2 NEURAXIAL BLOCKADE

2.9 EPIDURAL COMPLICATIONS

KEY WORDS
Complications, treatment, hypotension, local anaesthetic toxicity, high block, inadvertent subarachnoid opioid, haematoma, neurological, spinal cord

It is vitally important that the major, potentially life-threatening complications of epidural techniques are promptly recognised, and appropriate resuscitation and management instituted.

HYPOTENSION
Not uncommon (5 to 10% after the initial dose). May lead to reduced uteroplacental perfusion and fetal hypoxaemia, depending on its severity, duration and current fetal condition.

PREVENTION
- Avoid aortocaval compression - position women in the left lateral.
- Slow institution of epidural block.
- Fluid preloading is not required routinely.

TREATMENT
- Stop top-up or epidural infusion.
- Call for assistance and notify anaesthetist.
- Give intravenous fluid boluses.
- Elevate legs (do not lower head).
- Place the woman in the left lateral position.
- Administer oxygen via Hudson mask 6-8L/min.
- Prepare vasopressors if no response to above measures.
  Drug of choice Ephedrine 30mg diluted to 10ml with Sodium chloride 0.9% given in 6mg increments (i.e. 2mL).
- Maternal observations 2 minutely/continuous fetal heart rate if in labour.
LOCAL ANAESTHETIC TOXICITY

The cause is usually an inadvertent intravascular injection with immediate signs and symptoms, rarely cumulative.
The incidence is approximately 1 in 2,500.

PREVENTATIVE MEASURES

- Gently aspirate the epidural catheter before injecting (observing for blood, which is NOT always, obvious).
- Give the dose in increments 2 to 3mL at a time over 3 to 5 minutes.
- Maintain verbal communication with the woman to detect early signs of toxicity (see below).
- If you suspect intravenous injection STOP immediately.
- Notify the anaesthetist.
- No further top-ups should be given until it is established where the catheter is situated.

SIGNS AND SYMPTOMS

Initial toxic plasma levels

- Light headedness
- Drowsiness
- Restlessness
- Tinnitus (ringing in ears)
- Circumoral tingling (around lips/mouth)
- Metallic taste in the mouth
- Sometimes thumping in the chest

If undetected can lead to higher toxic levels

- Convulsions
- Hypoventilation
- Arrhythmias
- Hypotension
- Tachycardia
- Respiratory and cardiac arrest

TREATMENT

- Call code blue - medical emergency.
- Place the woman in the left lateral position.
- Administer oxygen via Hudson mask 6 to 8L/min, support airway and ventilate with bag and mask as required.
- Increase intravenous fluids.
- Terminate convulsions – thiopentone 50mg: midazolam 2.5-5mg, suxamethonium 1.5mg/kg and intubation using cricoid pressure if persisting or cardiovascular toxicity.
- Assess fetal wellbeing once the woman has been resuscitated.
HIGH BLOCK (EPIDURAL, SUBDURAL OR SPINAL ANAESTHESIA)

The incidence of this is about 1 in 2,500, with intervention required in 1 in 5500. This may result from local anaesthetic drugs entering cerebrospinal fluid (CSF) at higher levels than desired due to:

- migration of subdural or epidural catheter into the intrathecal space
- accidental dural puncture
- multicompartamental catheter
- accidental overdose

PREVENTION

- Use the correct top-up technique:
  - Aspirate at filter observing for CSF
  - Administer a test dose
  - Then give the required dose in increments of 2 to 3ml over 3 to 5 minutes
- Be aware of unusually fast pain relief as a response to the top-up
- Maintain verbal communication to allow for early detection
- If you suspect the catheter is not in the epidural space stop the top-up and summon help immediately.

SIGNS AND SYMPTOMS

May be slow or rapid onset over 1 to 30 minutes presenting as:

- ascending sensory and motor block (rising numbness from legs to chest, arms, neck and face)
- dyspnoea
- inability to swallow and talk
- progressing to apnoea
- sedation leading to loss of consciousness
- severe hypotension and bradycardia.

TREATMENT

- Stop the top-up
- Call code blue - medical emergency
- Place the woman flat in the left lateral position.
- Administer oxygen via Hudson mask 6 to 8L/min, support airway and ventilate with bag and mask as required
- Support circulation with intravenous fluid and ephedrine as required.
- Early intubation using cricoid pressure; intermittent positive pressure/sedation awaiting resolution in one to three hours.
- Assess fetal well being.
INADVERTENT SUB-ARACNOID OPIOID

Accidental administration of epidural opioid into the CSF may lead to rapid spread to the brainstem.

PREVENTION

- Use the correct top-up technique:
  - Aspirate at filter observing for CSF
  - Administer a test dose
  - Then give the required dose in increments of 2 to 3mL over 3 to 5 minutes
- Be aware of unusually fast pain relief as a response to the top-up
- Maintain verbal communication to allow for early detection
- If you suspect the catheter is not in the epidural space stop the top-up and summon help immediately.

