EMRAM In-service Review: Trauma 3

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Outline

- Abdominal trauma
- Puncture wounds
- Special (sensitive lacerations)
- Lid lacerations
- Globe Perforation
- Blast injuries
- Open fractures
- Knee dislocation
- Achilles tendon rupture
- Patellar tendon rupture
- Joint penetration

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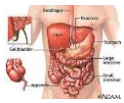
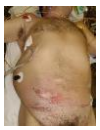
Abdominal trauma





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Blunt abdominal trauma

- Benign initial exam in 20 % of patients
- Spleen is most commonly injured organ
  - Liver is 2nd
- Solitary lap belt injuries result in jejunal injuries and mesenteric lacerations

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Diaphragmatic injuries

- Usually from blunt trauma
- Left side 3x higher rate of injury; liver is protective on right
- Symptoms and signs
  - Sob
  - Bowel sounds on chest auscultation
  - Abd pain radiating to ipsilateral shoulder
- Diagnosis = challenging!
  - High index of suspicion
  - Ct can help but can miss injury
  - Ng tube/abdominal content on CXR is diagnosic
- Treatment is operative

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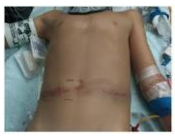
Hollow viscus injuries

- Spectrum from contusion to rupture
- Have high suspicion with seatbelt signs for contusion
  - CT can miss
- Jejunum is most common area of injury
- Symptoms
  - Peritoneal signs, can be delayed
- Treatment
  - OR for rupture
  - Observation for contusions



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Solid organ injuries

- Spleen is most commonly injured
  - Followed by liver
- Diagnosis : CT with IV contrast
- Treatment :
  - Based on hemodynamic stability not on grade of injury
  - Most managed expectantly rather then surgically

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Retroperitoneal injuries

duodenal

- High-speed decelerating trauma
- Range from intramural hematoma to extensive crush or laceration
- Symptoms usually slow to develop
  - Abd pain, nausea, vomiting
- Ruptures usually contained in the retroperitoneum

pancreatic

- Rapid deceleration or crush injuries
  - Classic case of blow to midgut from steering wheel or handlebar of bike
- Leakage of activated enzymes leads to retroperitoneal autodigestion which can become superinfected and develop into abscesses

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Penetrating abdominal trauma

- Liver is the most commonly injured organ
  - Followed by small bowl
- GSW to peritoneum requires laparotomy
  - Commonly injured organs – Small bowel, colon, liver
- Stab wounds have a lower incidence of intraperitoneal injury
  - Commonly injured organs – liver, small bowel
  - Can be locally explored, laparotomy only if peritoneal space violated
  - Most common site is LUQ

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US - CT

- Initial diagnostic modality
  - FAST
  - For Blunt Trauma!
- Can miss small bowel injury and retroperitoneal injury
- Cannot differentiate fluids
  - Blood vs ascites
- Study of choice for hemodynamically patients with…
  - Blunt trauma
  - GU trauma
  - Suspected retroperitoneal trauma
- Can miss diaphragmatic, small bowl and pancreatic injuries

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Imaging algorithm

- Unstable patient + positive Fast =
- Stable Patient + Positive FAST =
- Unstable Patient + Negative FAST =
- Stable Patient + Negative FAST =

- OR
- CT
- Repeat US or DPL
- observation

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DPL

- Used to identify intra-abdominal bleeding or bowel injury that requires laparotomy if FAST is inconclusive
- Can miss retroperitoneal, diaphragmatic and isolated hollow viscus injuries
- Only contraindication is clear need for laparotomy
- In pregnant patients
  - Open, supra-umbilical technique

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Puncture wounds

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- Plantar surface most common site
- inspect for retained foreign body and underlying structural injury
- Infection occurs in 6-11%
  - Higher rate in diabetics, PVD and immunocompromised pts
  - Staph aureus is common organism
  - Pseudomonas concern when going through sole of tennis shoe
- Treatment failure usually suggests retained foreign body
- Irrigate and prophylactic antibiotics for high risk patients
  - Keflex or cipro when concerned for pseudomonas
- Update tetanus

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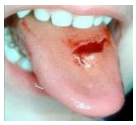
Sensitive Lacerations



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- Tongue lacerations
  - Repair if ….. Gaping open, flap shaped, actively bleeding, involve muscle
  - Use 4-0 absorbable suture
  - Operative repair for extensive lesions or uncooperative patients
- Facial lacerations
  - Aim for cosmetic repair
  - Regional blocking for anesthesia
  - Plastics referral for parotid injury or facial nerve injury
- Genital lacerations
  - Urology for scrotal lacerations
  - Repair superficial vaginal/vulvar lacerations
    - Gyn referral for extensive vaginal injury or cervical laceration

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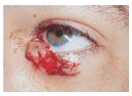
Lid lacerations



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- Superficial can be repaired with 6-0 or 7-0 absorbable sutures
- Refer these injuries:
  - Lacrimal caniculi
  - Levator muscle/tendon (ptosis)
  - Canthal tendons
  - Orbital septum (fat protrusions)
  - Lid margins
  - Extensive tissue loss

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Globe rupture

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Bell's phenomenon

- Globe rupture commonly located in the inferior aspect of the globe
- Eyeball rolling upward and outward in response to eye closure

