
2019

EM CASES COURSE

PRE-COURSE WORKBOOK



AM: GI Bleed | Opioids | Knee Injuries

PM: Cardiac Arrest | Awake Intubation | Peds Trauma

Instructions for Getting the Most Out of The EM Cases Course Workbook

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1. Reviewing the pre-course material in the handbook
2. Participating in discussions during the course

If you have NO TIME TO PREPARE prior to the course - At a minimum please read the handbook for the modules that you chose. (10 minutes each)

If you want to get MORE out of the course – Read the handbook AND read the written summary of the corresponding podcast(s) -Link available in handbook (20 minutes each)

If you want to get MOST out of the day – Read the handbook, read the written summary of the podcast and listen to the relevant podcast(s) (1-2 hours each)

Morning Modules

1. **GI Bleed pg 2**
2. **Opioids pg 6**
3. **Knee Injuries pg 10**



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GI Bleed

With Walter Himmel & Rick Penciner

PODCASTS TO LISTEN TO PRIOR TO THE COURSE

Link to: GI Bleed Emergencies Part 1

Link to: GI Bleed Emergencies Part 2

Link to: EMU 365 Video with Dr. Himmel

Link to: Transfusions, Anticoagulants & Bleeding

Link to: DOACs: Bleeding & Reversal

The acute GI bleed patient presents several challenges including coagulation, source and airway control. There is a wide spectrum of disease from relatively benign to peri-arrest. Through these cases Dr. Penciner will guide us through these challenges with expert help from Dr. Himmel.

Case 1: The Cirrhotic Bleeder

A 66 year old female with a known history of alcoholic liver cirrhosis presents to your ED with 3 hours of coffee ground emesis and 1 episode of black stool. Vital signs are HR 115, BP 95/70, RR 24, O2 sat 94% on RA, T 36.5C. She is awake, but disoriented. Her abdomen is slightly distended with bulging flanks.

Past medical history other than the alcoholic cirrhosis is non-contributory.

Q1: What therapies have the most evidence for benefit in this situation? How will you prioritize the medications accordingly

Q2: When will you consider initiating a massive transfusion protocol?

Q3: The patient becomes progressively more obtunded and you decide she needs to be intubated. How can you optimize your chances of a successful intubation? What modifications to standard RSI techniques will you consider here?

Q: When should you consider placement of a Blakemore tube? Describe the steps you would take in placing the tube.

Case 2: The Undifferentiated Leak

A 78 year old male presents with a primary complaint of weakness worsening for the last month or so. He is in no pain. You note his hemoglobin is 75. He is not sure if his stools are dark or not, he doesn't usually check. He has had some nausea and vomited twice in the last two days, but again cannot really describe the emesis.

His vital signs are stable and he is in no apparent distress. He is alert and oriented. PMHx includes atrial fibrillation, hypertension, dyslipidemia. He is on warfarin, rosuvastatin, and hydrochlorothiazide.

Q1: How might you go about determining if a GI bleed is present here? Are there any ways you could differentiate between upper or lower source of bleeding?

Q2: The patient is taking Warfarin for atrial fibrillation and his INR today is 2.9. How will you advise him to proceed regarding anticoagulation assuming you confirm he has a GI bleed?

Q3: Will you offer this patient a transfusion? If so, how many units over how much time? Will you give furosemide as well?

Q4: What factors will determine your disposition plan for this patient? How might you decide if he is a candidate for outpatient follow up?

Case 3: The Never Ending Bleed

A 63 year old female is being treated for PE with Apixaban as an outpatient. For the last two days she has had multiple black and red stools. HR is 70bpm, BP 95/65mmHg, RR 18, O2 sat 98% on RA. She is alert and oriented. Hemoglobin is 60.

Her past medical history also includes MI 6 months ago with placement of 2 stents, hypertension, hyperlipidemia, and type 2 diabetes. In addition to Apixaban she is on ASA, hydrochlorothiazide, metoprolol, perindopril, metformin, and atorvastatin. She took all her medications today.

Q1: What is your approach to reversing this patients' coagulopathy? How do you compare the risk of stent obstruction with the risk of continued GI bleed?

Q2: Despite fluid and blood product resuscitation the patients' blood pressure continues to drop, now at 80/50. Will you add vasopressor support here? If so which agent, and to what clinical targets? Is there a role for "permissive hypotension"?

Q3: Should you administer tranexamic acid? Will it increase her risk of stent obstruction?

Q4: You must transfer her to another centre for continued management. Would this patient be transferred to the care of general surgery or internal medicine? How can you determine in the ED when a GI bleed is a candidate for surgical management?

Opioids

With Michelle Klaiman & Maria Ivankovic

PODCAST TO LISTEN TO PRIOR TO THE COURSE

Link to: [Opioid Misuse, Overdose & Withdrawal](#)

Link to: [Opioid Misuse in EM \(Strayer/Juurlink\)](#)

The opioid epidemic is still in full swing. And it's everywhere. To even the most seasoned EM physician, opioid-addicted, opioid-overdosed, and opioid-withdrawing patients can be a challenge. Dr. Ivankovic will guide us through several cases with expert commentary from EM and Addictions specialist Dr. Klaiman, so that next time you're faced with an opioid issue in the ED, you'll know exactly what to do.

Case 1: The Fulminant Overdose

A 24yo male is brought into your ED with a presumed overdose. GCS is 6. Pupils are pinpoint and non-reactive. He is being assisted with BVM breaths. HR is 70bpm, BP 110/70, RR 10 (bagged), O2 sat 96% on BVM. Paramedics report he was found with a group of friends who endorsed using fentanyl.

Q1: What are your immediate management priorities? Will you administer naloxone prior to airway management?

Q2: EMS states they provided 0.4mg of naloxone on route and found minimal response. What will your orders for naloxone dosing and frequency be? When will you stop giving naloxone? What are your resuscitation targets?

Q3: An hour later the nurse tells you the patient's GCS is 6 again and is hardly breathing. How would you treat this patient now?

Q4: When is it safe to discharge this patient home? What if he overdosed on methadone - would that change your timing of discharge?

Q4: What techniques could you use to discuss the patients' opioid use and their readiness to begin treatment for opioid use disorder prior to discharge?

