



Case 98: Abdominal Pain

- **Chief complaint**
 - 48-year-old male, brought in by wife, presents with abdominal pain
- **Vital signs**
 - HR: 98 BP: **98/60** RR: 18 Sat: 96% on RA T: 37.9°C (if asked) Wt: 70kg
- **Patient appearance**
 - Patient appears ill but in no distress. He is sleeping and awakens to voice.
- **Primary survey**
 - Airway: intact
 - Breathing: no respiratory distress, clear lungs
 - Circulation: warm skin, 2+ distal pulses
- **Action**
 - Place patient on the monitor
 - Oxygen by NC (optional)
 - One-two large bore peripheral IV lines (draw rainbow top)
 - 1 L IVF bolus
 - POC glucose (85, if ordered)
 - Order stat ECG (verbal report- normal sinus rhythm)
- **History**
 - Source: Patient (limited 2/2 confusion), wife
 - HPI: a 48-year-old male presents with 3 days of progressively worsening abdominal pain. The pain is diffuse, constant, 7/10 in severity, and does not radiate. There is no associated nausea, vomiting, diarrhea, constipation, or rectal bleeding. He has also had increasing abdominal distention and lower extremity swelling. If asked, his wife will note that he has “seemed off” since this morning. There have been no falls or trauma.
 - PMHx: HCV, cirrhosis, esophageal varices, CKD
 - If asked, paracentesis x1 approx 3mo ago, no known ho SBP
 - PSHx: esophageal banding 1 year ago, appendectomy 20 years ago
 - Allergies: none
 - Meds: none
 - Social: previous alcohol use, denies smoking or drugs
 - FHx: non-contributory
 - Code Status: full code

- **Physical Exam**

- **General:** drowsy, ill-appearing, no acute distress
- **HEENT:** scleral icterus, otherwise normal
- Neck: normal
- Chest: nontender
- Heart: normal
- Lungs: normal
- **Abdomen:** distended, diffusely tender without rebound or guarding. Fluid wave present. Normal bowel sounds. No pulsatile mass or hernias.
- Rectal: normal tone, brown stool, occult blood test negative (if asked)
- **Extremities:** 1+ pitting edema to knees
- Back: normal
- **Neuro:** (must ask specifics) drowsy but wakes to voice. Will answer questions but slow to respond. Oriented x 2 to self and place but not time. Asterixis present. Otherwise normal.
- **Skin:** warm, dry, jaundice, spider angiomas, scattered superficial bruises
- Lymph: normal

- **Instructor Prompt:** learners should discuss the stability of the patient (sick or stable in the context of history and borderline vitals) and differential diagnosis

- **Nursing update:** The nurse will state that the patient feels warm. Oral temp will be the same as above. If rectal temp is checked, it will be **39.2°C**.

- **Action**

- Order Labs
 - CBC, BMP, LFT, lipase, PT/INR, PTT, urinalysis, urine culture, blood cultures, lactate, ammonia level, LDH
 - Consider troponin, bnp
- Order Meds
 - 1 L IVF bolus (if not already given, may consider 2nd liter)
 - IV analgesia (IV opioid, consider fentanyl IV due to patient's hypotension)
 - PO antipyretic (acetaminophen 650 mg PO)
- Order Imaging
 - Consider CXR (verbal report "normal")
 - If CT A/P is ordered there will be a long delay
- POCUS
 - FAST to evaluate for free fluid (ascites) in abdomen
 - [Figure 98.1 \(A\)](#): RUQ view, significant free fluid
 - [Figure 98.1 \(B\)](#): LUQ view, significant free fluid
 - [Figure 98.1 \(C\)](#): suprapubic view, significant free fluid, small bowel and mesentery floating in ascites
 - Ascites to evaluate for a fluid pocket and safe paracentesis site

