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By Surgery

Emergency Laparotomy
Laparotomy for Intestinal Obstruction
Gastrectomy
Laparoscopic Surgery
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Laparoscopic Hemicolecction/Anterior Resection
Appendicectomy
Inguinal Hernia Repair
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Day Case Colonoscopy
Major Colorectal Surgery

- effects of major surgery:
  - neuroendocrine
  - metabolic
  - inflammatory

- problems:
  - pulmonary dysfunction
  - ↑ cardiac demand
  - pain
  - nausea & vomiting

- end result:
  - ↓ mobilisation
  - prolonged LOS
  - ↑ M&M

ERAS

- key aspects:
  - bundle of care
  - MDT approach to planning of surgery, anaesthesia & recovery
  - preop iron supplements for anaemia
  - detail preoperative pt education, info & risk assessment
  - avoidance of prolonged starvation & dehydration:
    - clear fluids up to 2hrs prior,
    - CHO drink 2hr prior to surgery = ↓ post op problems by 44% ie N&V, pain, diarrhoea, dizziness, wound healing problems
  - no premeds
  - no bowel prep ⇒ dehydration & diff fluid balance
  - avoid routine NGTs & drains
  - Abx given within 30min prior to incision
  - minimally surgical incisions
  - avoidance of hypothermia
  - fluids:
    - goal directed fluid approach (eg oesophageal doppler) = controversial
    - avoid fluid overload vital = every extra litre of fluid ⇒ ↑ post op complications by 32% & extra 24hrs LOS
  - aggressive Rx of N&V
  - multimodal analgesia:
    - Regionals
    - single shot spinal vs epidurals
    - IV opioid PCAs
    - analgesia adjuncts - ketamine, lignocaine, gaba, clonidine
  - early removal of IDUC
  - early enteral feeding ⇒ ↓ mm loss, ↓ LOS +/− ↓ infection incidence
  - early mobilisation

Anaesthetic Course

Preoperative

- major issues to consider:
  - cachexia/weight loss
  - obstruction
  - diarrhoea
  - pain
  - malignant benign
  - large vs small bowel
  - open vs laparoscopic
- Asses ex tolerance - CPET
- ?invasive monitoring
- ?HDU/ICU required
- water & CHO drinks up to 2hrs prior to surgery

**Perioperative**

**Induction**
- regional plan:
  - epidural if required + test dose
  - single shot spinal with intrathecal opioid
  - wound catheters
- RSI if evidence of bowel obstruction

**Maintenance**
- active warming
- restrictive fluid management
- pressure area care
- FiO2 - controversial high vs low:
  - high = ↓ PONV, ↓ wound infection & ? does not ↑ atelectasis
  - low = ↓ inflammation, ↓ infection, ↓ atelectasis
- invasive monitoring indications:
  - (minimally invasive) cardiac output monitoring: potential fluid shifts, CVS compromise, periop inotropes
  - A line - CVS or resp compromise, major blood loss, blood gas sampling
  - CVP - inotropes, post op PN required

**End of case**
- PONV prophylaxis

**Postop**
- measure urine output for at least 24 hrs
- replace losses

**Analgesia**
- options
  - local infiltration
  - TAP block
  - rectus sheath infiltration
  - wound catheters
  - spinal
  - epidural
  - PCA
  - oral analgesia

**Epidural**

**Advantages**
- improved pain relief vs IV opioids
- improved post operative respiratory function -> reduced respiratory failure
- improved GI motility
- decreased MI incidence (decreased stress response -> decreased HR, coronary vasoconstriction, myocardial work)
- improved patient mobility
- reduced thromboembolism
- reduced sedation
- reduced PONV

**Disadvantages**
- insertion related complications (PDPH, epidural haematoma and abscess)
- catheter misplacement (intrathecal, intravascular)
- perioperative hypotension
- failure - 20-30%
- pruritis
- urinary retention
- post op motor blockade ⇒ delayed mobility
- no change in morbidity or mortality (MASTERS Trial) vs PCA

