Necrotizing Fasciitis / Fournier's Gangrene

Section 1: Case Summary

Scenario Title:	Necrotizing Fasciitis / Fournier's Gangrene
Keywords:	Necrotizing Fasciitis, Infections Disease, Interdisciplinary, surgical care
Brief Description of Case:	This case involves the approach to and management of necrotizing fasciitis. If treated aggressively (IV fluids, early broad-spectrum antibiotics and source control with surgical referral) the patient will stabilize. If not the patient will deteriorate into a PEA arrest.

Goals and Objectives	
Educational Goal:	Demonstrate approach to the diagnosis and management of NF.
Objectives: (Medical and CRM)	1. Recognize NF 2. Initiate appropriate and timely treatment 3. Advocate on behalf of their patient
EPAs Assessed:	

Learners, Setting and Personnel				
Target Learners:	☒ Junior Learners	☐ Senior Learners	☐ Staff	
	☒ Physicians	☐ Nurses	☐ RTs	☐ Inter-professional
	☐ Other Learners:			
Location:	☒ Sim Lab	☐ In Situ	☐ Other:	
Recommended Number of Facilitators:	Instructors: (1) MD facilitator			
	Confederates: RN			
	Sim Techs: One as available			

Scenario Development	
Date of Development:	March 23, 2020
Scenario Developer(s):	Dr. Jasdeep Gill

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Revised By:	
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Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Jay Lohr			Age: 59	Gender: Male	Weight: 110 kg
Presenting complaint: "Confusion"					
Temp: 38.5	HR: 118	BP: 105/70	RR: 22	O_2Sat: 92%	FiO_2: RA
Cap glucose: 22.0			GCS: 10 (E3V3M4)		
Triage note: A 59 year old Male was brought in via EMS from home to a moderate sized community emergency department during your night shift at 03:00 am. He is offloaded in the EHS zone. History from EHS note states his roommate has noticed he has been staying in bed the last 24 hours not drinking alcohol with him as per his usual.					
Allergies: NKDA					
Past Medical History: Type 2 DM -noncompliant Obese Chronic ETOH Hyperlipidemia			Current Medications: Metformin 1 gram PO BID		

Section 2B: Extra Patient Information

A. Further History
Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, confederate, SP, etc.)? Confederate RN to provide triage note information. Patient is confused. Not oriented to person, place or time. Periodic grimaces and localizes pain to central abdomen.

B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: Tachycardia, no rubs, gallops, murmurs	Neuro: Confused but no focal deficits. Neck is supple.
Resp: clear breath sounds	Head & Neck: Poor dentition, supple otherwise normal

Abdo: Morbid obese, soft, non distended , diffusely tender but no locality	MSK/skin: slight erythema visible in Suprapubic area **if exposed**
Other: GU: obvious swelling erythema, ecchymosis around scrotum. + crepitus if palpating tissue	

Section 3: Technical Requirements/Room Vision

A. Patient
☒ Mannequin *(specify type and whether infant/child/adult)*
☐ Standardized Patient
☐ Task Trainer
☐ Hybrid

B. Special Equipment Required
Critical care/Airway/ACLS equipment

C. Required Medications
IV fluids, antibiotics, presser's , RSI drugs

D. Moulage
The suprapubic area of the Mannequin is prepared with a standard moulage technique and a simple reversible modification to the simulator to give the appearance of erythema. The scrotum reveals ecchymosis as well as provide the feel of subcutaneous emphysema on palpation of the simulator skin. Mannequin to display slight increased work of breathing.

E. Monitors at Case Onset
☐ Patient on monitor with vitals displayed ☒ Patient not yet on monitor

F. Patient Reactions and Exam

Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format.

A- Moaning with patent airway
B- Slight increased work of breathing but clear lungs on examination
C- Cool extremities, mottling, decrease capillary refill
D- no focal neuro findings but confused
E - erythema at SP area that progresses down to GU area with ecchymosis, crepitus

Confusion
Diffuse pain out of proportion on abdominal examination

Section 4: Confederates and Standardized Patients

Confederate and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*
RN	Provide Triage history, connect phone call's to specialist services