Case 2: Opioid Withdrawal

A 35-year-old female presents with complaints of abdominal pain, nausea and vomiting. She was diagnosed with a localized tumour in her femur and 5 weeks ago underwent a full femur replacement. There were infection complications and she had a second surgery 3 weeks ago. She was discharged two weeks ago on antibiotics and pain medications which she had now been taking for over a month. Up until yesterday she had been recovering well. On further questioning she is having muscle aches and had sweat through her sheets overnight.

Medications include Flagyl, Keflex, and recent course of both hydromorph contin and hydromorphone but she ran out a couple days ago. She denies any localized pain to her right femur, hip, or knee. On physical exam she appears agitated and flushed. Vitals show a Temperature of 38.1, HR 105, BP 115/75, RR 16. You look up her records and her discharge note confirms the surgical admission with discharge medications of a 2 week supply of dilaudid 2-4mg PO q3-4h PRN. When asked she reports that she was taking the max dose and then stopped when she ran out.

Q1: Assuming this patient is suffering from opioid withdrawal, what is your general approach to this problem?

5 Steps to ED Opioid Withdrawal Management

- 1. Does the patient meet criteria for opioid use disorder?
- 2. Assess readiness to quit opioids.
- 3. Assess severity of withdrawal using COWS.
- 4. Administer Buprenorphine-Naloxone (Suboxone™) for patients who fulfill criteria OR treat symptoms of withdrawal for those who do not fulfill criteria for Buprenorphine-Naloxone initiation.
- 5. Counsel and arrange appropriate follow-up

Q2: What are the clinical clues that this patient is withdrawing from opioids? Assuming she has a runny nose, moderately dilated pupils and piloerection, how would you categorize her withdrawal - mild, moderate or severe?

Wesson & Ling, J Psychoactive Drugs. 2003 Apr-Jun;35(2):253-9.
COWS Clinical Opiate Withdrawal Scale

| | |
|---|---|
| Resting Pulse Rate: _____ beats/minute <i>Measured after patient is sitting or lying for one minute</i> 0 Pulse rate 80 or below 1 Pulse rate 81-100 2 Pulse rate 101-120 4 Pulse rate greater than 120 | GI Upset: <i>over last 1/2 hour</i> 0 No GI symptoms 1 Stomach cramps 2 Nausea or loose stool 3 Vomiting or diarrhea 5 Multiple episodes of diarrhea or vomiting |
| Sweating: <i>over past 1/2 hour not accounted for by room temperature or patient activity</i> 0 No report of chills or flushing 1 Subjective report of chills or flushing 2 Flushed or observable moistness on face 3 Beads of sweat on brow or face 4 Sweat streaming off face | Tremor: <i>observation of outstretched hands</i> 0 No tremor 1 Tremor can be felt, but not observed 2 Slight tremor observable 4 Gross tremor or muscle twitching |
| Restlessness: <i>Observation during assessment</i> 0 Able to sit still 1 Reports difficulty sitting still, but is able to do so 3 Frequent shifting or extraneous movements of legs/arms 5 Unable to sit still for more than a few seconds | Yawning: <i>Observation during assessment</i> 0 No yawning 1 Yawning once or twice during assessment 2 Yawning three or more times during assessment 4 Yawning several times/minute |
| Pupil size 0 Pupils pinned or normal size for room light 1 Pupils possibly larger than normal for room light 2 Pupils moderately dilated 5 Pupils so dilated that only the rim of the iris is visible | Anxiety or irritability 0 None 1 Patient reports increasing irritability or anxiousness 2 Patient obviously irritable/anxious 4 Patient so irritable or anxious that participation in the assessment is difficult |
| Bone or Joint aches: <i>If patient was having pain previously, only the additional component attributed to opiates withdrawal is scored</i> 0 Not present 1 Mild diffuse discomfort 2 Patient reports severe diffuse aching of joints/muscles 4 Patient is rubbing joints or muscles and is unable to sit still because of discomfort | Gooseflesh skin 0 Skin is smooth 3 Piloerection of skin can be felt or hairs standing up on arms 5 Prominent piloerection |
| Runny nose or tearing: <i>Not accounted for by cold symptoms or allergies</i> 0 Not present 1 Nasal stuffiness or unusually moist eyes 2 Nose running or tearing 4 Nose constantly running or tears streaming down cheeks | Total Score _____ The total score is the sum of all 11 items Initials of person completing Assessment: _____ |

Score: 5-12 mild; 13-24 moderate; 25-36 moderately severe; more than 36 = severe withdrawal

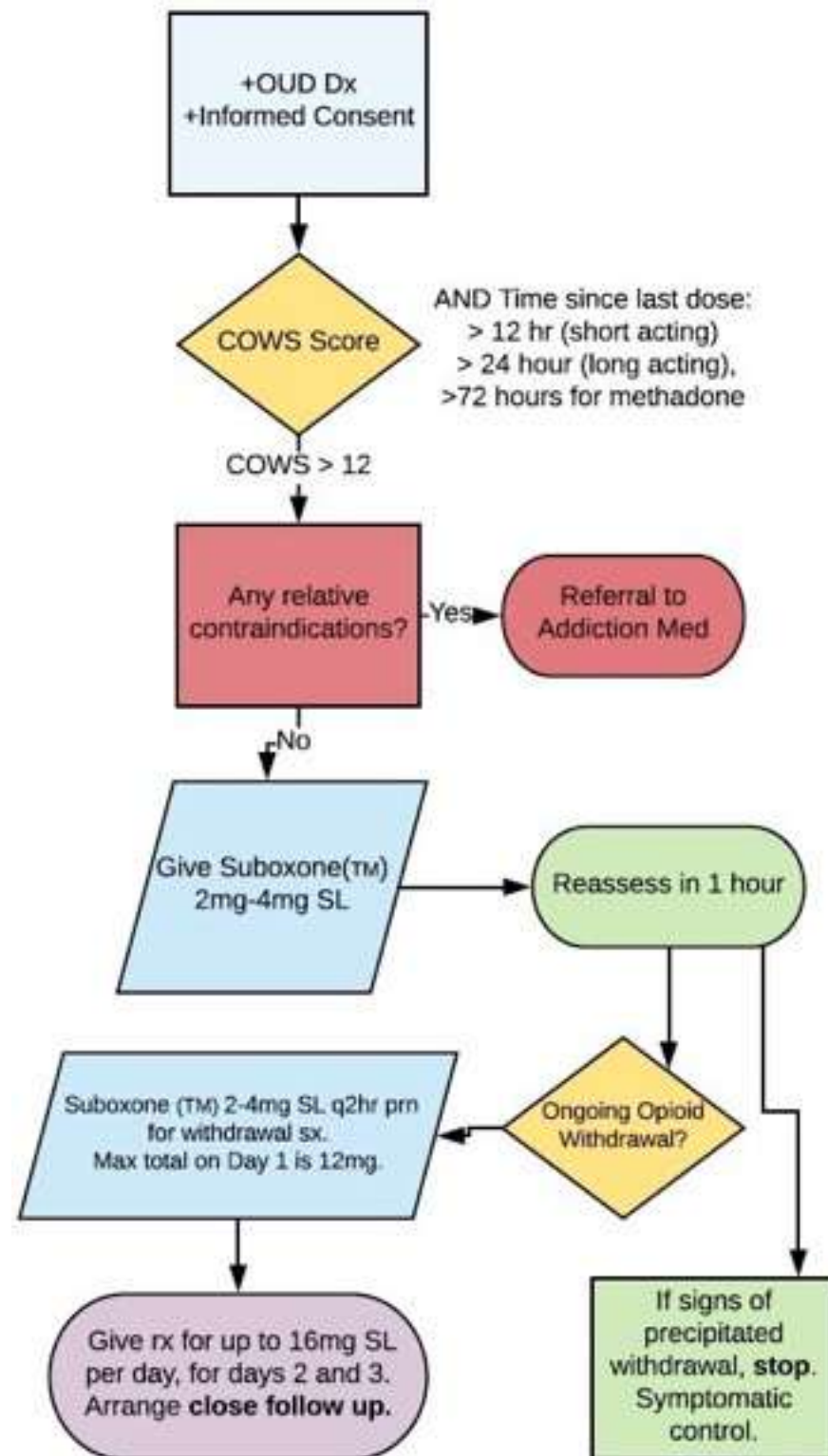
Q3: What are the prerequisites to starting Suboxone in the ED?

