

The Use of a Social Media Based Curriculum for Newly Matched Interns Transitioning into Emergency Medicine Residency

Joel C Park, MD*, Miriam Kulkarni, MD* and Mary McLean, MD*

*St. John's Riverside Hospital, Department of Emergency Medicine, Yonkers, NY

Correspondence should be addressed to Joel C Park, MD at JPark2@riversidehealth.org

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ABSTRACT:

Audience: This is an online social media curriculum aimed at the incoming emergency department (ED) intern. This curriculum is designed to foster collaborative learning in preparation for the upcoming intern year.

Introduction: Graduating medical students tend to have few clinical experiences at the end of their fourth year. For many students, their last ED rotation is six months or more before the start of their internship. In addition, the transition from being a medical student to an intern can be quite abrupt and jarring, with little time to adjust to the rigorous new clinical demands of internship. To ease this transition, the Slack channels provide an easy medium to share thoughts and ideas regarding clinical cases provided by the emergency medicine (EM) faculty.

After performing a PubMed, Google Scholar, and Medline search, we found that no interventions have been described utilizing social media for helping rising interns to transition from medical school to emergency medicine residency. Medical school curriculum varies widely, and medical students often struggle with this transition.^{1,2} Multiple authors have evaluated the use of pre-graduation or early internship boot camps as preparation for emergency medicine residencies, but to our knowledge, there is no existing curriculum that is designed specifically for the transition between medical school and internship.^{3,4,5} We designed a social media based curriculum that addressed several of the competencies targeted by these boot camp programs⁴ and based on Accreditation Council for Graduate Medical Education (ACGME) level 1 milestones in patient care.

This curriculum provides an interactive, case-based learning platform for incoming residents prior to the start of residency. Using Slack, learners can post responses in real-time that can be seen by the entire group of incoming interns. The incoming interns will be able to interact with other users, either in a public or private forum, and communicate with each other in a virtual classroom setting. The goal is to create an environment

INNOVATIONS

to facilitate collaborative learning and interaction between residents, residency leadership, and program faculty.

We created a total of ten cases, which were each posted with an associated intern-appropriate clinical question. We also posted an associated high-resolution image, such as an electrocardiogram (EKG) or a radiograph from a website such as LifeintheFastLane.com or ALiEM.com. Typically, 24 to 72 hours were given to allow sufficient time for the residents to contribute answers and ideas. Once the allotted time had ended, the EM faculty member provided the solution to the case with the appropriate supportive 'Free Open Access Medical Education' (FOAMed) resources.

Objectives: This curriculum is designed to bridge this gap by fostering an environment in which incoming interns can communicate, collaborate, and practice clinical reasoning with each other and faculty prior to their arrival in residency. The goals and objectives were tailored to the Accreditation Council for Graduate Medical Education (ACGME) level 1 milestones in patient care.

1. Interpret basic ECGs
2. Demonstrate ability to interpret basic radiographs
3. Identify common visual diagnoses
4. Identify common neurological emergencies on head imaging
5. Recognize basic airway anatomy
6. Demonstrate successful application of FOAMed resources to clinical cases
7. Interpret common ultrasound images
8. Describe common ED procedures
9. Demonstrate fundamental knowledge of evidence-based medicine and biostatistics

Methods: The educational strategies used in this curriculum included case-based learning, questions and answers, and links to online Free Open Access Medical Education (FOAMed) resources. Using Slack, an online collaborative social media application, we posted specific clinical-based cases in the "Cases" thread and then gave the new residents an opportunity to post their answers. We then posted a follow-up with the clinical outcome of the case and provided resources to encourage use of FOAMed, online libraries, textbooks, and other resources.

Topics: Online, social media, cases, interaction, collaboration, Slack, interns, preparation, orientation.



USER GUIDE

List of Resources:

Abstract	1
User Guide	3
Instructor Materials	6

Learner Audience:

We used this curriculum for graduating medical students who matched into our program. However, the curriculum could be adapted for use for an emergency medicine clerkship or with current emergency medicine interns.

Time Required for Implementation:

This is a 10-week curriculum that we initiated the week after Match Day and continued until orientation began in mid-June. The instructor will typically take approximately 15 to 20 minutes to set up the Slack channel. Each case takes approximately 3 to 5 minutes to write and publish on a Slack channel, and approximately 5 minutes to provide the responses to the questions. The instructor will typically publish 1 to 2 cases per week.

Recommended Number of Learners per Instructor:

Two to three instructors would be ideal for this curriculum, regardless of the number of students. This facilitates more of a conversation between the instructors and the learners and helps foster an environment that is more conducive to discussion. In addition, if an instructor is busy for a particular week, the other instructor(s) could then publish cases on Slack. While this curriculum was initially implemented by residency leadership, this could also be easily facilitated by junior faculty or chief residents.

Approximate cost of items to create this innovation: Slack is a free online application and does not require an ongoing paid subscription.

Topics:

Online, social media, cases, interaction, collaboration, Slack, interns, preparation, orientation.

Objectives:

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Linked objectives and methods:

The goals and objectives were tailored to the ACGME level 1 milestones in patient care. Specific linked objectives can be found at the end of each case explanation.

Due to the ease of accessing Slack via different online modalities such as computers, laptops, mobile phones, and tablets, the rising interns can spend a few minutes reviewing the case that was presented and answer accordingly. This can be accomplished wherever it is suitable, whether it is at their home, on the subway, or outdoors. This should provide ample opportunity for the incoming interns to review the cases. Because the questions are clinically based, they will help incoming interns develop a more clinical mindset in preparation for the intern year, with the goals of feeling more comfortable with the beginning stages of residency by achieving the above objectives.

Recommended pre-reading for instructor:

- The instructor should become familiar with the Slack application prior to its implementation: <http://www.slack.com>. Additionally, Life in the Fast Lane provides a wealth of cases and high definition images that can help supplement the facilitator's postings: <http://www.lifeinthefastlane.com>.