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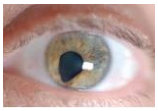
- Signs and symptoms
  - Teardrop/irregular pupil
  - Flattened anterior chamber
  - Decreased visual acuity
- Diagnosis
  - Seidel test (fluorescein stain flows in "riverlike" pattern from wound"
- Treatment
  - Ophtho consult
  - Do not check Iop
  - Metal eye shield, npo, tetanus, IV Abx, pain control
  - Avoid Succinylcholine (increases Iop)



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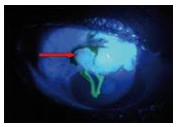
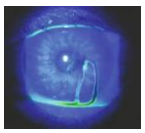
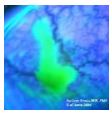
Seidel test

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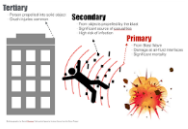
Blast injuries



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Type and mechanism

- Primary:
  - Result of the pressure wave
  - Ears, lungs, GI tract most susceptible
  - Tm rupture most sensitive indicator
- Secondary:
  - Injury from small fragments of flying debris from explosion
- Tertiary:
  - From victims collision with hard surface
  - Frequently lethal
- Quaternary:
  - Any injury not related to the above

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Specific injuries

Head and neck
- Most vulnerable
- Hearing impairment common
- Look for TM perforation

GI
- Air-containing organs and solid viscera may rupture
- Possible delayed perforations in the ileocecal region

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Specific injuries

- Lungs
  - Pulmonary edema and hemorrhage
  - ARDS 24-48 hours post blast
  - Respiratory failure
  - Airway management
    - Unassisted ventilation is best, provide supplement O2
    - Avoid PEEP given risk of air embolism
    - Delay general anesthesia 1-2 days if possible

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Open fractures

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- An underlying fracture with communication to the external environment through a break in the overlying skin
  - High risk for infection
- Considered an orthopedic emergency
  - Given iv antibiotics (ancef)
  - Update tetanus
  - Consult ortho for washout (usually in OR)

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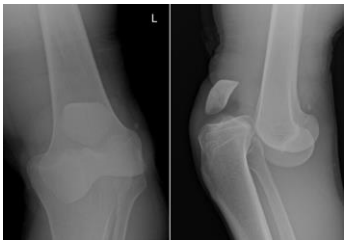

nee dislocation

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Classification and presentation

- Classified according to direction of tibial displacement relative to femur
- Presentation
  - Complete disruption of all major ligaments (+/- meniscal injury)
  - Popliteal injury (anterior posterior dislocations)
  - Peroneal nerve injury – dorsal foot paresthesia, reduced dorsiflexion
  - Tibial nerve injury
  - Proximal tibial fracture
  - May relocate spontaneously – have high suspicion with grossly unstable knee

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treatment

- Immediate reduction and immobilization in posterior splint at 15* flexion
- CTA to look for popliteal injury
- Check popliteal, DP and PT pulses before and after
- Check peroneal and tibial nerves before and after
- Immediate surgery
  - With popliteal injury
  - Open dislocation
  - irreducible

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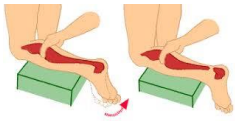
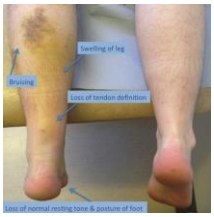
Achilles tendon rupture





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- Occurs in sedentary, middle-age males : "weekend warriors"
- Mechanism: forceful dorsiflexion of the foot with the ankle relaxed, direct trauma to taut tendon, extra stretch to taut tendon
- Sx: sudden excruciating pain at the back of ankle, heard a "pop" or felt a "snap"
- Exam: swelling at distal calf, palpable defect, weak plantar flexion
- Thompson test: normally have plantar flexion of foot when squeezing the calf
  - Will not occur with full tear
- Tx: immobilize in posterior splint in plantar flexion
  - Ortho referral

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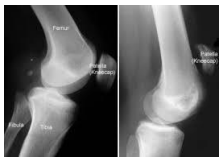

Patellar tendon rupture

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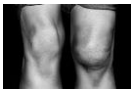
- More common in pts under 40 with hx of tendonitis or steroid injections
- Occurs after forceful contraction of the quadriceps
- Exam: defect inferior to the patella and inability to extend knee
- Xray will show a high or low riding patella
- Treatment:
  - Knee immobilization
  - Ortho referral for surgical repair



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Joint penetration

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- When a soft tissue injury violates the joint space
- Increased risk for septic joint
  - Immediate ortho consult and washout needed
  - Antibiotics like open fracture treatment, update tetan
- Concern for joint space involvement when
  - Proximity of soft tissue injury to joint
  - Visible joint capsule surface
  - Periarticular fracture

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Definitive joint involvement

- Or and washout with orthopedic without further testing when
  - Foreign body in joint on xray
  - Intra-articular air on xray or CT
  - Obvious joint involvement of fracture with open fracture on xray

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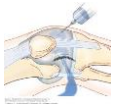
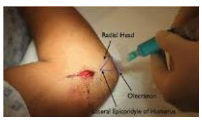
Unclear joint involvement

- Load joint with saline or methylene blue and look for extravasation from wound





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Questions??

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