DSM-5 Criteria for Opioid Use Disorder

| | |
|---|---|
| 1 Opioids are often taken in larger amounts or over a longer period than was intended | The presence of at least 2 of these symptoms indicates an Opioid Use Disorder (OUD) |
| 2 There is a persistent desire or unsuccessful efforts to cut down or control opioid use | |
| 3 A great deal of time is spent in activities necessary to obtain the opioid, use the opioid, or recover from its effects | |
| 4 Craving or a strong desire to use opioids | |
| 5 Recurrent opioid use resulting in a failure to fulfill major role obligations at work, school, or home | The severity of the OUD is defined as: |
| 6 Continued opioid use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of opioids | |
| 7 Important social, occupational, or recreational activities are given up or reduced because of opioid use | MILD: The presence of 2 to 3 symptoms |
| 8 Recurrent opioid use in situations in which it is physically hazardous | MODERATE: The presence of 4 to 5 symptoms |
| 9 Continued use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by opioids. | |
| 10 Tolerance,* as defined by either of the following: a) Need for markedly increased amounts of opioids to achieve intoxication or desired effect b) Markedly diminished effect with continued use of the same amount of opioid | SEVERE: The presence of 6 or more symptoms |
| 11 Withdrawal,* as manifested by either of the following: a) Characteristic opioid withdrawal syndrome b) Same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms | |

Link to: COWS pdf

Q4: How would you administer Suboxone to this patient?



Q5: If the patient decides she does not want Suboxone therapy for opioid withdrawal what alternative therapies can you offer for management of withdrawal symptoms?

Q6: One week later the patient presents to the ED following a bicycle accident and has an open fracture of her tibia. She is in severe pain. Can you administer opioids for analgesia given she is on Suboxone? Will they be effective and is there any increased risks with administration of opioids now?

Q7: What is precipitated withdrawal? How do you avoid it and how do you treat it?

Knee Injuries

Arun Sayal

PODCAST TO LISTEN TO PRIOR TO THE COURSE

Link to: **Episode Occult Knee Injuries**

<https://emergencymedicinecases.com/occult-knee-injuries/>

Knee injuries in the ED are much more than fractures and the catchall soft tissue injuries. Occult knee injuries - those that have a normal or near normal x-ray - can cause serious morbidity if missed. Knowing the subtleties in diagnosis and management will make a real difference to our patients' future function.

Case 1: Knee to dashboard

A 40-year-old man lost control while driving and collided into a barrier at 70km/hr. He was belted, no airbag was deployed and there was no passenger intrusion. He did not lose consciousness and has full recollection of the event. His only complaint is severe right knee pain.

His extremity exam reveals a swollen tender right knee with an obvious effusion and very limited range of motion.

Neurovascular examination is normal including present peripheral pulses however, there is significant ligamentous laxity of the knee.

Q1: In general, what are the kinds of the classic mechanisms of knee injuries that result in their commonly associated knee injuries?

Q2: What extremity injuries are on your differential diagnosis in this case?

Q3: What can we look for on physical exam to heighten our suspicion for an occult knee dislocation that has reduced before hitting the ED doors?

Q4: Is a high mechanism injury necessary for a knee dislocation?

Q5: Why is it important to maintain a high index of suspicion for occult knee dislocation in this case, and what tests would you order to confirm the diagnosis?

Case 2: Pedestrian struck

A pedestrian was struck at low speed by a car at the level of the knee. He is complaining of both medial and lateral knee pain. Physical examination reveals that on valgus strain, the patient is tender at the medial knee as well as the lateral knee.

Q1. What would you look for on x-ray?

Q2. What mechanism of injury and physical examination findings would make you suspect a tibial plateau injury?

Q3: What complications do we need to be on look out for with tibial plateau fractures?

Case 3: Raise the leg.....Straight!

A 45-year-old man, with a history of diabetes, was recently on Ciprofloxacin for suspected pyelonephritis. He has recently decided to play soccer with his teenaged son three times a week. He comes in to the ED after slipping on the soccer field, stumbling, and then not being able to weight bare due to severe left knee pain. He is unable to extend his knee against resistance and he has a lot of trouble performing a straight leg raise. On physical exam, you notice a knee effusion, but there is no joint line tenderness and his ACL, PCL, MCL, and LCL all seem to be intact with a negative Lachman test.



Q1. Why is it important for all patients with knee injuries to have an active SLR test performed?

Q2. What knee diagnoses should be considered in a patient who cannot straight leg raise?

Q3: What are the physical exam findings in quadriceps tendon injuries?

