

**MECHANISMS OF HUMAN DISEASE
AND
PHARMACOLOGY & THERAPEUTICS**

CASE-BASED SMALL GROUP DISCUSSION

**SESSION III
MHD I**

Monday, September 16, 2013

STUDENT COPY

Helpful Session Resources:

Murray's Medical Microbiology

p 327-331
p. 345-349
p. 339-342
p. 228-232

CASE 1

Cc: chills, leg pain, and drainage from a wound <24 hours after a penetrating injury

A 28 year-old man fell from the roof of his home (in a remote area of Montana) onto a metal grounding rod stuck in the ground that partially penetrated his left calf. He controlled the bleeding after removal of the rod, but elected not to seek attention since his home was two hours from the closest health care facility. The following morning he had shaking chills and severe leg pain. His leg was swollen and warm, with cloudy fluid draining from a very darkened wound site. He had a friend drive him to the hospital, where he was found to be stuporous, but able to answer questions.

Physical Exam: T= 35°C, P=120, RR=24, BP=90/54. The important physical findings were limited to the left leg: tense edema to mid thigh, marked tenderness with blanching of skin and tense bullae (fluid collections) around the wound site. The skin also contained dark areas of apparent necrosis, with serosanguinous, dirty, foul smelling discharge from the wound. Palpation of skin revealed crepitus. Gram stain of discharge revealed rare WBC's and many Gram positive rods.

Learning Objectives

1. What is the diagnosis, and what is the causative organism?
2. What is the pathogenesis of this infection? What predisposing factors are required for development of disease?
3. What virulence factor(s) are produced by the organism, and what are their effects?

Case 2

CC: Left lower quadrant pain for 24 hours

The patient is a 57-year-old man who presented with left lower quadrant abdominal pain. The pain began about 24 hours prior to admission and steadily worsened. Eventually any movement seemed to exacerbate the pain. He was going to “tough it out” at home, but the development of fever to 101 degrees Fahrenheit prompted him to seek medical attention. He had nausea the day of admission and a decreased appetite. His last bowel movement was 2 days prior and was normal in color, though more loose than usual. He never had pain like this before.

He has a history of hypertension well-controlled on hydrochlorothiazide 25mg daily.

He has had no surgeries.

He has never smoked and rarely drinks alcohol.

Physical exam revealed the following:

Temperature 99.9 F, pulse 102, BP 101/68, respirations 20.

ENT, heart, and lung exams were normal.

On abdominal exam there was left lower quadrant tenderness to palpation with involuntary guarding.

There was a mass with overlying warmth in the same region.

Educational Objectives:

1. Develop a differential diagnosis for the main clinical problem (ie think about the LLQ vicinity organs and associated potential disease processes)

Diagnostic studies are obtained.

Electrolytes are normal.

Urinalysis is normal.

CBC shows a normal hgb and platelet count and leukocytosis (WBC 17,000 with bandemia)

CT ABDOMEN AND PELVIS

COMPARISON: NONE

TECHNIQUE: 5MM THICK IMAGES WERE TAKEN THROUGH THE ABDOMEN AND PELVIS FOLLOWING THE ADMINISTRATION OF NONIONIC AND INTRAVENOUS ORAL CONTRAST MATERIAL.

FINDINGS:

ABDOMEN: THERE IS A PUNCTATE LOW ATTENUATION STRUCTURE IN THE POSTERIOR ASPECT OF THE RIGHT HEPATIC LOBE TOO SMALL TO CHARACTERIZE BY CT. THERE IS NO BILIARY DUCTAL DILATATION. THERE ARE CALCIFIED CALCULI WITHIN THE GALLBLADDER LUMEN , WITH MILD AND IRREGULAR THICKENING OF THE GALLBLADDER WALL, NONSPECIFIC FOR CHOLECYSTITIS.

THE SPLEEN IS NORMAL IN SIZE. THE PANCREAS DEMONSTRATES GROSSLY HOMOGENEOUS ENHANCEMENT AND REGULAR CONTOURS, WITHOUT INTRA OR EXTRAHEPATIC FLUID COLLECTIONS OR GROSS INFILTRATION OF THE PERIPANCREATIC FAT. THERE ARE NO PANCREATIC CALCIFICATIONS.

THERE IS NO ADRENAL MASS. THERE IS A 6MM NONSPECIFIC LOW ATTENUATION STRUCTURE IN THE LEFT KIDNEY. THERE ARE NO CALCULI OF HYDRONEPHROSIS.

PELVIS:

THERE IS EXTENSIVE SIGMOID COLONIC DIVERTICULOSIS. THERE IS FOCAL COLON WALL THICKENING WITH PERCOLONIC STRANDING AND AN ADJACENT COLLECTION OF FLUID AND GAS MEASURING 5 x 4 CM CONSISTENT WITH ABSCESS FORMATION. THERE IS NO EVIDENCE OF FREE AIR.

