

## **Preprocedure ultrasonography**

Preprocedure ultrasound scanning of the spine may be useful in identifying the intervertebral space for needle placement and an estimation of the depth required to reach the epidural space. Ultrasound can be particularly useful in patients with obesity or patients with altered anatomy in whom the traditional surface landmarks are vague or difficult to identify.

# septic technique

Strict aseptic technique is required for all aspects of the spinal anesthesia procedure. In 2017, the ASA published a Practice Advisory for the Prevention, Diagnosis, and Management of Infectious Complications Associated with Neuraxial Techniques [16]. We agree with the critical components of the Practice Advisory, including the following:

- The clinician should:
  - Wear a cap and mask, covering mouth and nose.
  - Remove jewelry, including rings and watches.
  - Wash hands prior to the procedure.
  - Wear sterile gloves.
- The skin of the patient's back should be:
  - Widely cleaned using individual antiseptic packets of chlorhexidine, preferably with alcohol, allowing adequate time for the solution to dry, according to the antiseptic package insert. The skin prep solution should be discarded before opening the spinal tray and preparing the drug solutions.

Contamination of equipment with the prep solution must be avoided to prevent introduction of neurotoxic solution into the subarachnoid space. (See "Lumbar puncture: Technique, indications, contraindications, and complications in adults", section on 'Aseptic technique'.)

- Draped with a sterile drape.

At the author's institution, additional precautions include:

- Change masks between cases
- In addition to removing jewelry, remove false fingernails
- Wash hands with alcohol solution or perform surgical scrub
- All providers in the immediate environment wear a cap and mask
- The patient wears a cap
- Clean the tops of nonsterile drug ampules with alcohol or chlorhexidine

## **“Spinal/Epidural hematoma”**

Epidural or spinal hematomas may occur in patients who are anticoagulated with LMWHs or heparinoids and are receiving neuraxial anesthesia or undergoing spinal puncture. These hematomas may result in long-term or permanent paralysis. Consider these risks when scheduling patients for spinal procedures.

Factors that can increase the risk of developing epidural or spinal hematomas in these patients include use of indwelling epidural catheters; concomitant use of other drugs that affect hemostasis, such as nonsteroidal anti-inflammatory drugs (NSAIDs), platelet inhibitors, and other anticoagulants; a history of traumatic or repeated epidural or spinal punctures; and a history of spinal deformity or spinal surgery. Optimal timing between the administration of enoxaparin and neuraxial procedures is not known.

Monitor patients frequently for signs and symptoms of neurological impairment. If neurological compromise is noted, urgent treatment is necessary.

Consider the benefits and risks before neuraxial intervention in patients anticoagulated or to be anticoagulated for thromboprophylaxis.