Learner responsible content (LRC):

- The learner should become familiar with the Slack application prior to starting the curriculum.

Implementation Methods:

The Slack session will start the following Monday after Match Day. The faculty member designated as the Slack facilitator should create a Slack account and invite other interested faculty members and the recently matched medical students via e-mail. Once to twice a week, the Slack facilitator will post a clinical-based case with an associated high definition image. The students are then given 48 to 72 hours to answer or debate the



USER GUIDE

case amongst themselves. The facilitator can provide some clues but should avoid answering the questions until the allotted time is given. Once the students are given ample time to answer the questions, the facilitator can subsequently post the answers to the case as well as any associated medical literature, whether from a textbook or FOAMED. The step-by-step process is described in more detail below.

List of items required to replicate this innovation:

- Slack (<http://www.slack.com>)
- Access to the internet. Images and cases can be created or searched online. For example, <http://www.lifeinthefastlane.com> or Google Images.

Approximate cost of items to create this innovation:

This model is free to implement.

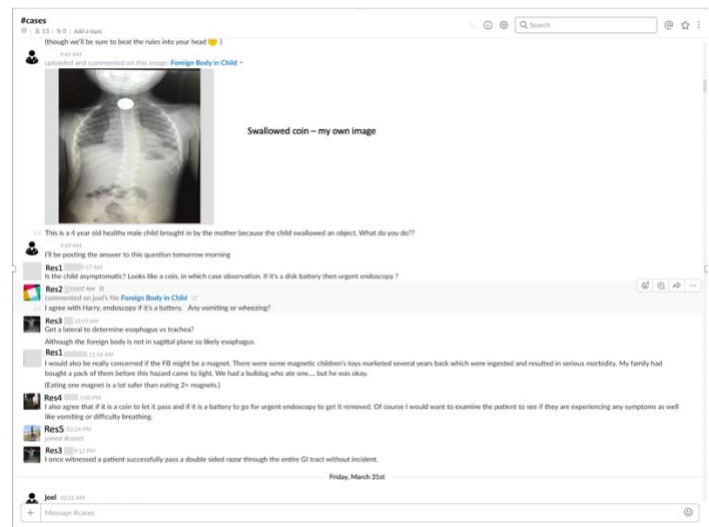
Detailed methods to construct this innovation:

Initial Setup:

1. Access <http://www.slack.com>.
2. Click on the “Create Team” tab.
3. Enter an e-mail address.
4. The website will e-mail a confirmation code. Type in the confirmation code into the Slack website.
5. Enter your full name and select a username.
6. Type in a password.
7. Fill out the information regarding your residency. (I.e. What will your team use Slack for? Work. What kind of company is it? Healthcare/Pharmaceutical). Please select “Yes” to the question, “Are you a manager?”
8. Under the “Company name”, type in the residency name.
9. Create a team URL.
10. Send out the invitations to the faculty and incoming interns. Completing this step starts the Slack Application.
11. On the left side of the Slack Application, under the “Channels” bar, click on the “+” button. Under the name, type in “cases.” Send the invitations to your interns and to the other instructors.
12. It is also advised to install the applications on the desktop and mobile phone. To access the desktop application, select the “Download Slack” option on a link at the top right portion of the screen. To access the mobile phone application, go to the respective application store (ie, Apple App Store, Google Play, etc.) and download the application. The application will prompt you for the username and password.
13. Slack is now successfully created and is ready for use.

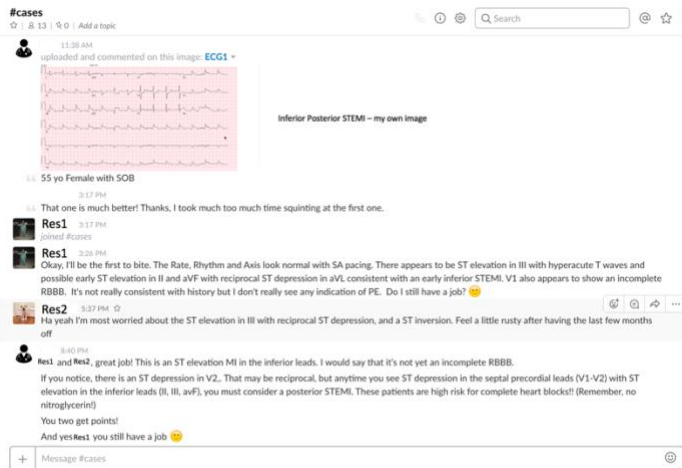
Case Presentations on Slack:

1. Select a clinical case that would be typical of an emergency medicine patient or choose a case from the attached list of clinical cases. These cases can be used in any order and are unrelated and self-contained.
2. Find an appropriate high-definition image (preferably 1280 x 856 or higher) that will supplement the clinical case. Again, you may use the attached images corresponding with the clinical case.
3. Post the text and image in the #cases section in the Slack application.
4. Allow 48 to 72 hours for the residents to respond to the case. During this time, the instructor should minimize participation in the discussions in the thread to allow the residents opportunity to discuss the case amongst themselves.
5. Once the allotted time is given, the instructor provides the answer and the associated FOAMED resource. Time should be given to explain incorrect answers and to allow the residents an opportunity to ask further questions.
6. If you choose to do so, additional cases may be utilized from a recent or memorable patient, or from online resources such as the cases provided by Life in the Fast Lane (<http://www.lifeinthefastlane.com>). Here are two examples of Slack in use:





USER GUIDE



Results and tips for successful implementation:

The Slack curriculum was initially implemented in March 2017 to July 2017, and the nine participating interns found it to be overall helpful in preparation for intern year. Many of our interns felt that this online medium aided the transition from taking medical school knowledge to real-world medicine. The residents were asked to rate how prepared they felt for residency before and after implementation of the curriculum, using a Likert Scale. The scale ranged from 1 to 5, with 5 being the highest comfort level. The Pre-Slack Intervention average was 3.111 and the Post-Slack Intervention average was 3.667 ($n = 9$, 95% CI: 2.649 – 3.573, $p = 0.0242$). The descriptive comments given by residents praised the ease of use, diversity of topics, and the ability to participate regardless of geographic location. The data suggests that the residents felt more comfortable entering intern year after the use of Slack. Though the implementation could certainly utilize more time and subjects, the pilot data was certainly promising.