2. What is the likely diagnosis?

The pericolonic fluid collection is drained percutaneously under CT guidance. Approximately 60 cc of purulent material is initially obtained and a drainage catheter is left in place. The purulent material is submitted for aerobic and anaerobic culture.

Specimen: Abdominal Abscess

Gram stain:

- Many WBCs
- Many Gram negative rods
- Many Gram positive cocci in pairs and chains

3. What micro-organisms do you think might be involved in this infection? Do the results of the Gram stain fit the clinical scenario?
4. The medical team is debating their choice of empiric antibiotic therapy.
- a) Define what is mean by “empiric”.
 - b) The team chooses ciprofloxacin and metronidazole. Is this therapy rationale? Why or why not?
 - c) If this patient were a 22-year old pregnant woman with the same disease process, would you agree with the choice of antibiotics? Why or why not?

5. One of the Gram negative rods isolated from the fluid collection appears as faintly staining and pleomorphic. It is growing under anaerobic conditions and demonstrates resistance to kanamycin and vancomycin.

What is the most likely organism to be isolated? Discuss the virulence factor of this organism.

6 At what other sites can this organism cause infection?

7. Gram negative rods, which are lactose fermenters, are growing under aerobic conditions. What is the most likely organism?

Case 3:

CC: “I have had a lump in my jaw on and off for the past month”

A 55 year-old man presents with a mass of his left submandibular area. The patient initially had swelling in this area which was treated with ampicillin for one week. The swelling resolved, but recurred one month later. In addition, the patient has had an intermittent toothache in his left lower molars for the last 5 days.

He drinks a 6 pack of beer daily. He has a history of illicit drug use but has abstained since his last drug detoxification program 4 months ago. He smokes 1 ½ packs of cigarettes per day and has done so for the past 35 years.

PE: Temp: 99.8°

Patient is in no acute distress. Clothes strongly smell of cigarette smoke

Skin: 3 cm x 4 cm red-bronze area of swelling at angle of the jaw on left, woody induration, nontender. There appears to be a draining sinus tract.

Mouth: poor dentition, left lower molar decayed with surrounding gingivitis.

Educational Objectives

1. What is the main clinical problem? Develop a differential diagnosis.

Fine needle aspirate of the submandibular mass is done and sent for culture and cytology. Gram stain of the aspirate revealed branching Gram-positive filamentous organisms.

2. What 2 organisms could be represented by the Gram stain?

The organism stains negative on Modified Acid Fast stain

3. What is the organism most likely causing this infection? How should this specimen be cultured?

4. What were the risk factors for acquiring the infection in this patient?

5. How is this infection treated?

6. Review the Case Images:

Bacteriology – Set 7

CASE 4:

CC: Pain and swelling of right thigh x 2 weeks

A 60 year-old man who is 4 months post-orthotopic heart transplant for ischemic cardiomyopathy presents with a 2 week history of increasing pain, swelling and tenderness in his right thigh. The pain is ~6/10 at rest and increases to 8/10 with activity. The patient also has had a fever to 101° over the last 2 days.

Medications include: Cyclosporine, prednisone and azathioprine.

PE: T. 38.0°C, BP 140/80, R-14, HR 80, No acute distress.

Lungs: Clear

Heart: S₁ and S₂ Normal, no S₃ S₄

Abdomen: soft, non-tender, no organomegaly.

Extremities: Right thigh with swollen, red, tender fluctuant 3cm x 3cm mass with some surrounding erythema and increased warmth.

Neuro: Within normal limits

LABORATORY DATA

Heme Final T2309

CBC w/ DIFF

WBC	6.1	[4.0-10.0] k/ul
RBC	3.61	[3.60-5.50] m/ul
Hgb	12.1	[14.0-17.0] gm/dl
Hct	36.3	[34.0-51.0] %
MCV	87	[85-95] fl
MCH	27.4	[28.0-32.0] pg
MCHC	32.3	[32.0-36.0] gm/dl
RDW	12.2	[11.0-15.0] %
Plt Count	250	[150-400] k/ul
Diff Type	Automated	
Bands	8	
Bands#	0.5	
Gran	88	[45-70] %
Gran #	5.4	[2.0-7.0] k/mm ³
Lymph	2 L	[20-45] %
Lymph #	0.1 L	[1.0-4.0] k/mm ³
Mono	2	[0-10] %
Mono #	0.1	[0.0-1.0] k/mm ³
Eo	0	[0-7] %
Eo #	0.0	[0.0-0.7] k/mm ³
Baso	0	[0-2] %
Baso #	0.0	[0.0-0.2] k/mm ³

5. What is the appropriate antibiotic therapy?

6. Review the Case Images:

Bacteriology – Set 8