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: Regular HR: 118 BP: 105/70 RR: 22 O_2SAT: 92 % T:38.5 ^oC GCS: 10 (E3V3M4)	Confused, Diffuse Abdo pain	<u>Expected Learner Actions</u> Focused H & P IV fluids (20cc/kg) Broad spectrum IV Abx Blood work/blood cultures Cap glucose Monitors O_2	<u>Modifiers</u> *Changes to patient condition based on learner action* -O2 applied —> Sat 95% - IVF —> Hr 110 <u>Triggers</u> *For progression to next state* - No fluids/Abx by 2 min → Phase 2 -All actions complete → Phase 2	

2. Worsening HR: 130 BP: 70/50 RR: 26 O_2SAT: 90 % T:38.5 ^oC GCS: 8 (E2V2M4)	More Confused, Increasing RR with obvious Tachypnea	<u>Expected Learner Actions</u> Recognize that instability of patient in shock Emergent need to RSI Vasopressors	<u>Modifiers</u> -Bp will drop further despite fluids and Abx <u>Triggers</u> -Intubation complete —>Phase 3 - No intubation —> 4	
3. Response HR: 110 BP: 95/50 RR: 22 O_2SAT: 94 % T:38.0 ^oC GCS: Intubated	Intubated No source identified	<u>Expected Learner Actions</u> Source control. Find the infection based on examination if completed already. May come across GU exam if inserting foley. Call surgery/ICU if not done so	<u>Modifiers</u> - no further changes - Gen surgery or plastics pushes back asking for CT with ICU admit and abx with reassessment <u>Triggers</u> - if demanding for Gen Sx consult —> 5 - if succumbs to pushback -> 4 - Patient codes	

4. PEA arrest	no response to ACLS	Expected Learner Actions - ACLS - x 2 rounds —> ROSC - Calls back general surgery for OR	Modifiers - learner demands they come in for source control Triggers - if call back Gen Sx —> 5 - otherwise PEA — > Death (end of case)	
5. Disposition HR: 110 BP: 95/60 RR: 22 O_2SAT: 96 % T:38.0 ^oC GCS: 9	Stable on pressors if Gen surgery made to agree to take pt. to OR	Expected Learner Actions Ongoing monitoring Call ICU Ensure appropriate Abx May arrange for CT	Modifiers -no further changes Triggers - speak with ancillary staff and consultant - End of case	

