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Central Line and Paracentesis

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Disclosures

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Disclosures

Jeremy Flowers, DNP
Speakers Bureau: AbbVie, Clinical Area – IBD
At the end of this course participants will be able to:
- Describe clinical indications for central venous access
- Review different types of central venous access
- Identify sonographic considerations related to vascular assessment
- Review steps for placement of a non-tunneled central line
- Review indications for paracentesis
- Review steps for paracentesis
- Discuss role of paracentesis for determination of SBP
- Understand criteria for SBP ppx
Central Lines

• Are used to have access to central venous circulation (superior vena cava or inferior vena cava most frequently)

• Administration to the largest veins in the body allows for prompt hemodilution and limits potential damage to blood vessels due to osmolality, pH or other physical characteristics

• Central lines can be used to administer medications, nutrition, chemotherapy or provide for physiological monitoring

• 3 common anatomic insertion sites: internal jugular, subclavian, and femoral veins
Types of Central Lines

• Non tunneled
  – Primarily designed for short term use
  – PICC lines can be intended for long term use

• Tunneled
  – Tunneled catheter is a central line that is placed under the skin in a vein, allowing long-term access to the vein
  – Frequently has a cuff that will have epithelization into to help prevent infections

• Subcutaneous venous ports
  – Has a reservoir under the skin that is access with special needles for intermittent access. Needs to be positioned over bony support
  – Designed for long term use and central access
  – Often placed to anterior chest, but alternative sites can include arm, pelvis
Non Tunneled Lines

• Here is a left internal jugular line
PICC Line
Tunneled Lines

- Tunneled dialysis catheters are frequently used
Subcutaneous Venous Ports

- Chest port
Ultrasound Evaluation of Veins for Vascular Access

- Veins should be evaluated for access sites
- Veins should be adequate size to accommodate desired catheter (catheter to vein ration 45% or less)
- Vein should demonstrate patency
  - Compressibility
  - Color Doppler imaging
  - Lack of echogenic focus (long and short view)
- Appropriate access any structures blocking the needle/catheter
Central Line Placement

• Consent

• Risks, benefits, alternatives need to be discussed

• Common risks:
  – Placement failure, bleeding, infection, damage to tissues/structures, Thrombosis. Vessel stenosis, and failure of vessels for future use

• Alternatives
• Ultrasound guidance has become the standard of care

• Seldinger technique or a modified Seldinger technique frequently used

• Seldinger technique – a needle is used to enter the vein, a guide wire is advanced though the needle, needle removed and a central catheter is advanced. Some line use a peel away sheath

• Modified Seldinger technique – catheter over the needle (such as an standard IV) is used to enter the vein, a guide wire is advanced though the catheter, catheter removed and a central catheter is advanced. Some line use a peel away sheath
• Verification of line placement
• Clinical verification – does the line aspirate and flush easily, bright red or dark red blood
• Radiographic imaging for subclavian or internal jugular lines
• EKG or can be done for some PICC lines
• Femoral lines do not require abdominal x-ray
Central Venous Line Associated Bloodstream Infections

- Reportable event to CMS
- A CLABSI is a primary bloodstream infection (that is, there is no apparent infection at another site) that develops in a patient with a central line in place within the 48-hour period before onset of the bloodstream infection that is not related to infection at another site. Culturing the catheter tip or peripheral blood is not a criterion for CLABSI
Paracentesis

- Removal of peritoneal fluid from the abdominal pelvic cavity
- Diagnostic or therapeutic
- Therapeutic – for patient comfort decreased abdominal distension and bulk related symptoms due to tense ascites
- Diagnostic
- Can be used to characterize ascites and screen for infection
- Three main causes of ascites are cirrhosis, cardiac, malignancy
Contraindications/Considerations

- Small fluid pockets
- Coagulopathy (such as platelet count <50,000, or elevated INR)
- Distended urinary bladder or bowel
- Cellulitis or skin infection at proposed insertion site
- Pregnancy
- Acute abdomen that requires surgery
Diagnostic Paracentesis

• Serum-ascitic albumin gradient (SAAG).
  – Calculated by subtracting the albumin concentration of the ascitic fluid from the albumin concentration of a serum specimen obtained on the same day
  – SAAG level of 1.1 g/dL or greater indicates that ascites is due to portal hypertension

• Total protein
  – Protein level of 2.5 g/dL or greater suggests accumulation may be due to heart failure

• Fluid culture- historical low yield

• Cytology requires large volume

• Spontaneous bacterial peritonitis – A count of 250+ neutrophils
## Ascites Biochemical Analysis

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<tr>
<th>Type</th>
<th>SAAG &gt;1.1 g/dL</th>
<th>Ascites Protein &gt;2.5 g/dL</th>
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<tr>
<td>Cardiac</td>
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<td>High</td>
</tr>
<tr>
<td>Malignancy</td>
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Additional Tests

- Adenosine deaminase – increased in tuberculous ascites and peritoneal carcinomatosis
- Amylase – increased levels associated with acute pancreatitis and pancreatic pseudocyst
- Glucose – can be decreased with infection and malignancy
- Lactate dehydrogenase often low in cirrhotic and elevated in malignancy
Spontaneous Bacterial Peritonitis

- Defined by the presence of neutrophil cells greater than or equal to 250/μL or a positive bacterial culture in the ascitic fluid without evidence of an abdominal source
- RBC correction
- For every 250 RBC 1 PMN is reduced
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<th>Ref Range &amp; Units</th>
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**Fluid Type**

**Ref Range & Units**

**1 mo ago (6/8/21) Peritoneal**

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SBP Prophylaxis

- Active GI bleed in Cirrhotic – treat with 7 days of antibiotics
- History of SBP – should be on Prophylaxis
- Ascites with low protein and decompensated cirrhosis (childs-pugh score 9+), Bilirubin >3, renal dysfunction (BUN >25, CTR> 1.2, Na<130)
- Common agents Ciprofloxacin or Bactrim
Importance of Diagnostic Paracentesis

Large retrospective study of approximately 75,000 patients found that early paracentesis (within 24 hours of admission) was associated with reduced inpatient mortality. SBP related mortality and 30-day readmission.

Ultrasound Examination for Paracentesis

- Should have large anechoic (black) potion of image
- Fluid and structures move with respiration do you have a moving target, any critical structures near your target
- Ensure no blood vessels visible on ultrasound of abdominal wall for planned puncture,
- Often modified Seldinger technique is used for therapeutic paracentesis and the catheter over the needle has multiple side holes
- A needle can be used for diagnostic paracentesis
Large Volume Paracentesis

- Albumin is required if over 5 Liters is removed to reduce risks including post paracentesis circulatory dysfunction can result in renal impairment, HRS or even death
- 6-8 G of albumin per liter of ascites removed
- post paracentesis circulatory dysfunction risk increases with removal over 8 liters
Steps for a Paracentesis

• Obtain Consent
• Ultrasound examination/site marking
• Prep and drape site using sterile technique
• Administer local anesthesia
• Insert needle or catheter for paracentesis.
  – Advance slowly to minimize risk of bowel perforation
  – Realtime ultrasound guidance can be considered
• After collection of sample remove access set
Leaking Post Paracentesis

- Pressure dressings may not stop leaking
- Ostomy bag for fluid collection
- Management of diuretics to reduce ascites accumulation may help
- Skin glue such as Dermabond, blood patch or even suturing of the site may be needed
Thank You