Slack collects data on daily usage, and the data demonstrated that all incoming interns participated in case discussions. The average daily number of posts was 7.18. The interns were able to generate the correct answers for all cases.

Initially, the residents felt there was a small learning curve associated with Slack, but after a day or two, they became increasingly more comfortable with its use. To help prepare the residents, we suggest that the Slack facilitator become familiar with the application's capabilities and check in frequently in the first few weeks to help troubleshoot with any resident technical issues. The provided answers to the cases below are intended to be a starting point, and faculty members should feel free to include additional discussion or links to other resources. In addition, the faculty discussion should respond appropriately to incorrect answers and diagnostic missteps by the participants.

Because this is an interactive curriculum, faculty discussion should be tailored to the responses of the resident.

References/suggestions for further reading:

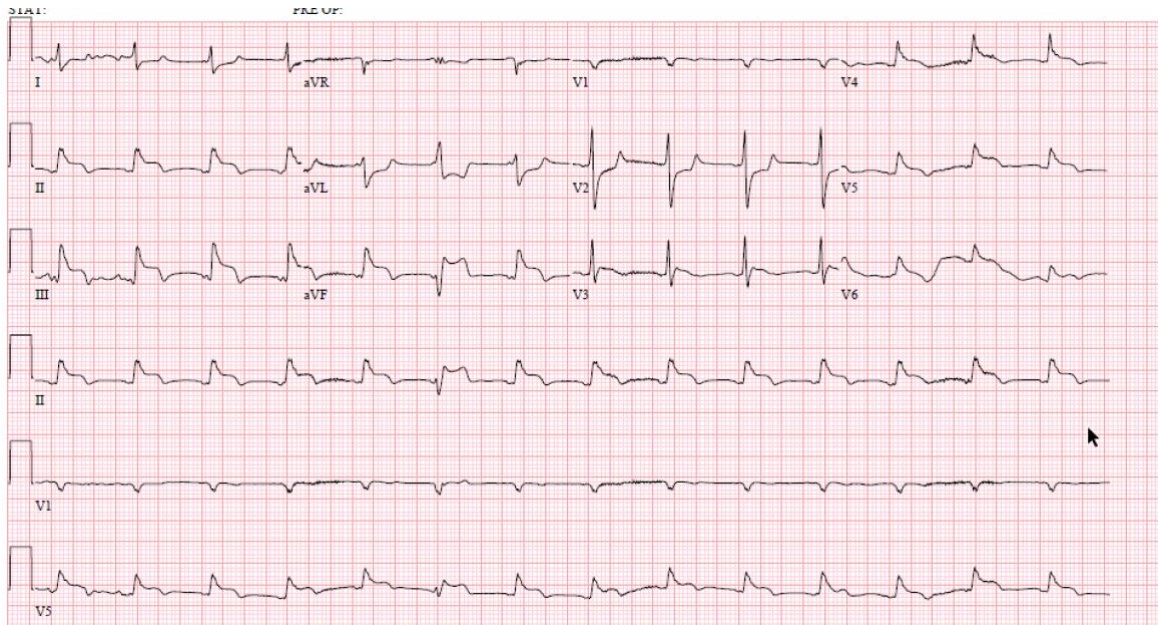
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2. Franzen D, Kost A, Knight C. Mind the gap: the bumpy transition from medical school to residency. *J Grad Med Educ.* 2015;7(4):678-680. doi: 10.4300/JGME-D-15-00413.1
3. Ataya R, Dasgupta R, Blanda R, Moftakhar T, Hughes PG, Ahmed R. Emergency medicine residency boot camp curriculum: a pilot study. *West J Emerg Med.* 2015;16(2):356-361. doi: 10.5811/westjem.2015.23931
4. Lamba S, Wilson B, Natal B, Nagurka R, Anana M, Sule H. A suggested emergency medicine boot camp curriculum for medical students based on the mapping of Core Entrustable Professional Activities to Emergency Medicine Level 1 milestones. *Adv Med Educ Pract.* 2016;7:115-124. doi: 10.2147/AMEP.S97106
5. Min AA, Stoneking LR, Grall KH, Spear-Ellinwood K. Implementation of the introductory clinician development series: an optional boot camp for emergency medicine interns. *Adv Med Educ Pract.* 2014;5:275-279. doi: 10.2147/AMEP.S67239



INSTRUCTOR MATERIALS

Slack Cases

1. A 55-year-old female with a past medical history of hypertension, diabetes, and high cholesterol presents with sudden onset of chest tightness and shortness of breath. The patient reports that the pain radiates to the left arm and left jaw. The patient has a family history of heart disease. A technician obtains an electrocardiogram (ECG). Describe this ECG. What is the definitive treatment for this patient?



Author's own image.

Answer: Inferior-Posterior ST-elevation myocardial infarction (STEMI). This is a classic case of an inferior-posterior STEMI. The vast portion of inferior STEMIs are due to an occlusion of the right coronary artery. These patients are at higher risk for a high degree atrioventricular (AV) block, and placing pacer pads on these patients should be considered. Ultimately, the patient will need an emergent percutaneous coronary intervention (PCI) for definitive treatment.

Reference: <https://lifeinthefastlane.com/ecg-library/basics/inferior-stemi/>. (Objective 1, 7).

2. A 13-year-old male with no past medical history presents with left fifth digit pain after stealing the ball while playing basketball. This occurred approximately 15 minutes prior to his arrival to the ED. Make a diagnosis and describe the treatment.



