Common Hospitalist Procedures

Definition and Overview

Hospitalist procedures are invasive interventions performed or overseen by hospitalists to diagnose or treat inpatient conditions

- This guide focuses on central venous catheter (CVC) placement, lumbar puncture (LP), paracentesis, thoracentesis, and arterial line placement, providing brief descriptions of techniques, indications, and complications to optimize patient care and safety
- Prevalence: Hospitalists perform or supervise ~10-20 procedures per month per provider, with CVC placement (~30%), paracentesis (~25%), and LP (~20%) being most common
- Complications: occur in 5-15% of cases, varying by procedure
- Risk Factors: Coagulopathy, obesity, altered anatomy, operator inexperience, emergency settings

Common Procedures

Procedure	Indications	Technique	Complications	Notes
Central Venous Catheter (CVC)	Long-term IV access, vasopressors, TPN, dialysis	Ultrasound-guided, Seldinger technique, internal jugular/ subclavian/ femoral vein Sterile prep, 7-8 Fr catheter, secure with suture	Pneumothorax (1-3%), infection (5-10%), thrombosis (2-5%), arterial puncture (1%)	IJ preferred; confirm placement with CXR
Lumbar Puncture (LP)	CNS infection, SAH, pseudotumor cerebri	L3-L4/L4-L5 interspace, sitting/ lateral position, 22G needle, collect 10-20 mL CSF Measure opening pressure	Post-LP headache (10-30%), spinal hematoma (<1%), infection (<1%)	INR <1.5, platelets >50K; avoid if increased ICP
Paracentesis	Tense ascites, SBP diagnosis	Ultrasound-guided, RLQ/LLQ, 16-18G needle/ catheter, drain 4-6 L Albumin 6-8 g/L removed	Bleeding (1-2%), infection (1%), bowel perforation (<1%)	Diagnostic tap for PMN >250; large-volume needs albumin

Procedure	Indications	Technique	Complications	Notes
Thoracentesis	Pleural effusion, diagnostic/ therapeutic	Ultrasound-guided, mid-scapular line, 7th-8th interspace, 16-18G catheter, drain <1.5 L	Pneumothorax (2-5%), bleeding (1%), re-expansion edema (<1%)	Drain slowly; CXR post-procedure if air suspected
Arterial Line	Continuous BP monitoring, frequent ABGs	Radial artery (preferred), 20G catheter, ultrasound-guided, Seldinger technique Secure, flush with saline	Thrombosis (5-10%), infection (1-2%), hematoma (1%)	Allen's test optional; monitor distal perfusion

Labs and Studies

Labs

- CBC Platelets <50K (bleeding risk), leukocytosis (infection)
- Coagulation INR >1.5, aPTT (coagulopathy)
- CMP Cr (CVC, contrast), electrolytes (arrhythmias)
- Advanced
    - D-dimer (CVC thrombosis), CSF analysis (LP, meningitis)

Imaging

- Ultrasound:Guide CVC, paracentesis, thoracentesis; confirm anatomy
- CXR :Post-CVC/thoracentesis (pneumothorax), post-LP (hematoma)
- CT: Head Pre-LP (rule out mass effect), post-LP (hematoma)
- Advanced
    - Doppler US (CVC thrombosis), CT chest (thoracentesis, malignancy)

Other

- Blood Cultures: Pre-CVC (rule out bacteremia)
- Pleural Fluid Analysis Post-thoracentesis (LDH, protein)
- Advanced:
    - Opening pressure (LP, pseudotumor), arterial waveform (line patency)

Management Strategies

General Principles

- Ensure sterile technique, ultrasound guidance, and informed consent to minimize complications
- Reverse coagulopathy (e.g., FFP for INR >1.5) and monitor post-procedure

Supportive Care

- Sterility Full barrier precautions (CVC, LP)
- Analgesia Lidocaine 1% local, morphine 2 mg IV PRN (paracentesis, thoracentesis)
- Monitoring Vitals q15min x 1h post-procedure, site inspection q4h

Specific Techniques

- CVC Ultrasound, Seldinger, confirm with CXR
- LP Landmark L3-L4, measure opening pressure, supine 1-2h post
- Paracentesis Ultrasound, drain <6 L, albumin infusion
- Thoracentesis Ultrasound, limit 1.5 L, CXR if dyspnea
- Arterial Line Radial, ultrasound, secure with suture

