

# Epidural Anaesthesia

Epidural anesthesia is a method based on application of local anesthetic into the epidural space. It is a type of local neuraxial blockade.

## Anatomy

Epidural space (= extradural space) is localized in the spine canal between the ligamenta flava and the dura mater. It contains loose connective tissue. The pressure in the epidural space is lower than atmospheric pressure (will be useful). The epidural space is 3-5 mm wide and has no horizontal borders – epidural anesthesia works where it is applied.

## Performance

Epidural anesthesia can be performed anywhere in the entire length of the spine. The patient lies on their side, we start with disinfection of the skin and application of a small dose of local anesthetic into the skin. After the local anesthetic starts working, we can insert a Tuohy needle (it has a slightly curved end, is used for epidural catheter insertion). It is difficult to recognize the epidural space, there are two techniques of insertion<sup>[1]</sup>:

- **Loss of resistance technique** – the needle is connected with a special syringe filled with saline solution, while we are inserting the needle, we are continuously pushing on the piston of the syringe, there is a loss of resistance.
- **Hanging drop technique** – there is a drop of saline solution hanging in the external end of the needle, when we reach the epidural space, the drop is sucked into the needle (there is lower pressure in the epidural space!).

Then we can insert the catheter and remove the needle. There is a possibility of single-shot application.<sup>[1]</sup>

## Effects

- local anesthesia
- motor blockade
- sympathetic blockade

Range (number of dermatomes) of epidural anesthesia is determined by its localization and amount of local anesthetic (1.5–2 ml for 1 dermatome). Intensity of epidural anesthesia is determined by the concentration of local anesthetic:

- low concentration – local anesthesia (sensitive fibers – are on the surface),
- higher concentration – motor block (motor fibers – are deep inside).<sup>[1]</sup>

## Indications and Types

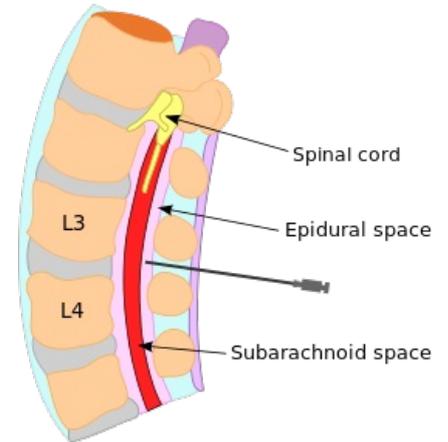
General indications are:

- perioperative analgesia,
- postoperative analgesia,
- chronic pain management.<sup>[2]</sup>

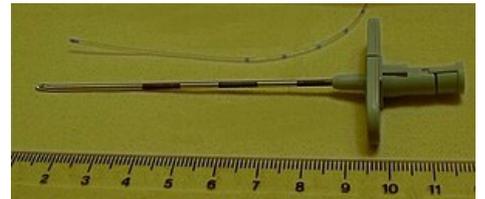
## Types

- **Lumbar** epidural – (L2–5) lower extremity operation, inguinal hernias, cesarean section and childbirth.<sup>[2]</sup>
- **Thoracic** epidural – lower thoracic level (Th7–12) – laparotomy, cholecystectomy, or upper thoracic levels (Th1–7) for postoperative analgesia of thoracotomy, sternotomy. Performed only with catheter.<sup>[2]</sup>
- **Cervical** epidural – C6–C7 or C7–Th1 level, carotid endarterectomy, strumectomy and hand surgery.<sup>[2]</sup>

## Complications



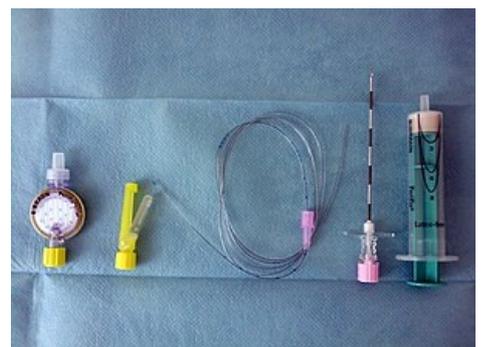
Localization of epidural.



Tuohy needle.



Tuohy needle detail of the tip.



Set for epidural catheterization: philter, catheter, Tuohy needle and syringe.

Complications are more frequent than in spinal anaesthesia. Higher risk of complications is in pregnant women because of swelling of tissues caused by progesterone, epidural space is thinner.

- postpuncture headache - if the subarachnoid space and dura mater is violated,
- bleeding,
- infection,
- spinal haematoma formation is very dangerous and needs acute surgery,
- anaphylactic or toxic reaction to the anaesthetic.

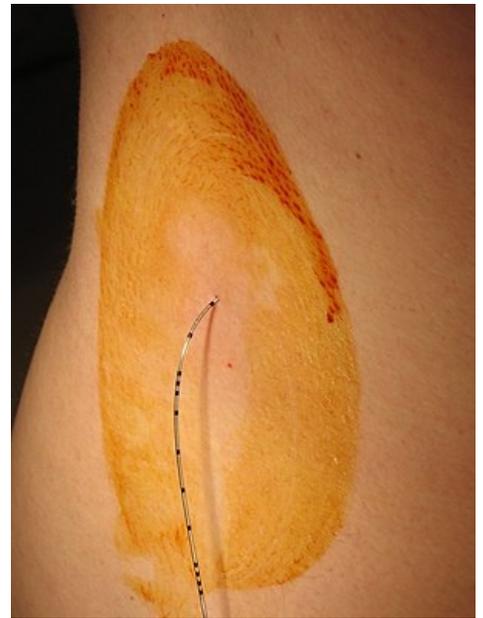
## Links

### Related Articles

- Spinal Anaesthesia

### References

1. MÁLEK, J - DVOŘÁK, A, et al. *Základy anesteziologie*. 1. edition. Praha. 2009.
2. MICHÁLEK, Pavel. *Regionální anestezie* [lecture for subject Anesteziologie, specialization General Medicine, 1. LF UK Charles University in Prague]. Prague. 2012. Available from <<http://www.karim-vfn.cz/userfiles/download/003-regionalnianestezie-1317888703.pdf>>.



Epidural catheter.