Note. It may not be until after commencing the top-up that it is obvious a subarachnoid injection has occurred despite the absence of CSF at the initial aspiration prior to administration.

SIGNS AND SYMPTOMS

- Nausea – vomiting
- Severe itch
- Drowsiness progressing to coma
- Bradypnoea progressing to apnoea

TREATMENT

- Stop the top-up
- Call code blue - medical emergency
- Naloxone 400microgram intravenously repeated as required (intramuscular injection may be necessary if intravenous access is not available). A naloxone infusion may be required especially if morphine has been used – due to the long duration of action.
- Place the woman flat in the left lateral position.
- Administer oxygen via Hudson mask 6 to 8L/min, support airway and ventilate with bag and mask as required
- Increase intravenous fluids
- Transfer to high dependency unit until the woman has recovered.
EPIDURAL HAEMATOMA

Epidural haematoma refers to bleeding or a blood clot in the epidural space. Although this is a very rare condition, it is particularly serious as the pressure effects of the haematoma can lead to compression and/or ischaemia of the spinal cord and subsequent paralysis. This condition may arise spontaneously, especially in anti-coagulated patients or those with a bleeding disorder and very rarely in association with epidural or spinal anaesthesia. Epidural haematoma may be very difficult to diagnose following regional block or in the presence of an epidural infusion, because the signs and symptoms can either be masked or ascribed to the effects of the epidural block or infusion. It is thus crucial to have patients with the following signs and symptoms immediately assessed by medical staff.

PREVENTION

Know the coagulation status of your patient (platelets should be 75,000 or more prior to insertion or removal of the epidural catheter). Platelets lower than 100,000 – consult anaesthetic registrar on 3225 prior to removal.

Know if and when an anticoagulant has been administered.

As a general guide:

- **Low Molecular Weight Heparin (LMWH)**
  Removal of the epidural catheter occurs at least 12 hours after the last dose of LMWH at prophylactic dosing level. After removal the next dose of LMWH should not be given for at least 4 hours.

- **Unfractionated heparin**
  Removal of the epidural catheter occurs at least 6 hours after the last dose of unfractionated heparin. After removal, the next dose should not be given for at least 2 hours.

- **For doses of LMWH or unfractionated heparin higher than normal**
  Removal should be discussed with the anaesthetic registrar for further instruction.

Epidural insertion site should be checked immediately prior to administration of anticoagulant observing for:

- a dislodged catheter
- dressing intact
- any fluid leaking
- signs that the epidural will fall out in the “unsafe” period.

If there are signs that the epidural catheter will fall out / require removal, do so prior to administering heparin and withhold the dose until it is safe to administer (see above).

SYMPTOMS AND SIGNS:

- **Severe back pain**
  This is most commonly in the region of the epidural site but may occur in the buttocks or radiate into the legs. Tenderness at the epidural site may also be present.

- **Any severe or prolonged motor block or new sensory block**
  Motor or sensory block that appears either prolonged or excessive with respect to the original regional procedure or subsequent epidural infusions or bolus doses, may be due to the pressure effects of an epidural haematoma.

- **Faecal or urinary incontinence**

- **Paraplegia (Late sign)**
TREATMENT
If an epidural haematoma is suspected the Anaesthetic Department must be notified as early as possible by paging the duty anaesthetic consultant or registrar (page 3225).
The diagnosis is confirmed by computerised tomography scan or magnetic resonance imaging which requires transfer to another hospital and neurological review that could cause delay.
Early diagnosis and treatment are vital and the epidural haematoma needs to be surgically evacuated within 8 hours to avoid permanent cord damage.

SUMMARY:
An epidural haematoma is extremely rare but often leads to paraplegia because diagnosis and treatment are too late. A high index of suspicion is needed and any sensory or motor block that is more severe or prolonged than would normally be expected, needs to be referred to the Anaesthetic Department immediately.

NEUROLOGICAL & SPINAL CORD INJURY
This is a very rare complication despite being the most commonly feared by women.
For labour the epidural is inserted at lumbar spine 2-3 or lumbar spine 3-4 which is below where the spinal cord ends (lumbar spine 1-2 in most adults).
Damage to the cauda equina is rare but can cause nerve damage.
Contact with nerve roots on insertion of the spinal needle usually causes a sudden “electric shock” down one leg, which last seconds.
Most cases of altered sensation/nerve damage resolve within three months. Some may be long term.