INSTRUCTOR MATERIALS



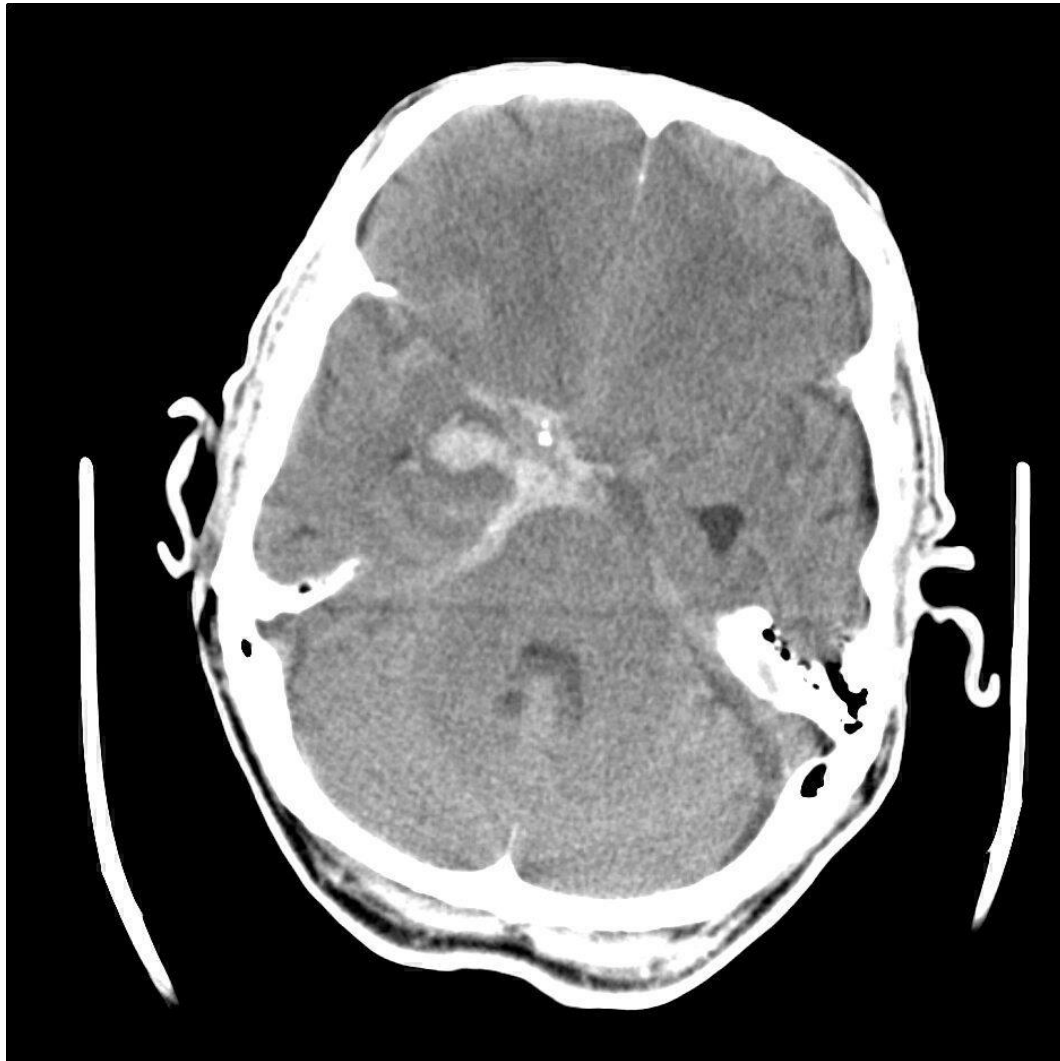
Author's own image.

Answer: Left fifth digit proximal interphalangeal (PIP) joint dislocation. To optimize the success rate for PIP joint reduction, adequate pain control should be achieved, ie, a ring block. Reference: <http://emedicine.medscape.com/article/80887-technique#c4>. Steady traction is applied to the distal tip of the digit until the PIP joint is successfully reduced. Reference: <http://emedicine.medscape.com/article/109206-technique>. The patient should subsequently have a splint applied and be referred to hand surgery for outpatient follow-up. (Objective 2, 6, 8).

3. A 74-year-old male with past medical history of hypertension, hyperlipidemia, and atrial fibrillation on warfarin presents to the emergency department for a mechanical fall. The patient had tripped and fallen, hitting the right frontal portion of his head. He reports a mild right-sided headache but denies any loss of consciousness. The patient is somewhat drowsy but appropriately communicative. You order a computed tomography (CT) scan of the head. Please make a diagnosis and treat the patient.



INSTRUCTOR MATERIALS



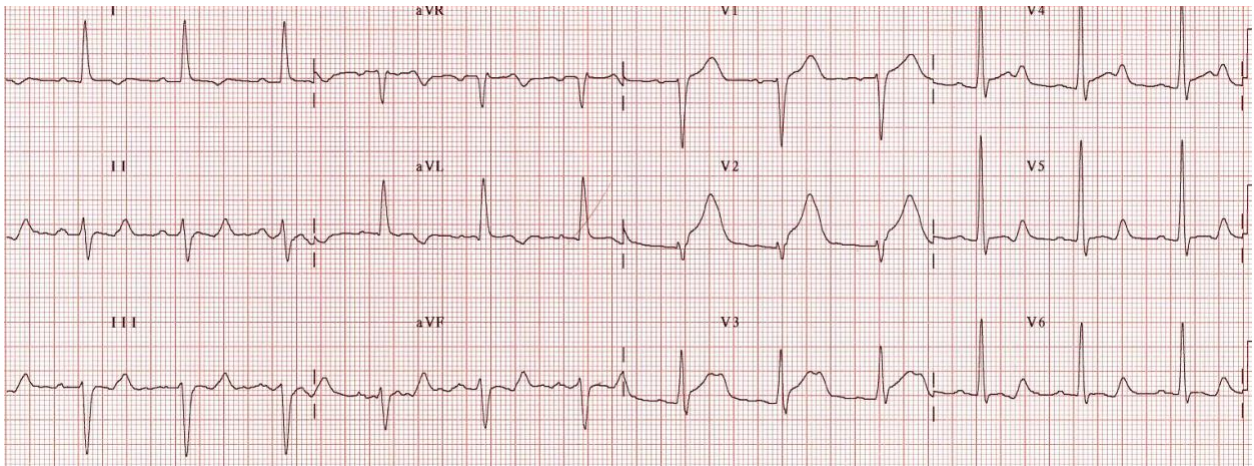
References: Allely F. Subarachnoid hemorrhage. In: Cadogan M and Nickson C, FOAMed resource. <https://lifeinthefastlane.com/cc/subarachnoid-haemorrhage/>. Life in the Fast Lane. CC BY-NC-SA 4.0.

