

Confirm Indication	<ol style="list-style-type: none"> 1. Symptoms from abdominal distention (pain, dyspnea, or early satiety) 2. Intra-abdominal hypertension with AKI 				
Contraindications	<ol style="list-style-type: none"> 1. Absence of a safe pocket (>3cm in 3D) 2. Overlying skin infection <p>*Bowel obstruction – increased risk of perforation *Intraperitoneal adhesions – unlikely to evacuate all fluid *At risk of hepato-renal syndrome (e.g., AKI, GIB, sepsis, dehydration) *Increased risk of bleeding with full AC, INR>2 or Plt<50K. Consider smaller bore catheter.</p>				
Obtain Consent	<p>Explain in simple terms & confirm patient’s understanding</p> <table border="0"> <tr> <td>1. Procedural process</td> <td>3. Potential benefits</td> </tr> <tr> <td>2. Risks & techniques to mitigate them</td> <td>4. Risks of not performing & alternatives</td> </tr> </table>	1. Procedural process	3. Potential benefits	2. Risks & techniques to mitigate them	4. Risks of not performing & alternatives
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Positioning	Lying supine with HOB at 30-45 ⁰ , rotated 15-30 ⁰ toward proceduralist with cushioned support				
Ultrasound Confirmation of Safe Insertion Site	<p>Using low-frequency transducer at depth ≥8cm, scan the region roughly 3cm superior and 3cm medial to the anterior superior iliac spine to identify an accessible fluid pocket through the aponeurosis between the rectus abdominus and oblique muscle groups:</p> <ol style="list-style-type: none"> 1. Identify abdominal wall, peritoneum, liver/spleen, and bowel. 2. Measure distance (cm) from skin to peritoneum 3. Measure peritoneum to nearest intraperitoneal structures, confirming safe distance in all 3 dimensions. 4. Assess compressibility of the peritoneum and how closely the peritoneum approaches bowel. <p>Using a high-frequency transducer with color flow Doppler ultrasound confirm the absence of abdominal wall blood vessels at the targeted insertion site</p> <ol style="list-style-type: none"> 1. Slowly fan transducer to point tangential with the flow of blood, pause. 2. Slowly rotate transducer 90⁰, pause. <p>Mark insertion site with surgical pen or indentation.</p>				
Supplies	See reverse side for details				
Timeout	Confirm name, DOB, procedure, location, allergies				
Sterile Prep	<ol style="list-style-type: none"> 1. Apply chlorhexidine scrubbing for >30sec with circumference > drape aperture 2. Apply sterile drape with perforation over sterilized skin 				
Draw-up Lidocaine	<ol style="list-style-type: none"> 1. If lidocaine cap was previously removed, clean with EtOH swab. 2. Aspirate 5-10cc of lidocaine using appropriate needle/catheter not intended for use on the patient 				
Anesthetize Tract	Anesthetize the tract using a 22-25g needle and form a dermal ‘wheal’. If no fluid is aspirated, use a longer needle to continue advancing under negative pressure and anesthetizing tract, until ascitic fluid is aspirated. Pull needle back slightly and deposit ~2cc just superficial to peritoneum.				
Make Nick	Advance #11 blade to ~½ the width of blade along same trajectory as anesthetized tract				
Catheter Insertion	<ol style="list-style-type: none"> 1. Attach 5-10cc syringe to catheter hub, advance needle and catheter FIRMLY through skin nick 2. Apply pressure ONLY using syringe hand and use the other hand to guide catheter. Continuously apply negative pressure while advancing until fluid is aspirated. 3. Then advance an additional 0.5-1cm until the catheter (not just the needle) is in the peritoneum 4. Anchor arm holding syringe to maintain position of needle and advance catheter into peritoneum until hub is at the skin. Then remove needle. 				
Collect Sample	<u>If indicated</u> , connect 60cc syringe to side port and obtain >30cc of ascites to be sent for studies.				
Remove ascites	Attach long tubing to side port and hand the free end to non-sterile assistant. Once the free end is connected to the vacutainer and clamps are released, position stopcock to allow flow toward vacutainer. Once full, clamp IV tubing and connect another vacutainer, and unclamp, until desired volume is removed.				
Troubleshoot interrupted drainage	<ol style="list-style-type: none"> 1st: Stop negative pressure, and reposition abdomen. 2nd: Stop negative pressure and withdraw catheter to a depth with nearest perforation still 1-2cm deep to the peritoneum. Avoid re-advancing catheter at any point. 				

Supplies													
Items	Quantity												
Safe-T-Centesis or Thora/Para Kit (contents will vary by kit)	1												
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Ultrasound with high-frequency and low-frequency transducers	1												
Sterile Gloves	1-2/participant												
Mask and eye protection	1/participant												
Additional 30-60cc syringe for fluid collection (if indicated)													
Cap (optional)	1/participant												
Sterile Gown (optional)	1/participant												
	3 rd : Stop negative pressure, briskly flush side port with 5-10cc of sterile fluid.												
Catheter Extraction	Stop negative pressure, remove catheter, and apply pressure with gauze before placing band aid.												
Albumin Infusion	If high risk for AKI or > 5L are removed, order 50-100g of 25% albumin to be delivered by IV.												



Procedure video

All teaching resources



App fluid studies based on clinical concern:

- Is ascites due to portal hypertension? – serum and ascites albumin. If SAAG >1.1, then due to PHTN.
- Is ascites due to right heart failure? – A SAAG >1.1 and ascites Total Protein >2.5 suggests right heart failure
- Concern for SBP – cell count with differential and gram stain with reflexive culture
 - SBP = PMN >250 and single organism on culture
 - Culture negative neutrocytic ascites = PMN >250 and negative culture
 - Secondary bacterial peritonitis = PMN >250, polymicrobial, and 2/3 out of: TP >1, glucose <50 and LDH >ULN
 - *pH needs to be on ice and ideally a blood gas syringe
- Concern for chylous ascites – Triglycerides >200 mg/dL (occurs in 1/200 patient with cirrhosis in absence of cancer)
- Concern for pancreatic ascites – amylase >100units/L and SAAG <1.1
- Concern for malignancy – cytology (additional 30-60cc)

References

1. Sall, D., Wigger, G. W., Kinnear, B., Kelleher, M., Warm, E., & O'Toole, J. K. (2018). Paracentesis simulation: a comprehensive approach to procedural education. *MedEdPORTAL*, 14, 10747.
2. Barsuk JH, Cohen ER, Vozenilek JA, O'Connor LM, McGaghie WC, Wayne DB. Simulation-Based Education with Mastery Learning Improves Paracentesis Skills. *J Grad Med Educ*. 2012;4(1):23-27.
3. Cho, J., Jensen, T. P., Reiersen, K., Mathews, B. K., Bhagra, A., Franco-Sadud, R., ... & Soni, N. J. (2019). Recommendations on the use of ultrasound guidance for adult abdominal paracentesis: a position statement of the Society of Hospital Medicine. *Journal of hospital medicine*, 14, E7.
4. Biggins, S. W., Angeli, P., Garcia-Tsao, G., Ginès, P., Ling, S. C., Nadim, M. K., ... & Kim, W. R. (2021). Diagnosis, evaluation, and management of ascites, spontaneous bacterial peritonitis and hepatorenal syndrome: 2021 practice guidance by the American Association for the Study of Liver Diseases. *Hepatology*, 74(2), 1014-1048.