://morganlens.com

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

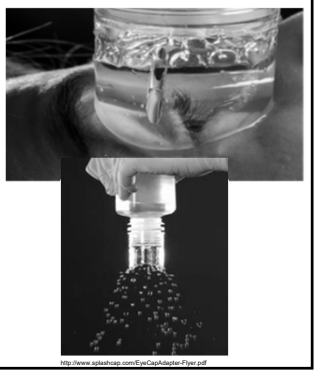
What you will need…

- 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



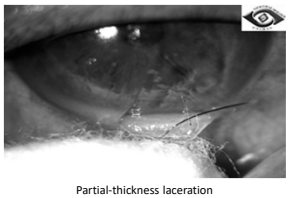
http://www.splashcap.com/EyeCapAdapter-Flyer.pdf

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

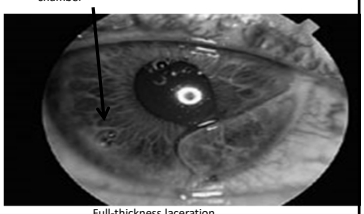
http://osha.theoshastore.com/emergency-eye-wash-station.html
Paragraph (c) of OSHA Standard 29 CFR 1910.151)

Corneal Lacerations



Partial-thickness laceration
www.sarawakeyecare.com

Note air bubbles in anterior chamber

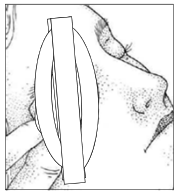


Full-thickness laceration

Deeper corneal injuries

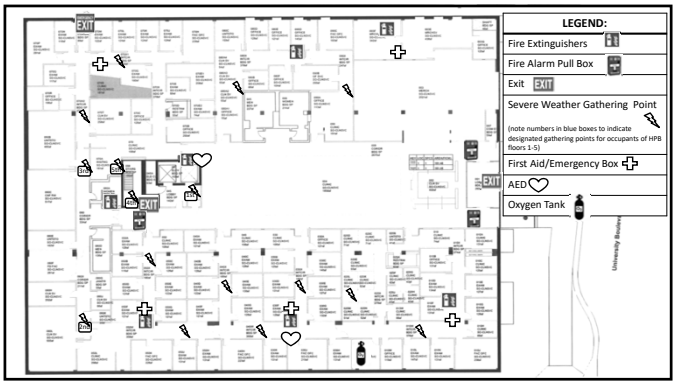
- Differentiate with Seidel's test!
- Lamellar laceration
  - Partial-thickness, closed globe, non-penetrating injury
- Corneal Laceration
  - Full-thickness, open globe, penetrating injury
  - Avoid unnecessary manipulation of the globe….***the less done in office, the better!!***
  - Gently shield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

Patching vs. Shielding



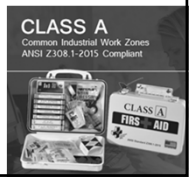
Emergency Supply Check List

- ✓ OSHA approved first aid 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 (National 1-800-462-0800)
  - ✓ 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

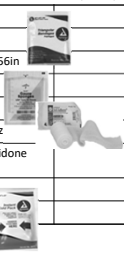
- Based on American National Standard (ANSI) Z308.1-1998 "Minimum Requirements for Workplace First-aid Kits"
- **Recent changes – required effective June 1, 2016**
  1. The introduction of two new classes of first aid kit
     A. regular workplace with risk of common workplace injuries
     B. high-risk work environments
  2. Contents are different
  3. Quantity of each item have been updated



http://www.wedgaz.org/wp-content/uploads/2015/07/ANSI-ISEA-Z308.1-2014-rev2.pdf
https://www.osha.gov/pls/oshaweb/owadisp.show_document%3Fp_id%3D9863%26p_table%3DSTANDARDS

First Aid Kit Contents per OSHA

Item	Qty Required
Hand-sanitizer (62% etOH)	1
Adhesive bandages 1x3 in	16
Triangular bandages 40x40x56in	1
Sterile pad 3 x 3 in	2
Roller bandage 2in x 4 yd	1
Antibiotic Application 1/57oz	10
Antiseptic 1/57 oz (e.g. providone sticks)	10
Adhesive tape 2.5 yd	1
Cold pack	1



Item	Qty Required
Trauma pad 5 x 9 in	2
Medical exam gloves	2 pr
Scissors , Tweezers	1 pr ea
Eye pads	2
Eye/skin wash (1 fl oz)	1
Burn dressing (gel soaked) 4 x 4 in	1
Burn treatment 1/32 oz	10
Breathing barrier	1
First Aid Guide	1

Other Recommended Emergency Items

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