Q4: What are the typical X-ray findings in quadriceps tendon injuries?

Q5: What is the ED management of patients with a suspected quadriceps tendon rupture?

Case 4: I felt a “pop” doc!

A 12-year-old boy presents to your ED after injuring his knee playing basketball. He planted his foot and rotated his left leg following a jump, and then fell to the floor. He had to be carried off the court. He complains of severe pain in his left knee and says he cannot put weight on it. He says he may have heard a “pop” as he planted.

On exam his left knee is swollen with a balotable effusion and is very tender to the touch diffusely. He’s unable to extend completely and can only flex to about 45 degrees. There appears to be anterior laxity of the knee. He’s still unable to weight bear.

Q1. What’s the most likely diagnosis in this case? What are the features in this story that are key in helping you make the diagnosis?

Q2. What physical exam maneuvers will help you to confirm the diagnosis of ACL tear?

Q3: What would you look for on X-ray in this patient?



Q4. What additional x-ray views should be obtained aside from the A-P and lateral, for suspected tibial spine fractures?

Q5. What is the ED management of suspected ACL rupture?

Case 5: Squat....ouch!

A 30y/o woman was playing volleyball and when she went to a sort of squatting position she had a sudden onset of knee pain that stopped her from continuing to play. She is able to weight bare with a limp in the ED and she doesn't have much swelling if any, but complains bitterly when you attempt to extend her knee fully.

Q1. What are some of the key features that can help us differentiate a meniscus injury from a ligament injury like an ACL tear?

Q2. What are the most important physical exam maneuvers we can do to help diagnose meniscus tears?

Q3: What is a locked knee and how do you manage it differently than a patient with a suspected simple meniscus tear that has full ROM or near full ROM?

References

- Stiell IG, Wells GA, Hoag RH, et al. Implementation of the Ottawa Knee Rule for the use of radiography in acute knee injuries. *JAMA*. 1997;278(23):2075-9.
- Bullock B, Neto G, Plint A, et al. Validation of the Ottawa Knee Rule in children: a multicenter study. *Ann Emerg Med*. 2003;42(1):48-55.
- Solomon DH et al. Does this patient have a torn meniscus or ligament of knee? *JAMA*. 2001; 286:1610-20.
- Seroyer ST et al. Management of the acute knee dislocation: The Pittsburgh experience. *Injury*. 2008; 39(7):710-8.
- Tintinalli, J. E., et al (2015). *Tintinalli's Emergency medicine: A comprehensive study guide*, 8th edition. New York: McGraw-Hill, Medical Pub. Division.
- Sayal, A, CASTED – The “Hands-On” ED Orthopedics Course: Casting And Splinting Techniques in the Emergency Department, Course Manual, 3rd Edition. 2012.

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Afternoon Modules

1. Cardiac arrest pg 15
2. Awake intubation pg 19
3. Pediatric Trauma pg 23



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Cardiac Arrest & Resuscitation POCUS

With Rob Simard

PODCASTS TO LISTEN TO PRIOR TO THE COURSE

Link to: [ACLS Guidelines 2015 – Cardiac Arrest Controversies Part 1](#)

Link to: [Beyond ACLS Cardiac Arrest](#)

Link to: [POCUS Cases - IVC POCUS](#)

The management of hypotensive resuscitations and adult cardiac arrest patients remains one of the most adrenaline-inducing and logistically challenging scenarios that Emergency Physicians face. A lot has changed over the years when it comes to managing the adult in cardiac arrest. In this module, Dr. Simard will guide you deeper into the controversies and subtleties of optimally managing the arresting adult; he will explore the incorporation and utilization of POCUS to improve resuscitative diagnosis in hypotensive patients (because not all hypotensive patients need 2L of fluid).

Case 1: PEA Arrest

A 60 y/o obese woman, with coronary artery disease, has a syncopal episode prior to calling EMS. Immediately before collapsing, she complained to her husband, who witnessed the episode, that she feels weak and unwell. The husband immediately phoned 911 and EMS arrived within 5 minutes. You are the ED physician covering Resus and are informed that the patient will be arriving shortly and has a blood pressure of 60/30.

Q1: How will you prepare your team in the 5 minutes you have before the patient arrives?

Q2: What are some indications to determine the amount of fluid you would administer to a patient who is hypotensive? Would you ever consider limiting the amount of fluid in a hypotensive patient?

Q3: When would you consider giving a patient vasopressor medication for hypotension? Would you ever consider giving it immediately OR delaying giving it?

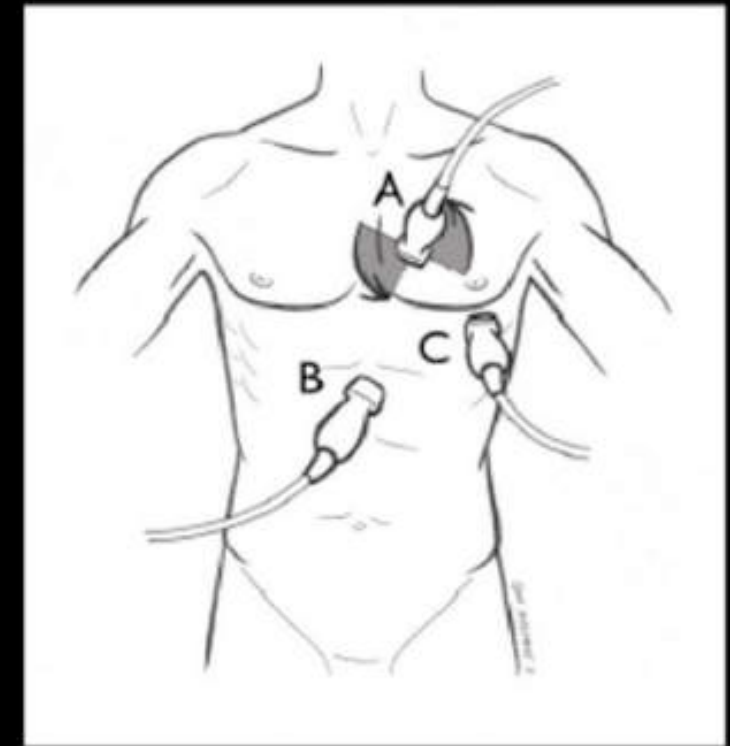
Case continued

Your team performs a POCUS to look for causes of Shock and looks to see if the patient is likely or unlikely to respond to fluid.