Answer: Traumatic Subarachnoid Hemorrhage. These patients should have the head of the bed at 30 degrees, strict blood pressure control (typically between 100 and 140 systolic), and reversal of the warfarin. Neurosurgery and Trauma should be consulted, and the patient should be admitted to the ICU for further care. Reference: <https://lifeinthefastlane.com/cc/subarachnoid-haemorrhage-initial-management/>. (Objective 3, 4, 6).

4. A 25-year-old male with no past medical history presents to the emergency department for syncope. The patient was in his usual state of health when suddenly he had a syncopal episode. This was not preceded by lightheadedness, nausea, or dizziness. He denies chest pain or shortness of breath. This is his first occurrence. Your technician obtains an ECG and gives it to you. Please diagnose this patient. What would you do next?



INSTRUCTOR MATERIALS



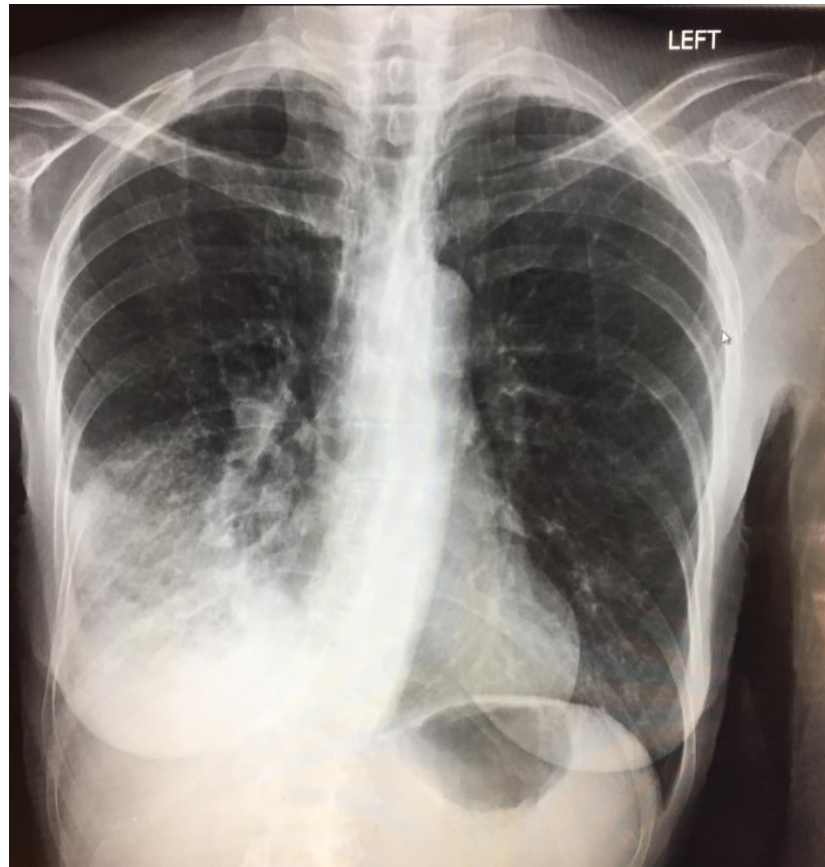
References: Burns E. Long QT Syndrome. In: Cadogan M and Nickson C, FOAMed resource. https://lifeinthefastlane.com/ecg-library/basics/qt_interval/. Life in the Fast Lane. CC BY-NC-SA 4.0.

Answer: This is a Long QT syndrome. The QTc is prolonged if > 440 msec in men or > 460 msec in women. QTc > 500 is associated with increased risk for torsades de pointes. A useful rule of thumb is that a normal QT is less than half the preceding RR interval. All of these patients should be placed on a monitor. If the patient's rhythm deteriorates into a ventricular arrhythmia, intravenous (IV) magnesium should be used. Ultimately, the patient should be admitted to telemetry and evaluated by cardiology. (Objective 1, 6).

5. A 23-year-old female with a past medical history of type I diabetes presents with cough for ten days. The patient reports a productive cough and difficulty breathing. You notice that her oxygen saturation is 92% on room air. The nurse proceeds to apply two liters of oxygen via nasal cannula, and the radiology technician obtains a chest radiograph. She has not been recently hospitalized. Please collaborate and develop a differential diagnosis; then provide your most likely diagnosis for this patient.



INSTRUCTOR MATERIALS



Author's own image

Answer: This is a right lower lobe pneumonia, likely community acquired. Also, within the differential diagnoses is pneumothorax and pulmonary embolism. The patient will need early intravenous antibiotics, such as ceftriaxone and azithromycin, and intravenous fluids. (Objective 2).

6. A 24-year-old healthy male is brought in by ambulance with right knee pain. The patient was playing football when he slipped and injured his knee. He is unable to walk and his knee is held in partial flexion. A knee radiograph was obtained. What is the diagnosis and how would you treat this?