**Practical**
- Site:
  - T10-11 lower abdo incision
  - T8-9 upper abdo incision
- test dose 3ml of 0.5% bupiv
- load intraop 10mls 0.5% bupiv in divided doses
- if expected bleeding delay LA into epidural until after
- for AP resection need Tx/Lx/sacral spread : give lower conc higher volume
- post op infusion 0.125% bupiv + fentanyl 2-4mcg/ml at 0-12ml/hr

**Temperature**
- reasons for becoming cold:
  - loss behavioural response to cold
  - impaired heat preserving mechanisms
  - induced vasoD
  - exposure
  - cold IVF
  - dehyration hypovolaemia ⇒ poor periph perfusion & impaired heat distribution
- laparotomy ⇒
  - long procedure
  - open abdo
  - limited access for warming
- risks of even just mild hypothermia:
  - myocardial ischaemia & arrhythmmias
  - ↑periop blood loss
  - ↑surg site infection
  - prolonged NDNMBs
  - ↑PACU stay
  - ↑LOS
- strategy:
  - only start if >36deg
  - active warming
  - warmed fluids
- hypothermia phases:
  - phase 1: rapid reduction 1-1.5deg 1st 30-mins due to loss of vasoC (REDISTRIBUTION)
  - phase 2: gradual ↓core temp 1deg over 2-3hrs due to radiation, convection, evaporation > metabolic rate (NET HEAT LOSS). Evap loss ↑ed in open abdo surgery
  - phase 3 = plateau heat loss = heat production.
  - if epidural ⇒ longer to reach plateau with ↑ed drop
- Methods of heating:
  - cutaneous:
    - passive - space blanket ⇒ ↓loss by 30%. wrap head
    - active - heat mat or forced air warmer
  - internal:
    - airway humidification - <10% lost via resp tract
    - fluid warming - prevents conductive heat loss
    - invasive warming - CPB, peritoneal dialysis

**Fluid Management**
- important for maintenance of Q and O2 delivery
- effective IVF therapy can improve outcomes

**Preoperative Management**
- fluid reviews
- IVF
- monitor U+E
- remember N/G and 3rd space losses

**Intraoperative Management**
- during open abdomen crystalloid maintenance can vary between 1-30mL/kg/hr
- watch for bleeding
- remember third space loss from omental and bowel sequestration
- remember evaporative losses
- monitor U/O

**Postoperative Management**
- watch for ileus development:
  - multifactorial causes:
    - over hydration with salt containing fluid - strong association
    - physical manipulation at surgery
    - hormonal stress response
    - ↑SNS
    - pain
    - immobility
    - opioids
    - ↓K & electrolyte imbalances
- ongoing N/G loss
- monitor for blood loss
- monitor U+E

**Oncological Surgery**

**General Considerations**
- chemo cardiac effects:
  - direct drug effects eg
    - anthracyclines = doxorubicin:
      - related to total cumulative dose
      - may be irreversible with 30% mortality
      - ECG changes incl block
    - cyclophosphamide
    - fluorouracil
    - trastuzumab
  - stress of chemo on compromised heart
- other chemo effects:
  - vinca alkaloids eg vincristine:
    - periph neuropathy
    - SIADH
  - MTX: pneumonitis, hepatic impairment
  - cisplatin: periph neuropathy, electrolyte ↑↓
  - pulmon toxicity - in 10% exposed to bleomycin:
    - fibrosing alveolitis
    - limit FiO2 to as low as poss
  - hepatic veno-occlusive disease (HVOD) - physical effect of tumour
  - tumour lysis syndrome -
    - normally lymphoma & high count leukaemia
    - 2nd to Rx eg steroids
    - mass cell death ⇒ lysis
    - chars = AKI, ↑K, ↑urea, ↑PO4, ↓Ca
  - mediastinal masses:
    - airway collapse under anaesthesia even in asymptomatic
  - SVC obstruction:
    - from direct tumour mass or vessel invasion
  - paraneoplastic syndromes:
    - 10% of pts esp lung, lymphoma, breast, prostrate, ovarian, pancreatic
Examples:
- Eaton Lambert = small cell lung Ca, breast, thymus & GI
- Cushings - lung pancreas, thymus, ovary
- PTH like secretions ⇒ ↑Ca
- ↓Na & SIADH caused by SCLC, lymphoma, leukaemia, upper GI tumours
- cachexia, ↓albumin are RFs for poor outcome