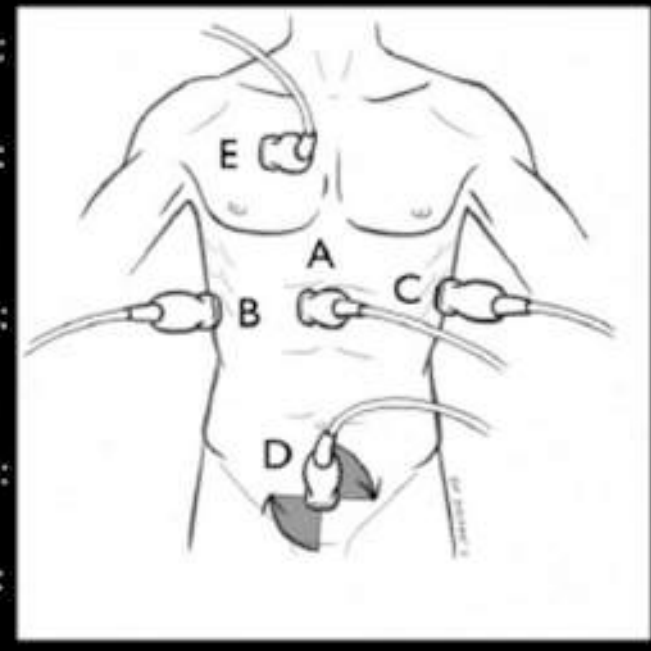
Q4: How can POCUS be helpful in determining fluid responsiveness in patients?

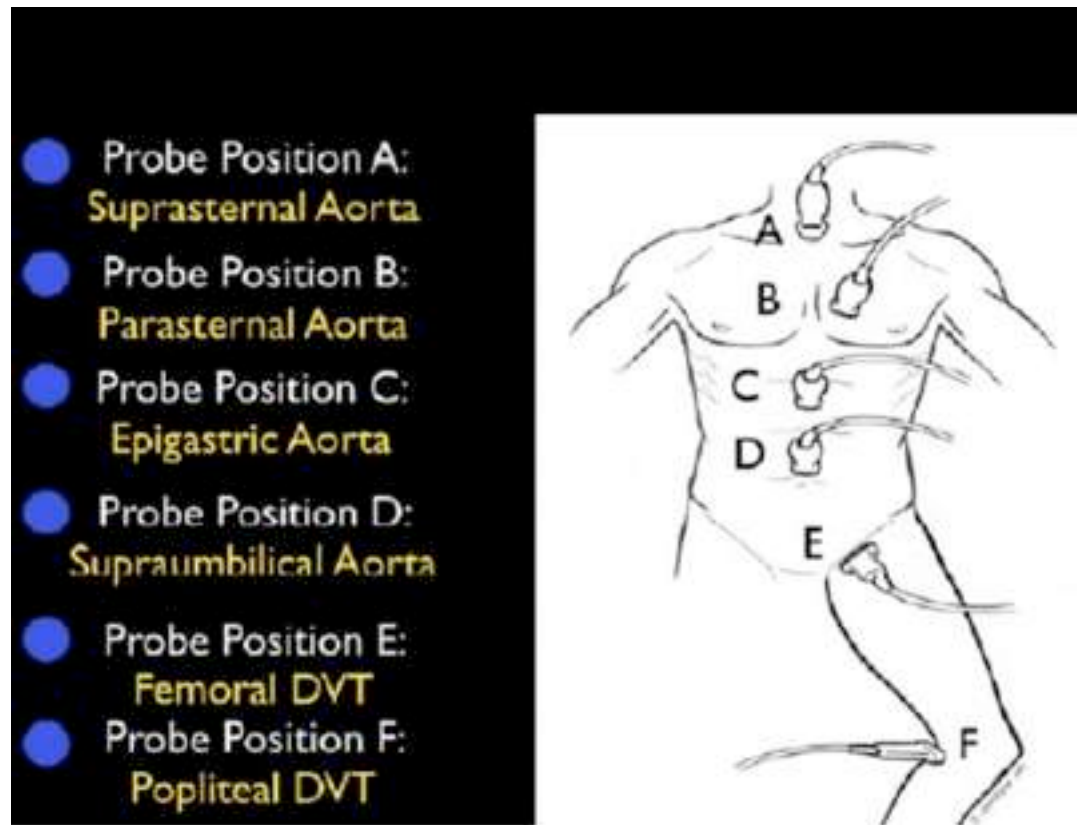
Q5: How can POCUS be helpful in determining the cause of the hypotension?

- Probe Position A:
Parasternal Views
Long / Short Axis
- Probe Position B:
Subxiphoid View
- Probe Position C:
Apical View



- Probe Position A:
IVC Views
- Probe Position B:
FAST / RUQ
add pleural view
- Probe Position C:
FAST / LUQ
add pleural view
- Probe Position D:
FAST / Pelvis
- Probe Position E:
Lung Views





Case continued

During ongoing resuscitative efforts, you determine that the patient has an elevated JVP, B-lines, pleural effusions, LV systolic dysfunction, an IVC that is not collapsing and is greater than 2cm. The blood pressure is still 60/30.

Q6: How would you proceed with resuscitation to optimize the blood pressure?

Reference

Seif, D., Perera, P., Mailhot, T., Riley, D., & Mandavia, D. (2012). Bedside ultrasound in resuscitation and the rapid ultrasound in shock protocol. Critical care research and practice, 2012.

Case 2: Refractory VT

A 55y/o male experiences chest pain and collapses; quick arrival of EMS and countershock in the field yields no ROSC. EMS and the patient arrive in your ED with CPR in progress. When you see the patient, three 200J defibrillations, three 1mg epi doses, and 300mg amiodarone have already been given. The total arrest time is 10 minutes.

Q1: How would you prepare your team?

Q2: How can you minimize interruptions to chest compressions?

Q3: Would you continue with defibrillation? And if so, at the current set-up/dose? What if you only had one defibrillator?

Q4: Would you continue to administer IV epinephrine q3-5 mins if the patient remained pulseless?

Q5: Are there any other medications that may be beneficial in this circumstance?

References

Bardy GH, Ivey TD, Allen MD, Johnson G, Greene HL. Prospective comparison of sequential pulse and single pulse defibrillation with use of two different clinically available systems. *J Am Coll Cardiol.* 1989;14(1):165-71.

