Complications

Nebras abu-abed
Complications of epidural and spinal anesthesia range from mild to life-threatening...

Complications can be secondary to excessive physiological effects of appropriately injected drug, injury from needle or catheter placement and systemic toxicity.
Excessive response

1) High neural block. Is an exaggerated dermatomal spread of neural block. Patients may complain of dyspnea and have numbness or weakness in upper extremities.

*Spinal anesthesia ascending into the cervical levels causes severe hypotension, bradycardia, and respiratory insufficiency.*
High spinal and total spinal...
Apnea is more often the result of severe sustained hypotension and medullary hypoperfusion than a response to phrenic nerve paralysis from anesthesia of C3–C5 roots.

MAY LEAD TO CARDIAC ARREST!

Exact pathophysiology explained in book p.1637
Treatment of an excessively high neuraxial block involves maintaining adequate arterial oxygenation and ventilation and supporting the circulation. When respiratory insufficiency becomes evident, in addition to supplemental oxygen and assisted ventilation, intubation and mechanical ventilation may be necessary. Hypotension can be treated with intravenous vasopressors and rapid administration of intravenous fluids. Bradycardia can be treated early with atropine. Ephedrine or epinephrine can also increase heart rate and arterial blood pressure.
2) Urinary Retention
Local anesthetic block of S2–S4 root fibers decreases urinary bladder tone and inhibits the voiding reflex.
If no urinary catheter is placed perioperatively, it is prudent to use the regional anesthetic of shortest duration sufficient for the surgical procedure and to administer the minimal safe volume of intravenous fluid.
Needle or cath insertion

1) Inadequate anesthesia or analgesia
Movement of needle during injection, incomplete entry of needle, insufficient dose are all examples.
2) Intravascular injection
Accidental intravascular injection of the local anesthetic for epidural and caudal anesthesia can produce very high serum drug levels, which may affect the central nervous system (seizure and unconsciousness) and the cardiovascular system (hypotension, arrhythmias, and depressed contractility).

Because the dosage of medication for spinal anesthesia is relatively small, this complication is seen after epidural and caudal (but not spinal) block.
The incidence of intravascular injection can be minimized by carefully aspirating the needle (or catheter) before every injection, using a test dose, always injecting local anesthetic in incremental doses, and close observation for early signs of intravascular injection (tinnitus, lingual sensations).

Advanced cardiac life support should be initiated if cardiac arrest occurs. Lipid emulsion, 20% 1.5 mL/kg bolus, should be given followed by a 0.25-mL/kg infusion. Incremental 1 mcg/kg doses of epinephrine should be administered.
Local anesthetics vary in their propensity to produce severe cardiac toxicity. The rank order of local anesthetic potency at producing seizures and cardiac toxicity is the same as the rank order for potency at nerve blocks.

Chloroprocaine has relatively low potency; lidocaine and mepivacaine are intermediate in potency and toxicity; levobupivacaine, ropivacaine, bupivacaine, and tetracaine are most potent and toxic.
3) Total spinal anesthesia

Total spinal anesthesia can occur following attempted epidural or caudal anesthesia if there is accidental intrathecal injection. Onset is usually rapid, because the amount of anesthetic required for epidural and caudal anesthesia is 5 to 10 times that required for spinal anesthesia. Careful aspiration, use of a test dose, and incremental injection techniques (remember, “every dose is a test dose”) during epidural and caudal anesthesia can help avoid this complication.
4) Subdural Injection

Because of the larger amount of local anesthetic administered, accidental subdural injection of local anesthetic during attempted epidural anesthesia is much more serious than during attempted spinal anesthesia. A subdural injection of epidural doses of local anesthetic produces a clinical presentation similar to that of high spinal anesthesia, with the exception that the onset may be delayed for 15 to 30 min and the block may be “patchy.” The spinal subdural space is a potential space between the dura and the arachnoid that extends intracranially, so that anesthetic injected into the spinal subdural space can ascend to higher levels than epidural medications. As with high spinal anesthesia, treatment is supportive and may require intubation, mechanical ventilation, and cardiovascular support. The effects generally last from one to several hours.
5) Backache
As a needle passes through skin, subcutaneous tissues, muscle, and ligaments it causes varying degrees of tissue trauma. Bruising and a localized inflammatory response with or without reflex muscle spasm may be responsible for postoperative backache. Mild and self-limited.
6) Postdural puncture headache.
Any breach of the dura may result in a postdural puncture headache (PDPH).
Typically, PDPH is bilateral, frontal or retroorbital, or occipital and extends into the neck. It may be throbbing or constant and associated with photophobia and nausea.
The hallmark of PDPH is its association with body position. The pain is aggravated by sitting or standing and relieved or decreased by lying down flat. The onset of headache is usually 12 to 72 h following the procedure; however, it may be seen almost immediately.
A dural defect leads to leak of CSF with subsequent intracranial hypotension. Associated with use of large needle size, young age, female sex and pregnancy.

Conservative treatment involves recumbent positioning, analgesics, intravenous or oral fluid administration, and caffeine. Keeping the patient supine will decrease the hydrostatic pressure driving fluid out of the dural hole and minimize the headache. Analgesic medication may range from acetaminophen to NSAIDs and opioids. Hydration and caffeine work to stimulate production of CSF.
7) Neurological injury
Direct injection into the spinal cord can cause paraplegia.
Any sustained paresthesia during neuraxial anesthesia/analgesia should alert the clinician to redirect the needle. Injections should be immediately stopped and the needle withdrawn, if injection is associated with pain.
8) Spinal or epidural hematoma

Needle or catheter trauma to epidural veins often causes minor bleeding in the spinal canal, usually have no consequences.

Both insertion and removal of an epidural catheter can lead to epidural hematoma formation. Most have coagulation disorders.

**Symptoms** include sharp back and leg pain with a motor weakness or sphincter dysfunction, or both.

When hematoma is suspected, imaging (magnetic resonance [MR] or computed tomography [CT]) and neurosurgical consultation.
9) Meningitis and Arachnoiditis

Infection of the subarachnoid space can follow neuraxial blocks as the result of contamination of the equipment or injected solutions, or as a result of organisms tracked in from the skin. Indwelling catheters may become colonized with skin organisms.