- [Video 98.2 \(A\)](#): proposed window for paracentesis
 - [Figure 98.2 \(B\)](#): proposed window for paracentesis showing large fluid pocket, measured
- Perform diagnostic paracentesis
 - If time permits, request that the learner describe how they would perform the paracentesis (step-by-step)
 - Send fluid for cell count with differential, gram stain, culture, glucose, protein
 - Consider ascitic fluid pH, albumin and LDH in addition to serum albumin (included in LFTs) and LDH
- **Response/Results**
 - Patient reevaluation and repeat vitals:
 - Pain is improved if analgesia is given. If not given, prompt to give pain meds.
 - Vitals after IV fluids: HR: 88 BP: 104/70
 - Vitals if IV fluids not given: HR: **115** BP: **90/60** (Prompt: give fluids)
 - [Case 98 Lab Results](#) (sig for **WBC 15.2, PLT 98, Na 130, CO2 30, BUN 47, Cr 2.6, PT 17, INR 1.7, PTT 53, AST 93, ALT 140, T Bili 4.3, D Bili 3.1, Albumin 2.5**)
 - Additional Lab Results
 - Serum: **lactate 2.4, ammonia 115**, troponin 0.01, cultures pending, LDH pending
 - Peritoneal fluid: **cloudy, cell count 400, 92% PMNs, glucose 55, protein 0.8, pH 7.2**, albumin 0.5, LDH pending, gram stain/culture pending
- **Instructor Prompt:** Discuss the meaning of the paracentesis findings and the appropriate next steps
- **Action**
 - Order meds
 - IV antibiotics (cefotaxime 2g IV q 8hr preferred, alternative ceftriaxone 2g IV q day)
 - Albumin 1.5 g/kg within 6 hours
 - Lactulose 20-30 g PO q 1-2hrs until 2 soft stools/day
 - Update patient and wife of presumed diagnosis and plan
 - Admit patient to telemetry unit or step-down unit
- **Diagnosis**
 - Primary Diagnosis: Spontaneous bacterial peritonitis
 - Secondary Diagnoses: Hepatic encephalopathy, Acute Kidney Injury
- **Critical actions**
 - Obtain IV access
 - IV fluid bolus
 - POCUS to confirm ascites and safe pocket for paracentesis
 - Perform diagnostic paracentesis and send appropriate labs

- Start IV antibiotics
- Admission
- **Instructor Guide**
 - This is a case of spontaneous bacterial peritonitis (SBP) in a patient presenting with fever, abdominal pain, and abdominal distention with ascites. Since the patient is also confused, raising concern for hepatic encephalopathy, it is important to seek history from other sources such as the patient's wife. Important early actions include IV fluids, diagnostic paracentesis with appropriate labs, and IV antibiotics. The initiation of lactulose should also be considered for his hepatic encephalopathy. The patient should be dispositioned to a telemetry floor or step-down unit.
- **Case Teaching Points**
 - The differential for abdominal pain is extensive. In this patient, you should include SBP, other peritonitis due to surgical intra-abdominal source, AAA, bowel obstruction, bowel perforation, mesenteric ischemia, pancreatitis, gastroenteritis, intra-abdominal abscess, cholecystitis, constipation, hepatic encephalopathy, and sepsis.
- **What is SBP and its pathophysiology? How does SBP usually present?**
 - Definition
 - SBP is an acute infection of peritoneal fluid without evidence of other intra-abdominal surgically treatable sources.
 - Pathophysiology
 - The exact pathophysiology of SBP in liver cirrhosis remains speculative but the most important mechanism likely involves bacterial translocation from the lumen of the gut to the mesenteric lymph nodes. Possible contributing factors include bacterial overgrowth, impaired phagocytic function in liver, and portal systemic hypertension.
 - Most cases involve only one infecting organism type, the majority of which are gram-negative enteric organisms (e.g., *Escherichia coli*, *Klebsiella pneumoniae*) or gram-positive *Streptococcus pneumoniae*.
 - Clinical presentation
 - Symptoms may include fever, abdominal pain (may be subtle compared to other types of peritonitis), new or increased ascites, abdominal distention, altered mental status, fatigue, malaise, and/or diarrhea.
 - Approximately 13% of patients with SBP will have no signs or symptoms.
- **How is SBP diagnosed?**
 - Prompt diagnostic paracentesis is essential and should be performed before antibiotics are initiated whenever possible.
 - A single dose of antibiotics dramatically reduces the likelihood of gram stain and culture growth.