INSTRUCTOR MATERIALS



References: Guthrie K. Patella Dislocation. In: Cadogan M and Nickson C, FOAMed resource. <https://lifeinthefastlane.com/patella-dislocation/>. Life in the Fast Lane. CC BY-NC-SA 4.0.

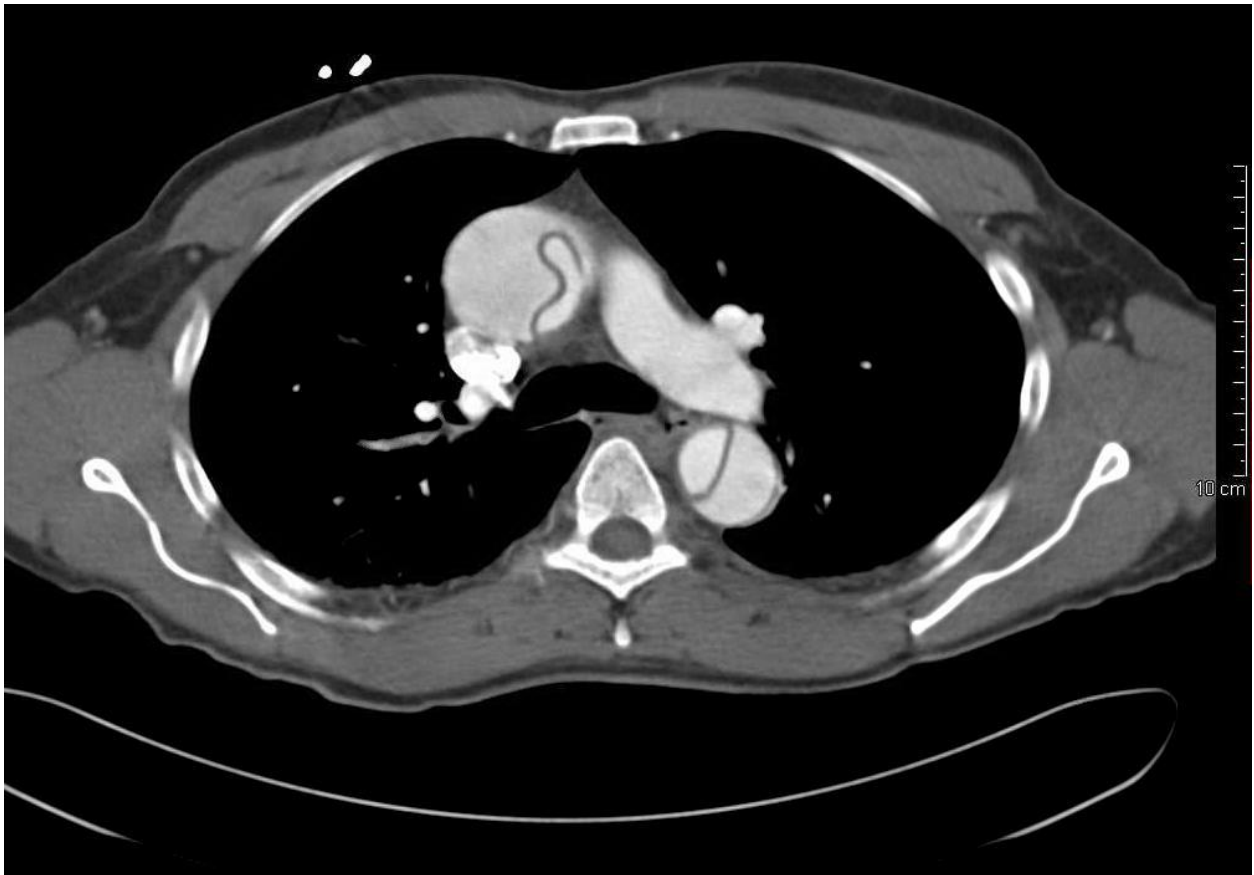
Answer: Right knee patellar dislocation. To reduce the patella, medial pressure is applied to the patella as the knee is extended. A posterior splint should subsequently be applied, and the patient should remain immobilized for up to three weeks. The patient can be discharged home with follow up with orthopedics.

Reference: <http://reference.medscape.com/article/90068-treatment>. (Objectives 2, 6, 8).

7. An 87-year-old male with past medical history of hypertension, diabetes, and high cholesterol presents with sharp pleuritic chest pain radiating to the back. You notice that the blood pressures were different in each arm, 200/110 in the right upper extremity and 175/89 in the left upper extremity. A CT scan of the chest was subsequently ordered. What is the diagnosis? And what medications should you give?



INSTRUCTOR MATERIALS



References: Young P. DeBakey Dissection. In: Cadogan M and Nickson C, FOAMed resource. <https://lifeinthefastlane.com/cardiovascular-curveball-008/>. Life in the Fast Lane. CC BY-NC-SA 4.0.

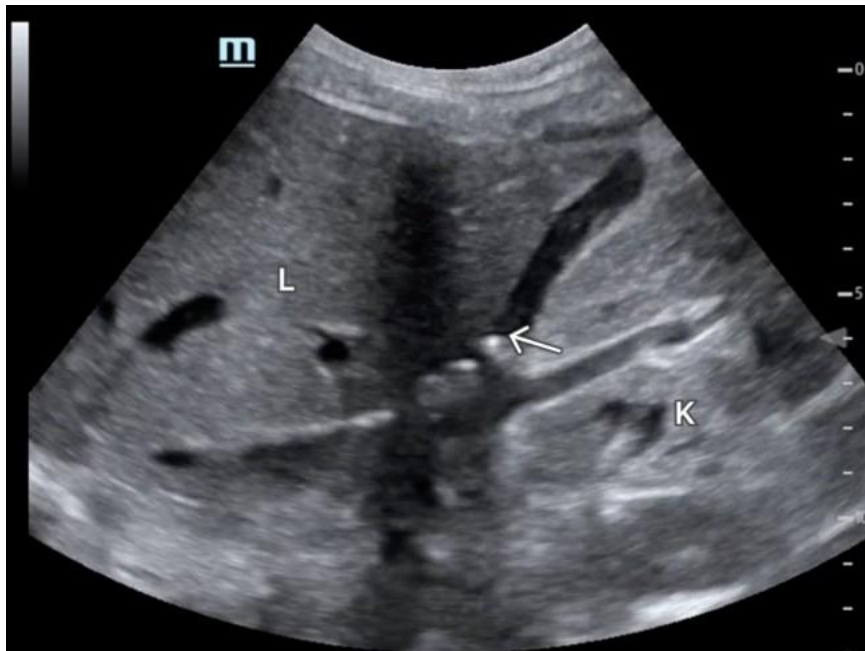
Answer: This is a type A aortic dissection. This is a hypertensive emergency that needs to be treated immediately. The target blood pressure is 100 to 120 mmHg systolic blood pressure and the target heart rate is less than 60 beats per minute, which can be achieved with an esmolol and nitroprusside drip. A cardiothoracic surgeon should be consulted for an emergent aortic repair.