Complication Management

- Pneumothorax Chest tube (thoracentesis, CVC)
- Bleeding Pressure, FFP, surgical consult
- Infection Antibiotics (vancomycin 15 mg/kg IV), remove device

Monitoring

- CXR Post-CVC/thoracentesis, q24h if infection suspected
- CBC/CMP q24h (bleeding, renal function)
- Site checks q4h (erythema, thrombosis)

Complications

Acute

- Pneumothorax 1-5% (CVC, thoracentesis), chest pain, hypoxia
- Bleeding 1-3% (all), hematoma, hypotension
- Infection 1-10% (CVC, LP), sepsis, abscess

Long-Term

- Thrombosis 2-10% (CVC, arterial line), embolism risk
- Chronic Pain Post-LP headache (10-30%), neuropathic pain
- Rare
    - Nerve injury (LP, <1%), bowel perforation (paracentesis, <1%), limb ischemia (arterial line)

Clinical Scenarios

Case 1 Central Venous Catheter Placement

- Presentation: 60 y/o M with sepsis, poor peripheral access
- Vitals: BP 90/60, HR 110, SpO2 94%, RR 20
- Exam: Tachycardic, dehydrated
- Labs/Studies: INR 1.2, platelets 150K, Cr 1.5 mg/dL, Blood cultures pending
- Interpretation: Need for vasopressors, CVC indicated
- Management: Ultrasound-guided IJ CVC, sterile technique, CXR confirms placement, Norepinephrine via CVC.No complications, stable by day 3

Case 2 Lumbar Puncture

- Presentation: 45 y/o F with fever, headache, neck stiffness
- Vitals: BP 130/80, HR 100, SpO2 96%, RR 18
- Exam: Nuchal rigidity
- Labs/Studies: INR 1.0, platelets 200K, WBC 15K, CT Head Normal
- Interpretation: Suspected meningitis, LP indicated
- Management: L4-L5 LP, 22G needle, CSF cloudy (PMN 1000), Ceftriaxone 2 g IV q12h, Post-LP headache, resolves with hydration

Case 3 Paracentesis

- Presentation: 55 y/o M with cirrhosis, tense ascites, dyspnea
- Vitals: BP 110/70, HR 90, SpO2 92%, RR 20
- Exam: Fluid wave
- Labs/Studies: INR 1.8, platelets 80K, albumin 2.5 g/dL, US Large ascites
- Interpretation: Symptomatic ascites, diagnostic/therapeutic paracentesis
- Management: Ultrasound-guided RLQ paracentesis, 5 L drained, albumin 8 g/L, PMN 300, ceftriaxone started, No bleeding, dyspnea improves

Expert Tips

- Use ultrasound for CVC, paracentesis, thoracentesis; reduces complications by 50%
- Check INR (<1.5), platelets (>50K) before LP, paracentesis; reverse with FFP
- Limit thoracentesis to 1.5 L to avoid re-expansion edema
- Confirm CVC placement with CXR; IJ site lowers pneumothorax risk
- Monitor arterial line site q4h; remove if distal ischemia
- Pitfall
    - Missing pneumothorax; CXR post-thoracentesis if dyspnea
- Advanced
    - Doppler for arterial line thrombosis; fluoroscopy for difficult CVC

Key Pearls

Ultrasound guidance is standard for CVC, paracentesis, thoracentesis

LP requires INR <1.5, CT Head if focal neuro signs

Paracentesis needs albumin for >5 L; diagnostic tap for SBP

Thoracentesis limits 1.5 L; CXR if air suspected

Arterial line in radial artery; monitor perfusion, thrombosis

References

UpToDate “Hospitalist Procedures: Techniques and Complications” (2025)

NEJM “Central Venous Catheter Placement” (2024)

Chest “Thoracentesis: Best Practices” (2024)

Gastroenterology “Paracentesis in Cirrhosis” (2023)

Crit Care Med “Arterial Line Management” (2024)

Visit medcheatsheets.com for more education, fun resources and 10 category 1 AAPA CME credit!