Lee YH, Lee KJ, Min YH, et al. Refractory ventricular fibrillation treated with esmolol. *Resuscitation.* 2016;107:150-5.

Awake Intubation

With George Kovacs

RESOURCES TO REVIEW PRIOR TO THE COURSE

Link to: [Dr. Kovacs book chapter on Awake Intubation](#)

Link to: [Airway Pitfalls](#)

Link to: [Obesity Emergency Management](#)

Even though we should always be prepared for a difficult airway with a plan A, plan B and plan C, when an airway is anticipated to be difficult from the start, consideration should be given to an awake intubation. In this module we will discuss the indications for awake intubation and demonstrate the procedural skills required to make it a success.

Case 1: The Anatomical Anticipated Challenging Airway

A 47 year old otherwise healthy man was extricated from a house fire. EMS estimates 35% total body skin burns. He arrives to your ED with normal vital signs except for a heart rate of 110, awake, and cooperative, with an oxygen saturation of 98% on 4L by nasal prongs. He is coughing and you note signs of singeing of his lips in addition to blistering burns to his forehead and neck. His voice is hoarse. His nares are covered in soot and his oral cavity appears diffusely red and swollen.

Q1: What factors will influence your decision making with regards to airway management in this patient?

Q2: What are the advantages of an awake intubation in this patient? Why not simply proceed with RSI if you feel intubation is indicated?

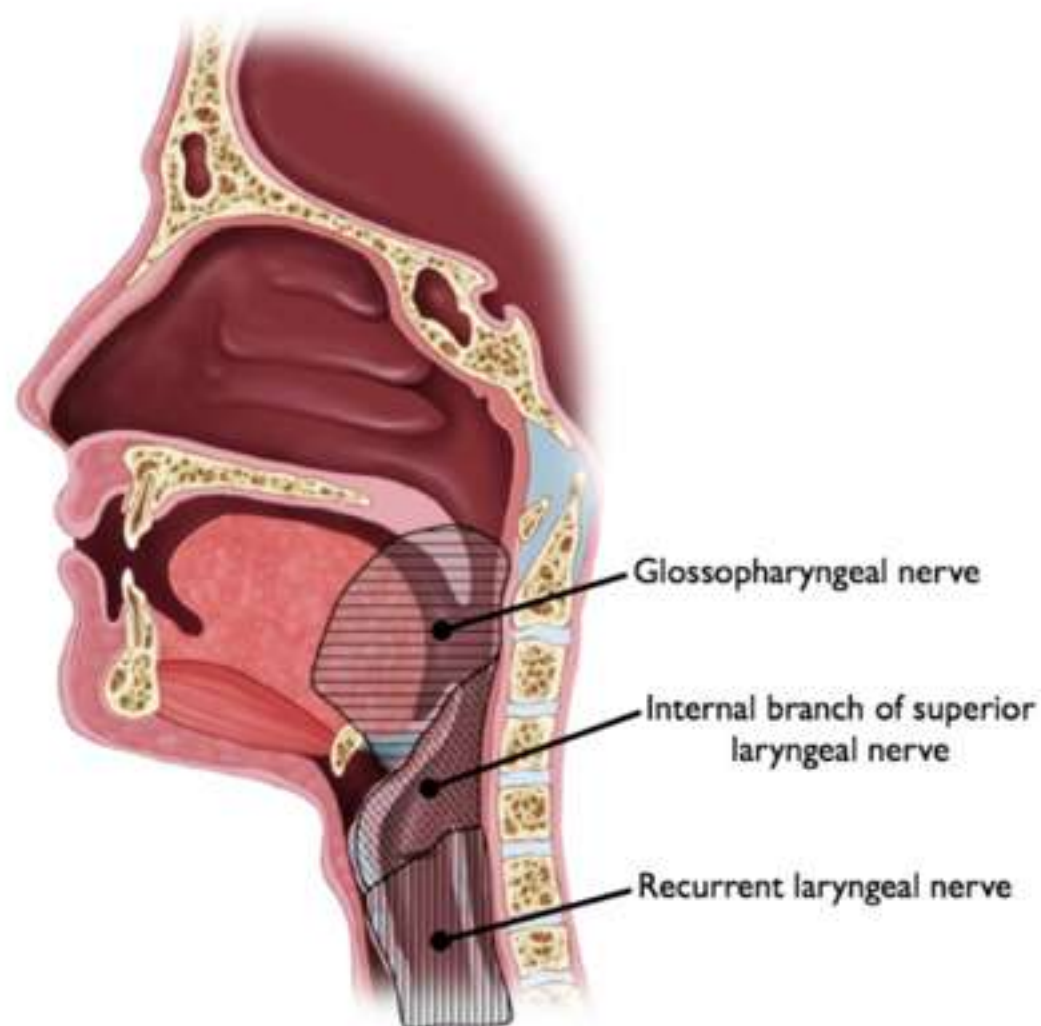
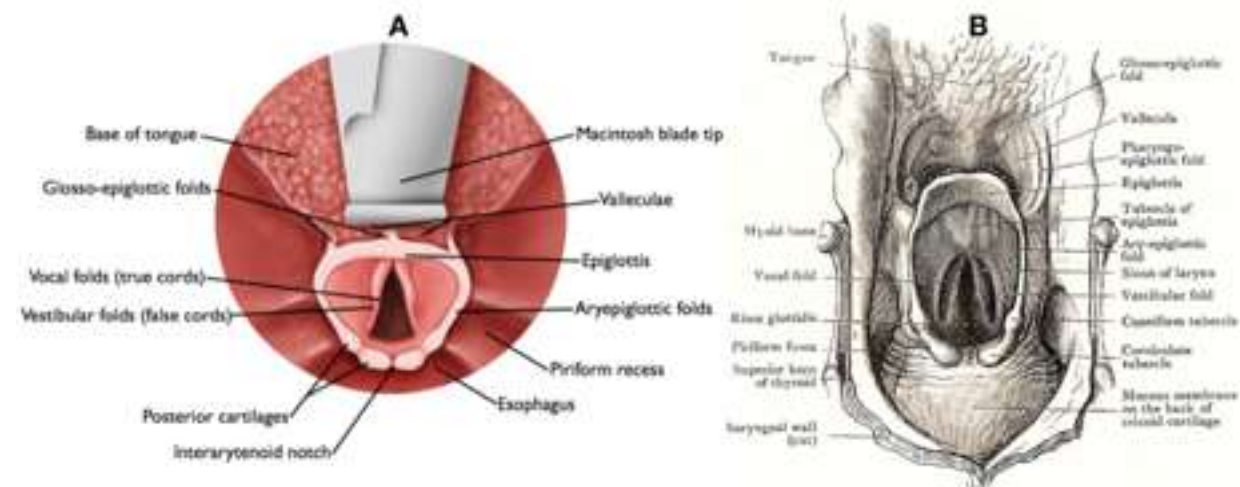
| <i>Intubation Method</i> | <i>Advantages</i> | <i>Disadvantages</i> |
|--|--|--|
| Awake intubation | <ul style="list-style-type: none"> • Patient continues to: <ul style="list-style-type: none"> ◦ breathe spontaneously ◦ maintain, and... ◦ protect the airway • Avoids adverse effects of RSI induction agents; • Avoids risk of hypoxemia/hypercarbia during transition from spontaneous respirations to taking over positive pressure ventilation; • When anatomic landmarks are obscured, as with upper airway edema, tissue movement or bubbles on expiration may be only indication of the location of the glottic opening. | <ul style="list-style-type: none"> • Clinician perception of patient discomfort; • Requires an element of patient cooperation; • As with RSI, requires training in indications, performing topical airway anesthesia and direct laryngoscopic or indirect flexible endoscope or videoscopic techniques. |
| RSI | <ul style="list-style-type: none"> • Skeletal muscle relaxation facilitates conditions for direct laryngoscopy; • Application of cricoid pressure may decrease risk of aspiration; • Not dependent on patient cooperation; • Drugs may help control undesirable physiologic responses, for example, ICP, HR; • High success rates in experienced hands.⁴ | <ul style="list-style-type: none"> • RSI drugs may cause profound drop in blood pressure, for example, in shock states; • Not all emergency physicians are adequately trained in, or comfortable using RSI; • "Rescue RSI" not appropriate for all uncooperative patients, for example, those with obstructing airway pathology; • Succinylcholine will not always wear off in time to have a patient resume spontaneous ventilation before life-threatening hypoxemia occurs in "can't intubate, can't oxygenate" situations; • Fear of the "what if I can't intubate or ventilate?" • Requires intimate knowledge of all drugs and contraindications to technique. |
| Deep Sedation | <ul style="list-style-type: none"> • Perception of a sense of security: "I haven't 'burned any bridges' by giving a muscle relaxant..." • May help control an uncooperative patient; • May make the clinician feel more humane. | <ul style="list-style-type: none"> • Often gives a false sense of security; • Retains many of the downsides of RSI while not delivering the upside of facilitated conditions; • Undesirable reflexes intact: <ul style="list-style-type: none"> ◦ gag/vomiting ◦ laryngospasm; • No guarantee that deep sedative doses will leave the patient breathing spontaneously or maintaining an airway; • Airway protection ablated in a full stomach patient, often with no applied cricoid pressure; • Deep sedative doses of medication can still hemodynamically "crash" the patient; • Compared with RSI, scientific literature clearly documents less optimal intubating conditions using only deep sedation.^{7b-7d} |
| Awake tracheotomy or cricothyrotomy | <ul style="list-style-type: none"> • In the patient presenting with obstructing airway pathology, there's no risk of losing the airway during application of topical airway anesthesia or attempted tube passage from above. | <ul style="list-style-type: none"> • Requires requisite surgical skills and equipment. |