Reference: <http://emedicine.medscape.com/article/756835-overview#a3>. (Objectives 2, 6)

8. A 46-year-old male with past medical history of peptic ulcer disease and alcohol abuse presents with severe generalized abdominal pain. He reports a dull epigastric abdominal pain for approximately three days. He has taken 800mg of ibuprofen every four to six hours but the pain has worsened. He has associated nausea but denies vomiting. He denies any prior abdominal surgeries. Given his ill-appearance, you decide to perform an abdominal ultrasound. What is your finding on the ultrasound, and what is the next step?



INSTRUCTOR MATERIALS



References: Shih, J. Ultrasound for the Win! – 46M with Diffuse Abdominal Pain #US4TW. In: Lin M, FOAMed resource. <https://www.aliem.com/2017/02/ultrasound-for-the-win-46m-abdominal-pain-us4tw/>. Academic Life in Emergency Medicine. CC BY-NC-SA 4.0.

Answer: The ultrasound is positive for free fluid in Morrison's Pouch. With the patient's history, this finding is concerning for perforated viscus secondary to peptic ulcer disease. The patient should receive aggressive fluid resuscitation, broad-spectrum antibiotics, and an emergent surgical consultation.

Reference: <https://www.aliem.com/2017/02/ultrasound-for-the-win-46m-abdominal-pain-us4tw/>. (Objectives 6, 7).

9. A 50-year-old male with past medical history of congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD) presents with severe respiratory distress. His respiratory rate is 30, and his oxygen saturation is 79% on room air. Your pre-test probability of CHF was 50%, and your physical exam demonstrated a jugular venous distension. By using the table below, determine the post-test probability of CHF. (Hint: Use Bayes Nomogram.)



INSTRUCTOR MATERIALS

Does your dyspneic patient have CHF?

Wang CS et al, *JAMA*. 2005. McCullough PA et al. *Acad EM*. 2003.

Population: All-comer Emergency Department patients

Diagnostic accuracy for CHF		
Finding	Positive LR	Negative LR
Initial clinical judgment	4.4 (1.8-10)	0.45 (0.28-0.73)
History		
- Heart failure	5.8 (4.1-8.0)	0.45 (0.38-0.53)
- Myocardial infarction	3.1 (1.3-5.8)	0.69 (0.58-0.82)
- Coronary artery disease	1.8 (1.1-2.8)	0.68 (0.48-0.96)
- Dyslipidemia	1.7 (0.43-6.9)	0.89 (0.69-1.1)
- Diabetes mellitus	1.7 (1.0-2.7)	0.86 (0.73-1.0)
- Hypertension	1.4 (1.1-1.7)	0.71 (0.55-0.93)
- Smoking	0.84 (0.58-1.2)	1.4 (0.58-3.6)
- COPD	0.81 (0.60-1.1)	1.1 (0.95-1.4)
Symptoms		
- Paroxysmal nocturnal dyspnea	2.6 (1.5-4.5)	0.70 (0.54-0.91)
- Orthopnea	2.2 (1.2-3.9)	0.65 (0.45-0.92)
- Edema	2.1 (0.92-5.0)	0.64 (0.39-1.1)
- Dyspnea on exertion	1.3 (1.2-1.4)	0.48 (0.35-0.67)
- Fatigue and weight gain	1.0 (0.74-1.4)	0.99 (0.85-1.1)
- Cough	0.93 (0.70-1.2)	1.0 (0.87-1.3)
Physical exam		
- S3 (ventricular filling gallop)	11 (4.9-25.0)	0.88 (0.83-0.94)
- Abdominal jugular reflex	6.4 (0.81-51.0)	0.79 (0.62-1.0)
- Jugular venous distension	5.1 (3.2-7.9)	0.66 (0.57-0.77)
- Rales	2.8 (1.9-4.1)	0.51 (0.37-0.70)
- Any murmur	2.6 (1.7-4.1)	0.81 (0.73-0.90)
- Lower extremity edema	2.3 (1.5-3.7)	0.64 (0.47-0.87)
- Valsalva maneuver	2.1 (1.0-4.2)	0.41 (0.17-1.0)
- SBP <100 mmHg	2.0 (0.60-6.6)	0.97 (0.91-1.0)
- S4 (atrial gallop)	1.6 (0.47-5.5)	0.98 (0.93-1.0)
- SBP ≥150 mmHg	1.0 (0.69-1.6)	0.99 (0.84-1.2)
- Wheezing	0.52 (0.38-0.71)	1.3 (1.1-1.7)
- Ascites	0.33 (0.04-2.9)	1.0 (0.99-1.1)
Chest radiograph		
- Pulmonary venous congestion	12.0 (6.8-21.0)	0.48 (0.28-0.83)
- Interstitial edema	12.0 (5.2-27.0)	0.68 (0.54-0.85)
- Alveolar edema	6.0 (2.2-16.0)	0.95 (0.93-0.97)
- Cardiomegaly	3.3 (2.4-4.7)	0.33 (0.23-0.48)
- Pleural effusion	3.2 (2.4-4.3)	0.81 (0.77-0.85)
- Any edema	3.1 (0.60-16.0)	0.38 (0.11-1.3)
- Pneumonia	0.50 (0.29-0.87)	1.0 (1.0-1.1)
- Hyperinflation	0.38 (0.20-0.69)	1.1 (1.0-1.1)

References: Lin M. Paucis Verbis: CHF Likelihood Ratios. In: Lin M. FOAMed resource.

