An injection of an anaesthetic or analgesic into the epidural space of the spinal cord resulting in regional anesthesia or analgesia.

**General use:**
- Surgical anaesthesia and post-operative analgesia
  - Thoracic / Abdo / Pelvic / Lower limb surgery
- Obstetrics
- Chronic pain

**Relevant anatomy:**
- Consent
- Preparation + position
- Asepsis
- Level (middle of surgical incision)
- Local anaesthetic
- Loss of resistance
- Thread catheter
- Position catheter
- Secure
- Test dose
- Bolus / Infusion

**Drugs:**
- Opioid
  - Fentanyl
  - Diamorphine
  - Morphine
- Supplemental analgesia
  - Local anaesthetic
  - Lignocaine
  - Bupivicaine
  - Ropivicaine
- Neural Blockade [Motor, Sensory, Autonomic]

**Side effects:**
- Local anaesthetic side effects
  - Motor block
  - Respiratory failure
- Sensory block
  - Thermal / Pressure injury
- Proprioception loss
  - Unsteadiness
- Autonomic blockade
  - CVS
  - Hypotension (hypovolaemia)
  - Bradycardia
- Visceral dysfunction
- Opioid side effects
  - Respiratory depression
  - Pruritus
  - Nausea / Vomiting

**Complications:**
- Potential benefits
- Analgesic benefits
- Physiological benefits

**System**
- **CVS**
  - Improved myocardial O2 supply-demand, reduced SVR
  - Reduced BP
  - Reduced myocardial ischaemia
  - Reduced blood loss
- **Coag**
  - Improved blood flow, reduced platelet stickiness, less inhibition of fibrinolysis
  - Reduced venous thrombogenesis
  - Improved graft outcome
- **Resp**
  - Improved lung mechanics (increased compliance), less diaphragmatic dysfunction
  - Improved oxygenation
  - Earlier extubation
  - Fewer pulmonary infections
- **GI**
  - Increased motility, improved blood flow
  - Earlier return of bowel function

**Stress response**
- Reduced / Abolishes neuroendocrine response to stress

**Management**
- **Failure of analgesia**
  - Assess block
    - Motor
    - Sensory
    - Autonomic
    - Unilateral/Patchy/Torso low/No block
  - Check site
  - Give top up
  - Opioid or local anaesthetic
  - Withdraw catheter
  - Consider subdural catheter
  - Reassess epidural
- **High block**
  - Subarachnoid block: Slow onset, inappropriately extensive, Horner’s syndrome, patchy, asymmetrical, motor sparing, risk of total spinal
  - Subdural block: Slow onset, appropriately extensive, Horner’s syndrome, patchy, asymmetrical, motor sparing, risk of total spinal
- **Local anaesthetic toxicity**
  - Stop / reduce rate
  - Do not lie patient flat
  - Treat side effects
  - either due to a cumulative effect or direct intravascular injection
  - Presentation
    - Perioral tingling, slurred speech, tinnitus
    - Ataxia, unconsciousness, confusion, coma
    - Amnesia, CVS collapse, respiratory arrest
- **Respiratory depression**
  - Pruritus
  - Vomiting
  - Treatment options include:
    - Naloxone
    - Ondansetron
    - Antihistamines
  - Treatment options for hypotension include:
    - Check fluid status
    - Relative hypovolaemia
    - Raise legs
    - Fluid
    - Ephedrine
    - Reduce infusion rate
  - **Opioid side effects**
    - Respiratory depression
    - Pruritus
    - Nausea / Vomiting
    - Treatment options include:
      - Naloxone
      - Ondansetron
      - Antihistamines

**Total Spinal occurs in 1:5000 - 50000. It is characterised by:**
- Difficulty coughing / breathing
- Weak arms
- Difficulty swallowing
- Cardiac/respiratory collapse

**Management:**
- Reassurance
- Analgesia
- Blood patch

**Key points:**
- High index of suspicion with:
  - Abnormal neurology
  - Unexpectedly dense block
  - Anticoagulation
  - Difficult insertion

**Potential benefits:**
- Analgesic benefits
- Physiological benefits

**System effects of epidural**
- **CVS**
  - Improved myocardial O2 supply-demand, reduced SVR
  - Reduced BP
  - Reduced myocardial ischaemia
  - Reduced blood loss
- **Coag**
  - Improved blood flow, reduced platelet stickiness, less inhibition of fibrinolysis
  - Reduced venous thrombogenesis
  - Improved graft outcome
- **Resp**
  - Improved lung mechanics (increased compliance), less diaphragmatic dysfunction
  - Improved oxygenation
  - Earlier extubation
  - Fewer pulmonary infections
- **GI**
  - Increased motility, improved blood flow
  - Earlier return of bowel function

**Stress response**
- Reduced / Abolishes neuroendocrine response to stress

**Management:**
- **Failure of analgesia**
  - Assess block
    - Motor
    - Sensory
    - Autonomic
    - Unilateral/Patchy/Torso low/No block
  - Check site
  - Give top up
  - Opioid or local anaesthetic
  - Withdraw catheter
  - Consider subdural catheter
  - Reassess epidural
- **High block**
  - Subarachnoid block: Slow onset, inappropriately extensive, Horner’s syndrome, patchy, asymmetrical, motor sparing, risk of total spinal
  - Subdural block: Slow onset, appropriately extensive, Horner’s syndrome, patchy, asymmetrical, motor sparing, risk of total spinal
- **Local anaesthetic toxicity**
  - Stop / reduce rate
  - Do not lie patient flat
  - Treat side effects
  - either due to a cumulative effect or direct intravascular injection
  - Presentation
    - Perioral tingling, slurred speech, tinnitus
    - Ataxia, unconsciousness, confusion, coma
    - Amnesia, CVS collapse, respiratory arrest
- **Respiratory depression**
  - Pruritus
  - Vomiting
  - Treatment options include:
    - Naloxone
    - Ondansetron
    - Antihistamines
  - Treatment options for hypotension include:
    - Check fluid status
    - Relative hypovolaemia
    - Raise legs
    - Fluid
    - Ephedrine
    - Reduce infusion rate
  - **Opioid side effects**
    - Respiratory depression
    - Pruritus
    - Nausea / Vomiting
    - Treatment options include:
      - Naloxone
      - Ondansetron
      - Antihistamines

**Total Spinal occurs in 1:5000 - 50000. It is characterised by:**
- Difficulty coughing / breathing
- Weak arms
- Difficulty swallowing
- Cardiac/respiratory collapse

**Management:**
- Reassurance
- Analgesia
- Blood patch

**Key points:**
- High index of suspicion with:
  - Abnormal neurology
  - Unexpectedly dense block
  - Anticoagulation
  - Difficult insertion