- In general, elevated INR is not a contraindication and FFP reversal is not recommended prior to the procedure.
 - LLQ is the preferred location, POCUS can help identify a suitable fluid pocket
 - Areas near surgical scars (appy?) should be avoided and the RLQ may be limited by a gas-filled cecum in a patient taking lactulose
 - Absolute neutrophil count (PMNs) ≥ 250 , bacteria on ascitic culture or gram stain (single organism), and absence of secondary causes of peritonitis
 - Absolute PMN count can be determined by multiplying the total ascitic fluid cell count by the % PMNs in the differential.
 - In the case of traumatic paracentesis, one PMN should be subtracted from the absolute PMN count for every 250 red cells/mm³
 - Other supporting findings include pH < 7.35 , blood-ascites pH gradient > 0.1 , serum ascites albumin gradient (SAAG) ≥ 1.1 (indirectly measures portal pressure), protein < 1 , and glucose > 50
 - Differentiating from secondary bacterial peritonitis (perforated bowel, appendicitis, cholecystitis) is important as mortality is approximately 80% if a patient with SBP undergoes unnecessary exploratory laparotomy and mortality approaches 100% if a patient with secondary bacterial peritonitis is treated with antibiotics alone with no surgical intervention.
 - Secondary bacterial peritonitis is suggested by PMNs ≥ 250 with multiple organism types on gram stain, protein > 1 , glucose < 50 , and LDH greater than the upper limit of normal for serum.
- **How is SBP treated?**
 - Third generation cephalosporin (cefotaxime 2 g q8hr or ceftriaxone 2 g q24hr). Cefotaxime may be more efficacious than ceftriaxone for SBP.
 - The early initiation of appropriate antibiotics is very important in patients with SBP; however, performing paracentesis first is ideal as even a single dose of antibiotic can lead to no growth on culture. You may start antibiotics once ascitic fluid is obtained without waiting for results. You should not wait for culture results if there is strong concern for SBP. If the procedure is unable to be performed quickly, antibiotics should be started.
 - Consider albumin (1.5 g/kg IV within 6 hours) as it has been shown to decrease risk of renal failure and in-hospital mortality
 - Give if creatinine > 1 mg/dL, BUN > 30 mg/dL, or total bilirubin > 4 mg/dL
 - **What is hepatic encephalopathy and how is it classified?**
 - Hepatic encephalopathy is a clinical state of disordered cerebral function that may develop as consequence of acute or chronic liver disease
 - Although often obtained, measuring serum ammonia levels is not necessary for diagnosis
 - The West Haven Criteria classifies the severity of hepatic encephalopathy
 - Grade 1: Mild confusion, depression, slurred speech, tremor

- Grade 2: Moderate confusion, lethargy, asterixis
 - Grade 3: Significant confusion, somnolence, amnesia
 - Grade 4: Coma
- **How is hepatic encephalopathy treated?**
 - Lactulose 20-30 g (30-45 mL) PO every 1-2 hours until 2 soft stools/day initially
 - Rifaximin 550 mg po BID may be added if patients are not adequately responsive to lactulose but should not replace lactulose therapy
- **POCUS Pearls**
 - To examine the abdomen for ascites, use the same approach as the FAST exam
 - FAST – Focused Assessment in Sonography for Trauma
 - Now used widely in Emergency Ultrasound to assess for free fluid, not just in trauma patients
 - Fluid (blood or other) will appear as an anechoic stripe with sharp borders
 - The RUQ window is the most sensitive for free fluid
 - Don't forget to scan the infrarenal space as free fluid collects there first
 - Fluid can collect anywhere in the suprapubic space, be sure to scan transverse and sagittal
 - In the LUQ, fluid preferentially collects in the sub-diaphragmatic space but can also collect in the splenorenal space
 - Use of POCUS is key for an undifferentiated distended abdomen as it can quickly demonstrate ascites, a distended bladder or even dilated loops of bowel
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- Image References
 - POCUS images courtesy of: Northwestern Emergency Medicine POCUS Image Bank AND/OR Emory Emergency Medicine POCUS Archive

Case 98 Lab Results

Basic Metabolic Panel:

Na	130 mEq/L
K	3.7 mEq/L
Cl	98 mEq/L
CO ₂	30 mEq/L
BUN	47 mg/dL
Cr	2.6 mg/dL
Gluc	85 mg/dL

Liver Function Panel:

AST	93 U/L
ALT	140 U/L
Alk Phos	130 U/L
T bili	4.3 mg/dL
D bili	3.1 mg/dL
Lipase	40 U/L
Albumin	2.5 g/dL

Complete Blood Count:

WBC	15.2 x 10 ³ /uL
Hb	12.1 g/dL
Hct	36.5%
Plt	98 x 10 ³ /uL

Urinalysis:

SG	1.018
pH	6.8
Prot	Neg
Gluc	Neg
Ketones	Neg
Bili	Neg
Blood	Neg
LE	Neg
Nitrite	Neg
Color	Yellow

Coagulation Panel:

PT	17 sec
INR	1.7
PTT	53 sec

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Figure 98.1 – POCUS (FAST)

A. RUQ



B. LUQ



C. Suprapubic



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[Video 98.2 A](#) - POCUS (proposed view)

Figure 98.2 B:



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