Q3: If you elect to proceed with awake intubation, what equipment will you require? If you do not have access to an atomizer device or flexible laryngoscope can you still proceed with the awake intubation?



Q4: During your awake intubation your patient becomes agitated and stops cooperating. How do you proceed?

Q5: If during the awake intubation you note significant swelling of the airway structures and are concerned your ET tube will not fit, how do you proceed?



Approach to Topicalizing the Airway

1. Apply nasal oxygen and have ready adjunctive procedure and post procedure sedation. Be prepared to take control of the airway having a complete array equipment and medications as you would for an RSI.
2. Engage and reassure the patient using lay terminology. Give them the suction to use as necessary and agree on hand signals defining that 'things are ok' and when to 'stop'.
3. Apply approximately 1 inch of the 5% lidocaine ointment to a tongue depressor and push it distally to create a lidocaine lollipop (Video 2 see link in legend).
4. Have the patient extrude their tongue and gently trap it anteriorly with a gauze.
5. Do not 'wipe' the ointment on the tongue, gently apply the lidocaine lollipop as posterior as possible moving side to side so that it 'melts' down the posterior slope of the tongue. It may take 2-3 passes to apply this initial application. (this may need to be repeated in some patients).
6. Using atomized 4% lidocaine, spray the tongue, tonsillar regions and posterior pharynx generously.
7. Reassure the patient explaining that they may cough during the next stage of spray and after they may feel slightly short of breath ('glottic dyspnea').
8. Trap the tongue. Bend the nozzle tip down to 70-90° and attack the posterior tongue and glottis ideally during inspiration. Do this a couple of times.
9. Perform 3 glottic/tracheal sprays either through the mouth with nozzle tip bent to 90° during inspiration. Alternatively, in a cooperative patient apply through a patent nares, again during a 'big' inspiration through the nose.
10. Use of Jackson forceps to place a lidocaine soaked pledgets held in the piriform recess on each side for up to 1 min (optional) (Video 1 see link in legend).
11. Perform gentle precision laryngoscopy or use a flexible intubating scope and put the damn scope in and tube the patient. You will know during laryngoscopy if your patient requires a second dose of lidocaine ointment.

Q6: You have successfully intubated your "awake" patient. How do you now proceed with post-intubation sedation and analgesia?

Case 2: The Physiologic Anticipated Challenging Airway

A 45 year old morbidly obese man arrives via EMS on a nonrebreather in severe respiratory distress following a febrile respiratory illness, with an oxygen saturation of 85%. EMS tells you that he improved when they initiated the nonrebreather up but that he seems to be tiring and his “sat” has dropped from 90%. His heart rate is 124, blood pressure is 98/57 and temperature 38.1. He is placed on BiPAP but the oxygen saturation remains at 85%.

Q1: How does obesity alter airway physiology and airway management?

Q2: What are the advantages of an awake intubation in this patient? Why not simply proceed with RSI if you feel intubation is indicated?

Q3: What steps will you go through for an awake intubation in this patient?