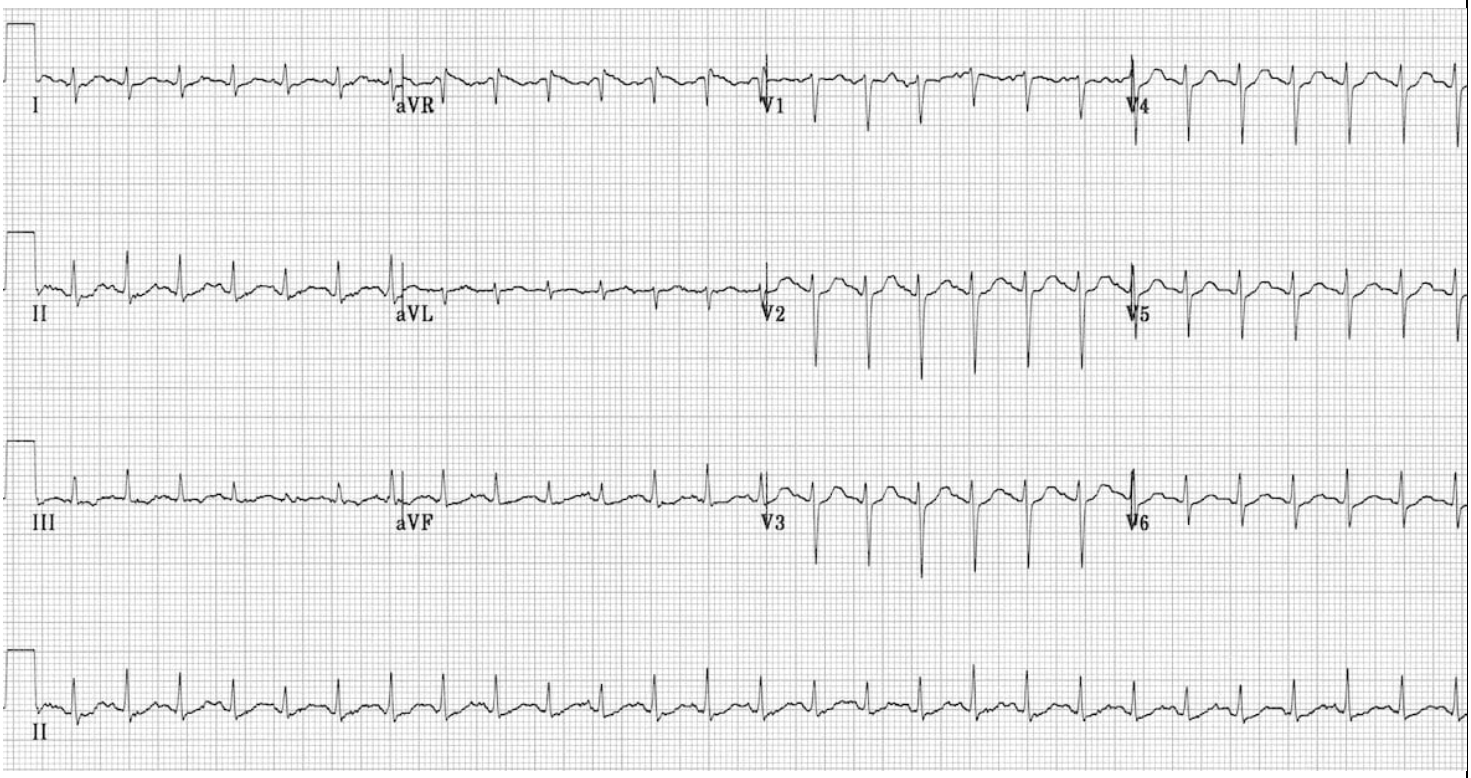
Appendix A: Laboratory Results

<u>CBC</u> WBC 14.0 Hgb 142 Plt 292 <u>Lytes</u> Na 134 K 5.5 Cl 97 HCO_3 26 AG 16 Urea 7 Cr 120 Glucose 30 <u>Extended Lytes</u> Ca 2.5 Mg N $PO_{4\ N}$ Albumin 30 TSH 1.93 <u>VBG</u> pH - 7.28 pCO2 - 28 pO2 - 40 HCO3 - 30 Lactate 4.0	<u>Cardiac/Coags</u> Trop hs : 20 D-dimer neg INR 1.5 aPTT 40 <u>Biliary</u> AST 140 ALT 55 GGT 110 ALP 98 Bili 13 Lipase 300 <u>Tox</u> EtOH NEG ASA Tylenol Dig level Osmols NEG <u>Other</u> B-HCG

Appendix B: ECGs, X-rays, Ultrasounds and Pictures

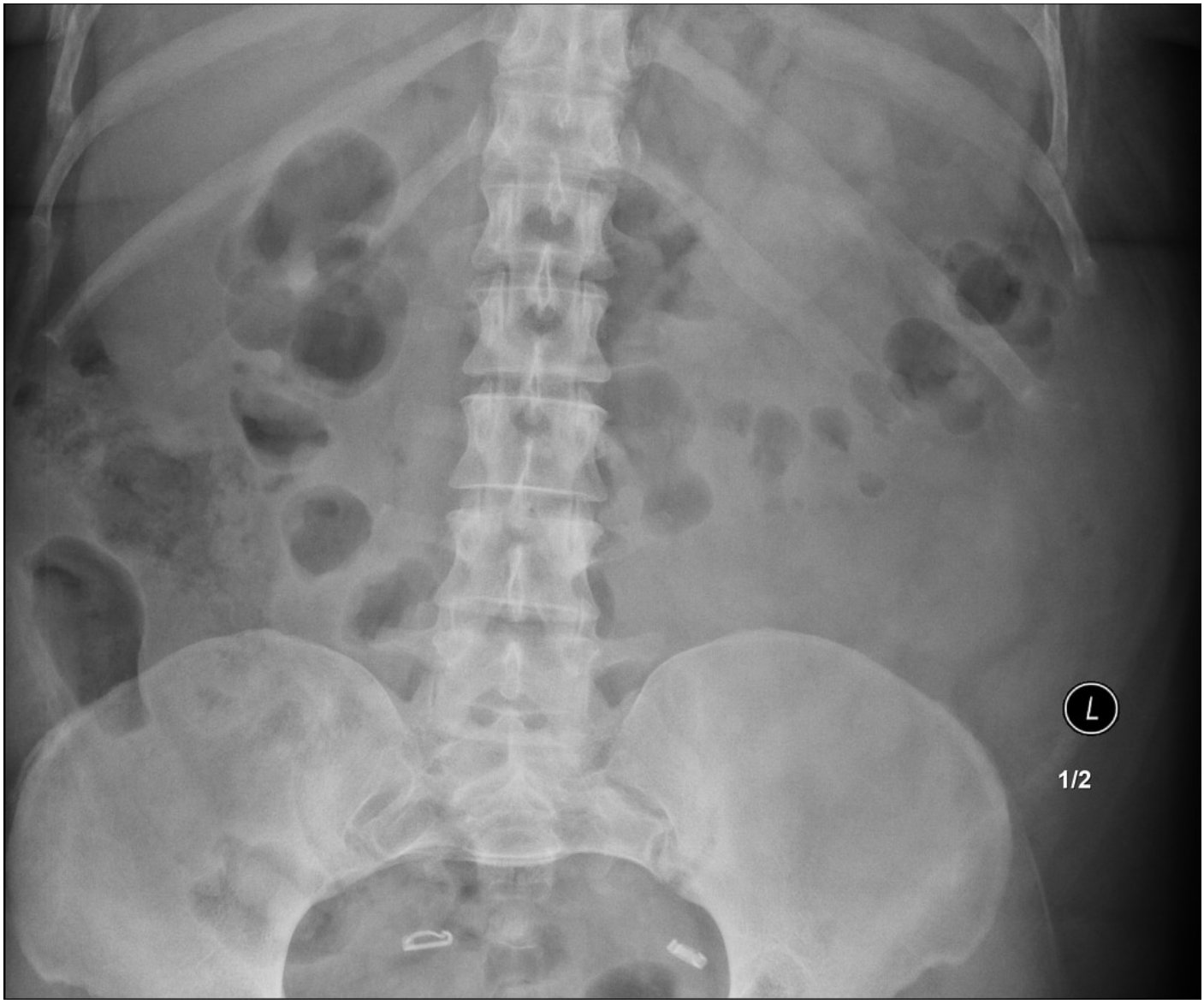
Paste in any auxiliary files required for running the session. Don't forget to include their source so you can find them later!