Radiotherapy:
- N&V
- localised fibrosis - warning for airway
- Chemo
- VTE - in 15% of Ca pts

Anaesthesia Conduct
- avoid dex ⇒ cytotoxic effects & risk of lysis
- keep FiO2 low

Brachytherapy
- remote location
- 1.5-3hrs
- minimal blood loss
- post op pain may be a problem
- options = light GA or sedation or spinal/CSE

Acute Abdomen
- = sudden severe pain with unclear cause for duration <24hrs
- Consider medical & surgical causes

GI Syndromes
- prolonged vomiting
  - eg pyloric stenosis
- bowel obstruction - acute or chronic
- Malabsorption syndromes eg ileostomy, short gut, bowel prep, diarrhoea

Bowel Prep

Types
- osmotic cathartic ⇒ ↑complications but better tolerated
- Non-absorbed osmotic ⇒ big volumes ie litres of fluid
- stimulant laxative
- Combos

Complications
- Electrolyte disturbance esp ↑K
  - osmotic cathartic ⇒ ↑Na, ↑Mg, ↑PO4, ↓Ca
- water intoxication/dehydration
- Post hypotension
- confusion/seizure/vomiting
By A Hollingworth & J Fernando

Emergency Laparotomy

Preoperative Management
- quantify degree of organ dysfunction:
  - CVS – vasodilation, requiring inotropes, myocardial dysfunction
  - RESP – ALI, alveolar collapse, hypoxaemia, reduced compliance and FRC, increased WOB
  - HAEM – DIC, coagulopathy, thrombocytopenia, hypofibrinogenaemia -> supportive care
  - RENAL – AKI
  - METABOLIC – high BSL -> control with insulin
  - HEPATIC – ischaemic hepatitis, hypoglycaemia, coagulopathy
- discuss probable diagnosis with surgical team and surgical plan
- quantify if there is time to resuscitate patient:
  ‣ ongoing haemorrhage = immediate surgery
  ‣ septic shock = surgery <3hrs
  ‣ severe sepsis = surgery within 6 hrs
- investigations; FBC, U+E, Mg2+, Coags, CXR, X-match, ECG, ABG, lactate
- IV resuscitation
  - Hb >70 as minimum
- prompt IV antibiotics
- vasopressors + inotropes
- may need preoperative admission to ICU
- give O2
- volume expand initially with crystalloid or blood
- insert N/G for bowel obstruction
- if in pain give IV opioids
- central venous oxygen saturation (ScvO2) >70%
- discuss with patient and family about possible morbidity and mortality associated with illness

Intraoperative Management
- place invasive monitoring prior to induction if possible
- aspirate N/G
- large bore access
- have pressors & vagolytics ready
- epidural siting =
  ‣ controversial (can site but not use until haemodynamically stable)
  ‣ other options eg wound catheters/RSC’s
- RSI (induction agent dependent on patient and process, sux -> rocuronium)
- opioid titration
- induce in OT with surgeon ready
- CVS support:
  ‣ noradrenaline - overcome vasodilated
  ‣ adrenaline,
  ‣ dopamine - if compromised systolic function but \(\Rightarrow\) ↑HR & arrhythmia
  ‣ dobutamine - if low CO despite adequate fluid resus (if hypovolaemic \(\Rightarrow\) ↓MAP)
- maintain normothermia

Postoperative Management
- end of surgery:
  ‣ assess lactate/base ratio
  ‣ PF ratio
  ‣ admission to HDU/ICU if
    - high risk, >10% predicted mortality (P-POSSUM)
    - lactate >4
- PF <400
- ↓ temp 36
- keep intubated if indicated
- UO
- supportive care

Laparotomy for Intestinal Obstruction

- various causes:
  - paralytic ileus
  - concentric narrowing eg Crohns, neoplasm
  - kinking - adhesions
  - Twisting - volvulus
  - intussusception - spont, 2nd to polyp
  - FB - ingested or gallstone
  - pseudo-obstruction

