Anaesthetics Teaching

Preoperative assessment

- Previous anaesthetic – any problems?
- Any FH of anaesthetic reactions?
- Current medical conditions
    - ASA Grade:
        - I Normal, healthy
        - II Mild systemic illness, no limitation
        - III Severe systemic illness, limits activity, not incapacitating
        - IV Incapacitating systemic illness, often life-threatening
        - V Moribund; not expected to survive 24hrs
- Current medication
- Teeth/dentures?
- Fasting status?
- Mallampati score:
    - I Anterior + posterior pillars
    - II Fauces, uvula
    - III Base of uvula + soft palate
    - IV Soft palate not visible
- Cormack-Lehane laryngoscopy view
    - I Most of glottis is seen
    - II Only posterior portion of glottis can be seen
    - III Only epiglottis may be seen
    - IV Neither epiglottis nor glottis can be seen

Ventilation

Chest compliance will be reduced by factors such as rib injuries, chest wall deformity, diaphragm splinting (laparoscopy, pregnancy, head down posture). Also turbulent flow will reduce dynamic compliance, e.g. faster breathing or asthma/airway narrowing.

Pressure limited ventilation gives less risk of barotrauma, and lower inflation pressures tend to give more volume due to improving the dynamic compliance. There is a risk of volutrauma if compliance changes, as can happen with treated asthma or venting gas after laparoscopy. In these cases, volume mode ventilation may be better.

Tidal volume ~7ml/kg
O_2 demand ~4ml/kg/min

Pain relief

WHO Pain ladder:

- Regular paracetamol (1g qds)
- Regular NSAID (e.g. Diclofenac 50mg tds)
- Weak opiod (Tramadol – more nausea; codeine – more constipation)
- Strong opiate – Morphine/Diamorphine

Local anaesthesia
Regional anesthesia

- Nerve block (e.g. ring, brachial plexus, etc)
- Spinal – onset ~5minutes, duration ~2-3 hours
- Epidural – onset ~40 minutes

If a particular titration of analgesia has failed (e.g. morphine PCA or epidural) then use bolus doses to gain control then titrate rate up – increasing rate alone is unlikely to be effective.

Nausea and Vomiting

Risk is determined by patient factors, operation factors, and drug factors.

Major risks:

- Non-smoker
- Hx travel sickness
- Hx post-op N/V
- Intra-/post-op opiate use

Reduce risk – avoid opiates, avoid N_2O, avoid GA, avoid volatiles, keep hydrated

Anti-emetic receptor targets: DA, $5HT_3$, HT_1, M_3

Drugs:
Ondansetron ($5HT_3$ only, best SE profile of antiemetics)
Cyclizine (main target H_1)
Metoclopramide (main target DA, poor SE profile, ?any better than placebo)
Hysocine (main target M_3)
Droperidol (Multiple, inc. $5HT_3$, cheap, good first line choice)
Dexamethasone (expensive, very effective, multiple receptors)

Combination of two or more drugs is better than single agent therapy.

Fluids

Approx 600ml/kg (42L in 70kg man). 2/3 is ICF, of remainder, ~1/3 (5L) is intravascular.

Grades of hypovolaemic shock:

I	0-15	Compensated
II	15-30	Pulse pressure narrows, tachycardic, RR increases
III	30-40	Systolic BP drops, LoC drops, oliguria
IV	>40	LoC crashes, as do most vitals, oliguria/anuria

Main options:

- Crystalloid – usually first choice for resuscitation
- Colloid
    - Protein (Gelofusin, Haemaccel)
    - Starch (Hetastarch, Dextrans)
- Blood components
    - Packed red cells/Fresh Frozen Plasma/Platelets/Cryoprecipitate (largely fibrin)

Dextrose important in maintenance fluids, but useless in resuscitation.

No urine output

Should have >0.5ml/kg/hr. If lower, consider pre-renal, renal, post-renal causes:

Pre-renal: Reduced cardiac output, hypovolaemia – check vitals, thirst, check mucous membranes. If reason to suspect, give 500ml fluid challenge and reassess. Repeat if helping, then increase rate of maintenance fluids (e.g. 1l over 2-4hrs)
Renal – Infection, drugs (esp gentamycin, NSAIDs)
Post-renal – flush catheter if suspect obstruction

Only give diuretics if confident that there isn't a pre-renal cause, otherwise risk provoking renal failure.

Drugs

Propofol: 2-3mg/kg induction, 4-12mg/kg/hr maintenance
Etomidate: 300µg/kg induction
Fentanyl: 50-200µg initial dose
Alfentanyl: Up to 500µg initial dose
Suxamethonium: 1-1.5mg/kg induction
Rocuronium: 600µg/kg induction (fastest acting non-depolarising blocker)
Cisatracurium: 150µg/kg induction (Metabolism independent of liver/renal function)
Sevoflurane: 2-4% for maintenance
Desflurane: 2-6% for maintenance

Misc

- IHD patients – aim for systolic BP>2/3 their normal during anaesthesia
- Venous plexus under tongue – 'rescue' access route for emergencies when no IV access
- Head down for central line insertion:
    - Distends veins
    - Reduces negative pressure, so less risk of air entrainment
- BIS probe – BiSpectral index – measures depth of anaesthesia. Need SQI (Signal Quality Index) over 75 to be reliable, and aim for BIS of 40-60