CAUSES
- Trauma
- Haematoma
- Abscess
- Meningitis
- Neurotoxic drug
- Ischaemia
- In obstetrics and gynaecology can also be due to:
  - Pregnancy
  - Length of time a women is in labour
  - Instrumental birth
  - Multiple birth
  - Use of stirrups
  - Caesarean section

MANAGEMENT
- Notify anaesthetist of any new or prolonged altered sensation immediately
- Neurological observations hourly or more frequently if required or concerned
- Neurological consult to be done by anaesthetist and appropriate follow up
- All women with altered sensation must be followed up in the high-risk anaesthetic clinic 2 to 6 weeks after discharge
ACCIDENTAL DURAL PUNCTURE

An unintentional puncture of the dura by an epidural needle or an intentional puncture with a spinal needle can both lead to a leakage of CSF. The resulting decrease in CSF pressure and tension on the meningeal vessels and nerves leads to a post dural puncture headache (PDPH). If undetected it can lead to a high or total spinal block.

IMMEDIATE MANAGEMENT BY ANAESTHETIST

1. Convert to regime for spinal analgesia
   - Via use of patient controlled spinal analgesia (PCSA), generally using a Gemstar or similar pump
   - Epidural catheter remains intrathecal until further orders. Ensure ‘intrathecal’ sticker is placed on the epidural filter to warn of the same.

2. Resite the epidural
   - The responsibility of ALL top ups becomes that of the anaesthetist, although patient controlled epidural analgesia is still able to be used.
   - Registered nurse/midwife top ups are not to be performed for danger of solution entering CSF and causing high/total spinal block

Removal of Intrathecal Catheter

- Preferably the intrathecal catheter remains in situ for 24 hours after birth, not insertion. This is thought to reduce the amount of CSF leakage and therefore decrease the incidence of a headache.
- Prior to removal some anaesthetists wish to have 10mL Sodium chloride 0.9% given as a top up to increase CSF volume therefore decreasing incidence of headache.
- Otherwise removal is as per epidural catheter removal (see E 2.7 Epidural Catheter Removal)

POST DURAL PUNCTURE HEADACHE (PDPH)

PREVENTION
Assist the woman to maintain her position during epidural insertion.

SIGNS OF PDPH
- Postural headache (usually frontal and/or occipital)
- Neck stiffness/tenderness
- Photophobia
- Tinnitus
- Hearing disturbance
- Very rarely, intracranial bleeding

CONSERVATIVE MANAGEMENT (24 HOURS MINIMUM)
- Rest in supine position
- Hydration with oral/intravenous fluids
- Analgesia
ACTIVE MANAGEMENT – EPIDURAL BLOOD PATCH (EBP)

This involves the insertion of another epidural needle (with same risks of complication) in a sterile manner (usually in theatre) to allow injection of the patient’s own blood to seal the hole in the dura, the only effective treatment.

One anaesthetist takes approximately 20mL of the patient’s own blood in a sterile manner. This is passed to a second anaesthetist for injection into the epidural space below where the original puncture occurred. It is an attempt to seal the hole and stop further CSF leakage.

This procedure is not performed on febrile or infectious patients for they are at high-risk of introducing blood borne bacteria into epidural space.

Preparation
- Complete a pre operation checklist
- Dress the woman in a back opening hospital gown
- There is no need for the woman to fast
- Ensure adequate analgesia
- Encourage the woman to empty her bladder

Management post E.B.P.
- Remain supine for 2 hours.
- Avoid straining (dislodges clot).
- Observation of epidural site once per shift.
- Observe for any neurological symptoms or local pain and report immediately to anaesthetic department.
- Follow-up in the High Risk Anaesthetic Clinic six weeks after EBP.

INFECTION

TYPES
- Epidural skin site infection
- Epidural abscess
- Meningitis

PREVENTION
- Use of a sterile insertion technique.
- Maintaining the integrity of the epidural dressing.
- Vigilant monitoring of epidural insertion site (8 hourly site check) observing for:
  - pain
  - exudate
  - redness
  - swelling
  - dressing intact
  - vital signs (especially temperature)
- Patient education – discharge information sheet given and explained to patient.
- Visiting Midwifery Service (VMS) follow up if a woman is transferred home with a tender epidural site.
Note: It is normal for women to experience slight tenderness at the insertion site. This should be similar to a bruise in sensation and continue to improve. Any worsening back pain should be reported and monitored vigilantly.

TREATMENT FOR EPIDURAL SKIN SITE INFECTION OR ABSCESS

- Intensive antibiotic therapy in conjunction with microbiologist.
- If no contra indications commence flucloxacillin 2g intravenously 6 hourly until condition has improved significantly. Then continue on oral flucloxacillin 1g 6 hourly for 10 days.
- Arrange an out patient appointment in the anaesthetic high-risk clinic for 2 weeks post discharge.
- Inform the woman to return immediately if any worsening of symptoms.
- If no improvement / worsening of symptoms magnetic resonance imaging or computerised tomography scan may be required.
- Surgical drainage/decompression and follow up via neurologist.

BIBLIOGRAPHY