Pediatric Polytrauma

With Sue Beno & Kylie Bosman

PODCAST TO LISTEN TO PRIOR TO THE COURSE

Link to: [Pediatric Trauma Main Episode](#)

Link to: [Rapid Review Video](#)

Link to: [Trauma - The 1st and Last 15 minutes](#)

Most of us don't have much experience managing the sick pediatric polytrauma. By preparing adequately and prioritizing actions to prevent immediate life-threats as well as keeping in mind the major pitfalls, your next pediatric trauma resuscitation will be successful.

Case 1: The ATV Crash

You are the ED physician in a rural hospital. You have access to a CT scanner, point of care ultrasound, and labs. The regional trauma centre is a two hour drive away. You get a call that a helmeted 7 year old boy has been involved in an ATV crash. His father's ATV flipped while going down a steep incline and he was caught underneath it during the rollover. EMS reports that he has obvious trauma to the left side of the chest, bruising over the abdomen, and an open left tibia fracture. He is awake and crying with a GCS of 13. ETA to your ED is 5 minutes.

Q1: You have 5 minutes to prepare prior to patient arrival. How do you prepare yourself, your gear, your environment and your staff?

Case Continued: He arrives in a C-spine collar and spinal board 30 minutes after the accident.


VS are HR 130bpm, BP 93/50, RR 35, O2 sat 92% on 10L by mask. His GCS is now 11.

Q2: What are your management priorities for this patient?

Q3: Is this patient in shock?

Pediatric Vital Signs PDF

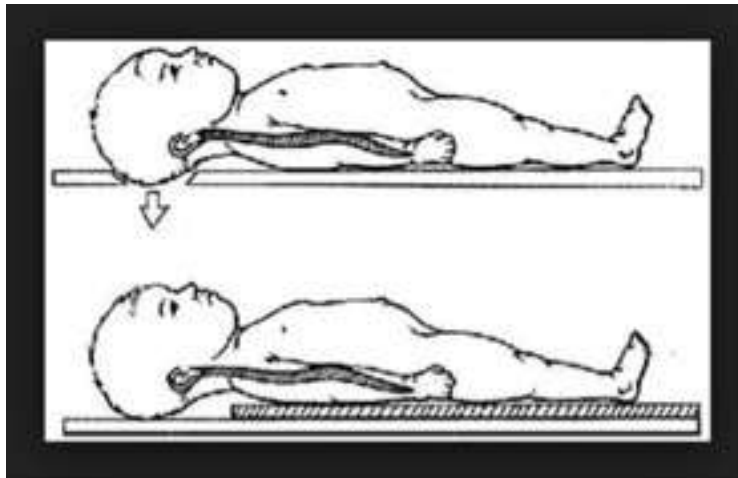
Q4: How will you obtain vascular access in this patient?

|  EM CASES | | |
|---|-----|----|
| Pediatric 90 th Centile Cut-Offs | | |
| Age | HR | RR |
| 0-3mo | 164 | 57 |
| 3-6mo | 159 | 55 |
| 6-9mo | 152 | 52 |
| 9-12mo | 145 | 50 |
| 12-18mo | 140 | 46 |
| 18-24mo | 135 | 40 |
| 2-3yr | 128 | 34 |
| 3-4yr | 123 | 29 |
| 4-6yr | 117 | 27 |
| 6-8yr | 111 | 24 |
| 8-12yr | 103 | 22 |
| 12-15yr | 96 | 21 |
| 15-18yr | 92 | 19 |

Excerpt from Emergency Medicine Cases Episode 89: PALS
Data from systematic review conducted by Fleming et al.
Fleming S, Thompson M, Stevens R, et al. Normal ranges of heart rate and respiratory rate in children from birth to 18 years of age: a systematic review of observational studies. Lancet. 2011;377(9770):1011-8.

Q5: What medications and strategies can you use to minimize this child's pain and anxiety?

Q6: You decide that this patient requires definitive airway management. How will your airway management differ for a pediatric trauma patient compared to a standard adult RSI?



Q7: How reliable is your FAST exam to rule out intra-abdominal bleeding in this situation?

Q8: What is your approach to decompression of the chest? Will you begin with needle decompression, finger thoracostomy or immediately place a chest tube? Will you use a large-bore chest tube, a smaller bore chest tube or a pigtail catheter?

Q9: You determine that the patient is suffering from hemorrhagic shock. How will you volume resuscitate this patient assuming that it takes 30 minutes to receive blood products at your rural centre? What are your resuscitation targets?

Q10: Is there a role of tranexamic acid (TXA) administration here? If so, what dose and how will you administer it?

Q11: What blood work is necessary for this patient? Why?

Q12: How do you decide which patients require transfer to a trauma centre?

| Assessment Component | SCORE | | |
|------------------------|----------------------------------|---|---|
| | +2 | +1 | -1 |
| Weight | Weight >20 kg | 10-20 kg | <10 kg |
| Airway | Normal | Oral or nasal airway, oxygen | Intubated, <u>cric</u> , trach |
| Systolic BP | >90 mmHg, good peripheral pulses | 50-90 mmHg, palpable carotid/femoral | <50 mmHg, weak/no pulses |
| Level of Consciousness | Awake | Obtunded, any loss of consciousness | Coma, unresponsive |
| Fracture | None | Single, closed | Open or multiple |
| Cutaneous injuries | None | Contusion, abrasion, laceration <7cm not through fascia | Tissue loss, any GSW or stab wound through fascia |

Q13: You determine this child needs to be transported urgently to the regional trauma centre. What interventions will you consider performing prior to this transfer?

Transport Checklist

- Identify, address and communicate life threatening injuries to trauma center
- Control airway, secure ETT, ensure sedation
- EtCO2 monitor to monitor ventilation strategy
- Secure tubes (OG, NG, Foley, chest tubes)
- Analgesia – fentanyl infusion
- Vascular access (IV or IO)
- Bind pelvis as indicated
- Splint fractures
- Antibiotics for open fractures
- TXA for hemorrhagic shock
- Blood products should be given as indicated, but massive transfusion protocols should be done at the receiving trauma center
- Paperwork (labs, imaging, notes)

Common pitfalls leading to bad pediatric trauma outcomes

Failure to:

Manage the airway – indicated for almost all severe TBI, any hypoxia

Appreciate and treat shock – do not wait for hypotension which is a sign of pre-arrest

Prioritize management of injuries – see “CABC” below

Check bedside sugar if altered LOC – ABCDEFG “Don’t Ever Forget the Glucose”

Keep the child warm