Anaesthetic consideration in patients with spinal injury

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Spinal cord trauma

- Timing
  - Acute (upto 3 days)
  - Intermediate
  - Chronic (> 3 months)
- Level
  - High (higher than T7), Low
  - Above or below C4
- Other associated injuries

Acute injury

- Suxamethonium (depolarizing muscle relaxant)
  - May be used in first 24 to 48 hours
  - To be avoided after the acute stage
  - Otherwise hyperkalemic cardiac arrest can occur

High level acute injury

- Spinal shock
  - Spinal cord below lesion is areflexic
  - Peripheral vasodilation
  - Hypotension
  - Level above T1 to T5, bradycardia is common
  - Recovery starts in first 24 hrs
  - Complete recovery takes several weeks
Cervical injuries

- Above C4
  - respiration compromised
- Below C4
  - some loss of diaphragmatic function
  - Ventilation usually preserved

Difficult airway

- Risk of permanent neurological damage during intubation
- Problem presented by traction device & collar
  - Awake fiberoptic intubation
  - Asleep
    - In line immobilization
    - Fiberoptic
    - Intubating laryngeal mask
  - Spine table

Awake fiberoptic intubation

Two dedicated suction
Warm fluid to soften ET tube

- Warm fluid

Lignocaine through suction channel

- 2 mls lignocaine, 2 mls air
- Clamp suction just prior to injection
- Inject immediately when larynx position correct
- Inject forcefully to create a jet of fluid

Asleep- Fibreoptic mask

- If patient is asleep and needs ventilation during fibreoptic intubation

Fibreoptic mask
- Thin membrane can be cut for ET tube to pass through

- Inserted with minimal movement of neck
- Silicone ET tube passed though LMA
Goals of anaesthesia

- Maintain blood pressure
  - Art. line
- Minimize bleeding
  - Low intrathoracic pressure
- Good oxygenation
  - Normal CO2
- Protection of pressure points
  - eyes, neck, nerves
- DVT prophylaxis
- Avoid hypo/hyperthermia

Maintain blood pressure

- Pressure transducer at level of spinal cord
Figure 4. Branches of the segmental artery. Each intercostal or lumbar artery splits into several branches as it comes around the vertebral body. One branch enters the foramen alongside the spinal root and splits into dural branches and a radicular artery. At most levels, the radicular artery connects to the posterior spinal artery.

Minimize bleeding

- Make sure abdomen is free from pressure
- Lowest possible intrathoracic pressure
- Low pressure in epidural veins

Prone position - eyes

Neck position
Positioning

Supine position

Ulnar nerve
Sequential compression device

Hypo/hyperthermia

Monitoring

- Wake up test
- Somatosensory Evoked Potentials (SEPs)
- Motor evoked potential (MEPs)

Wake up test
Somato-sensory evoked potential

- Median nerve or post tibial nerve stimulated
- Monitoring
  - by scalp surface electrodes
  - epidural
  - intrathecal
- Affected by inhalational agents, temp, hypoxia, hypotension, anemia, hypercapnia

Motor evoked potential

- Motor cortex stimulated by scalp surface electrodes
- Signals monitored at spinal cord, peripheral nerve, or muscle
- Affected by all anaesthetics, muscle relaxants, etc.

Extubation

- Swollen airway
- Respiratory compromise
- Surgical haematoma

Extubation over exchange catheter
Chronic spinal injuries

- Autonomic dysreflexia
- Mass reflex
- Difficult airway—previous operation
- Respiratory compromise
- Pressure sores
- Renal problems
- Lack of temperature regulation ability

Autonomic dysreflexia

- Acute sympathetic activity in response to stimulus below level of high (>T7) spinal cord lesion
- Stimulus
  - hot, cold cutaneous stimulus
  - urine cath, bladder irrigation, retention
  - enema, PR
  - surgical procedure
- Signs
  - hypertension
  - bradycardia, arrhythmia
  - sweating, gooseflesh
- Symptoms
  - severe headache, blurred vision
  - sweating
  - nausea
**Additional signs**
- convulsion, LOC
- cessation of respiration
- visual field defects
- CVA

**Mass reflex**
- Uncontrolled hyperreflexic spasms of muscle
- caused by hyperactive spinal reflexes controlling muscle tone
- Need gentle handling

End