EKG Sinus Tachy:



https://litfl.com/sinus-tachycardia-ecg-library/

Abdo XR – Normal:



https://radiopaedia.org/cases/normal-abdominal-x-ray-large-bowel-gas

Appendix C: Facilitator Cheat Sheet & Debriefing Tips

1. Review the initial approach, management, and treatment for NF
2. Discuss the importance of source control and early referral
3. No need for imaging, focus on clinical examination and need for Broad spec abx.

Include key errors to watch for and common challenges with the case. List issues expected to be part of the debriefing discussion. Supplemental information regarding any relevant pathophysiology, guidelines, or management information that may be reviewed during debriefing should be provided for facilitators to have as a reference.

Discussion Points:

- Rapid, yet often subtle, spread of inflammation and necrosis across fascial and subcutaneous tissues, leading to systemic signs of toxicity and pervasive tissue destruction and resulting in high morbidity and mortality
- Case fatality rate of NF remains between 11% and 76% (1)
- Risks and predisposing factors for NF include extremes in age, diabetes mellitus, peripheral vascular disease, immunocompromised states, and skin injury from surgery, procedures, burns, blunt trauma, childbirth, or IV drug use
- Any patient presenting with inflammatory skin changes and additional symptoms of fever, toxic appearance, crepitation, pain out of proportion to the exam, blisters or bullae, and/or rapid clinical deterioration should be evaluated for NF
- Exposing patient for physical examination if you see what appears to be a cellulitis on the lower abdomen examine the perineum for signs of Fournier's Gangrene.
- Role of the physician to advocate for his or her patient when inappropriate pushback despite need for definitive care
- Learners may overlook the obvious subcutaneous emphysema on physical exam the character of the pain, and the general appearance of the patient.
-Surgical exploration remains the gold standard for definitive diagnosis and treatment of NF and should never be delayed, especially in the presence of subcutaneous emphysema or rapidly evolving soft tissue

Empiric antibiotic therapy for suspected Necrotizing Fasciitis

Meropenem1 g IV q8h OR Piperacillin-tazobactam 3.375 g IV q6h
PLUS Vancomycin 15 mg/kg q12 h IV OR Linezolid 600 mg IV q12h

References

1.Group A Streptococcal (GAS) Disease. [Jul;2016];Group A. http://www.cdc.gov/groupastrep/clinicians.html 20142.
2. https://emergencymedicinecases.com/necrotizing-fasciitis/