<https://www.aliem.com/2012/08/paucis-verbis-chf-likelihood-ratios/>. Academic Life in Emergency Medicine. CC BY-NC-SA 4.0.

Answer: By using the Bayes nomogram, with a positive likelihood ratio of approximately 5, the post-test probability that this patient is having a CHF exacerbation is approximately 80%. References:

<https://www.aliem.com/2012/08/paucis-verbis-chf-likelihood-ratios/>,

[https://commons.wikimedia.org/wiki/File:P-](https://commons.wikimedia.org/wiki/File:P-value_nomograph_for_Bayesian_posterior_estimation.jpg)

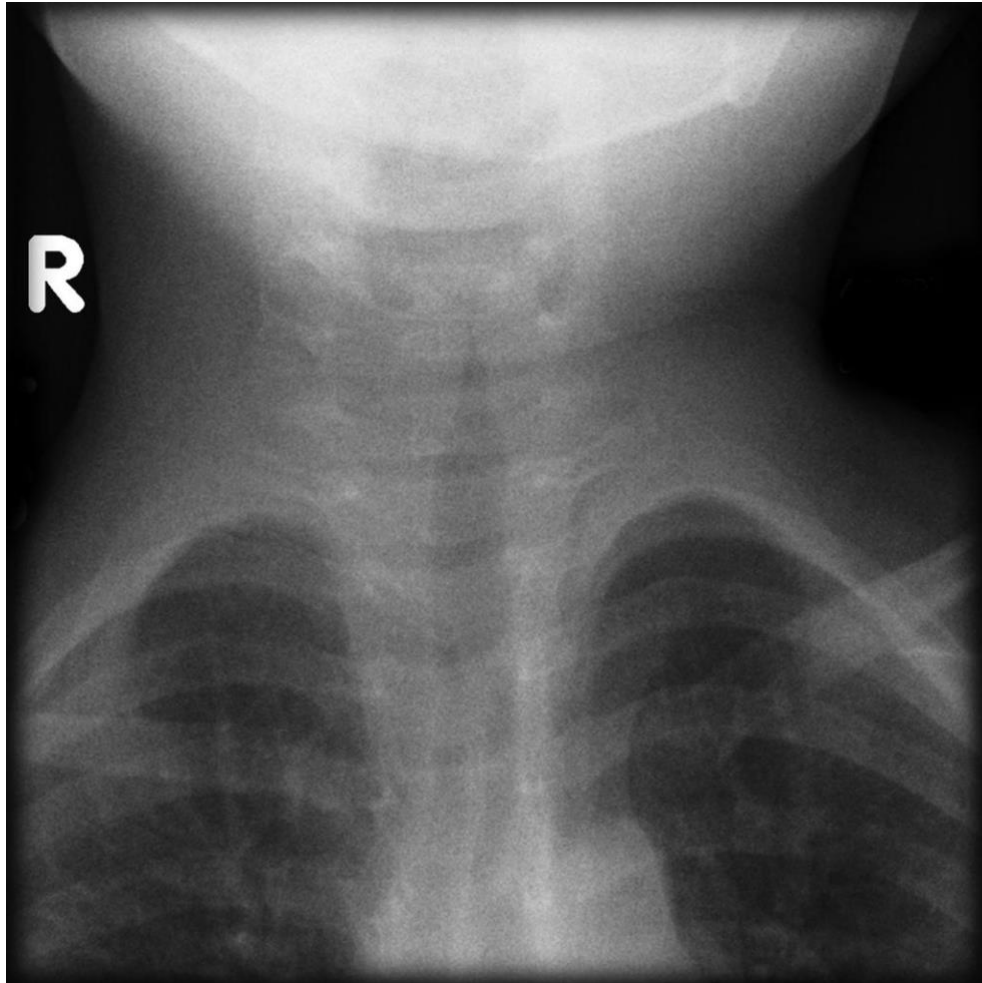
[value nomograph for Bayesian posterior estimation.jpg](https://commons.wikimedia.org/wiki/File:P-value_nomograph_for_Bayesian_posterior_estimation.jpg). (Objectives 6, 9).

10. A 3-year-old male with past medical history of asthma presents with a “barky” cough. The mother initially thought the cough was secondary to a common cold, but the coughing had persisted and kept



INSTRUCTOR MATERIALS

the patient up all throughout the night. The child is overall nontoxic appearing. The vital signs are normal. The triage nurse had ordered a chest radiograph. After examining the child, you review the chest radiograph with your attending. What is the child's diagnosis? What is the next step?



References: Bell D., Gaillard, F. Steeple sign (trachea), FOAMed resource.

<https://radiopaedia.org/articles/steeple-sign-trachea>. *Radiopaedia*. CC BY-NC-SA 3.0.

Answer: The radiograph finding is known as the steeple sign (it is narrowing of the trachea) and the child's findings are suggestive of croup. If the patient is in moderate to severe respiratory distress, 0.05 cc/kg of 2.25% of racemic epinephrine should be used, in addition to 0.5 mg/kg PO of dexamethasone. If the symptoms do not improve or reoccur after the use of racemic epinephrine, the patient should be considered for admission to the hospital.

Reference: <https://www.aliem.com/2010/08/paucis-verbis-card-croup/>. (Objectives 5, 6).