**Universal findings**

Sequestration of fluid and gas proximal to obstruction

- Fluid leaks into peritoneum
- Irritation of peritoneum (peritonitis)
- Vascular shifts into peritoneal cavity
- Hypovolemia, shock, dehydration

**Small Bowel**

- Increased intra-abdominal pressure
- Pressure on diaphragm
- Atelectasis
- Pneumonia

**Large Bowel**

- Reverse peristalsis
- Nausea, vomiting, anorexia
- Poor nutrient intake
- Malnutrition

- Gas accumulation → Ammonia ↑ → Alkalosis
- Abdominal distension
- Bowel perforation
- Bowel contents leak into peritoneum

- Peritonitis → Sepsis → Septic shock

**Preoperative**

- 4 main features: pain, vomiting, distension & constipation
- large bowel obstruction assoc with vit K deficiency ⇒ coagulopathy
- full Pre-Ax of current clinical status incl exam, bloods, XRs, vitals, PMH, hydration
- careful consideration with surgeons on urgency of surgery:
  - 90% of obstruction 2nd to adhesions will resolve spontaneously
  - majority of cases can be done in next in-hours session
- adequate preop optimisation with inotropes & fluid for 4hrs in HDU ⇒ ↓ mortality 17 to 3%

**Perioperative Induction**

- NG tube - controversial whether to leave in place or remove pre intubation. Should aspirate
- RSI with double suction setup
- ?? epidural - benefits vs risks
- avoid N2O

**Maintenance**

**End of case**

**Postop**
- HDU ideal place
- early establishment of:
  - CVS & resp monitoring
  - fluid balances
  - wound & Abx care
  - early enteral feeding
  - VTE prophylaxis
  - physio

**Gastrectomy**

**Table 1 Functions of the stomach**

<table>
<thead>
<tr>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage of food</td>
</tr>
<tr>
<td>Breakdown of solids into chyme</td>
</tr>
<tr>
<td>after mixing with gastric secretions</td>
</tr>
<tr>
<td>Controlled release of chyme into</td>
</tr>
<tr>
<td>small intestine, aiding efficient digestion and absorption</td>
</tr>
<tr>
<td>Defence: acidity kills bacteria</td>
</tr>
<tr>
<td>Secretion: Intrinsic factor, pepsinogens</td>
</tr>
</tbody>
</table>

- blood supply to stomach from 5 anastomosing arteries - all from branches of coeliac artery
- ANS:
  - PNS from vagal nerve ===> acid secretion, closure gastro-oesophageal sphincter
  - SNS from coeliac plexus ===> delayed gastric emptying
- grading & staging:
  - TNM Grading:
    - T1-4, N0-3, M0-1
  - Stage 1-3 = curative
  - Stage 4 = any N3 (>15nodes) or mets

**Preoperative**
- any stage 1-3 should have periop chemo then gastrectomy with lymph node clearance
- chemo =
  - epirubicin ===> ↓LV function
  - cisplatin ===> nephrotoxicity
  - fluorouracil
  - gastrectomy 3-6 weeks after completion of 3rd cycle then chemo again 6-12 weeks post surgery
- History:
  - IHD, HTN, resp pathology
  - nutritional assessment: BMI <18.5% or weight loss >20%, low albumin
- Ix:
  - PFTs: FEV1 ↓ed by >20% = ↑resp complications
  - CVS disease: ECHO, 350m shuttle test or stress testing
  - bloods - if ↓neutrophils then delay surgery for 3 weeks

**Perioperative**

**Induction**
- RSI

**Maintenance**
- epidural: MASTERS - no diff in outcome but ↓resp complications & ↓pain scores

**Postop**
- early feeding - placement of NJ tube

**Special Points**
- overall 5yr survival = 15% - 18% women
Laparoscopic Surgery
- benefits > laparotomy:
  ‣ ↓ tissue trauma, wound size & pain
  ‣ ↑ed resp function
  ‣ ↓ post op ileus = earlier enteral feeding
  ‣ earlier mobilisation => ↓LOS
  ‣ ↑ed benefit in obese patients - where open access would be challenging anyway
  ‣ ↑ed cosmesis

Physiological Effects of Pneumoperitoneum
  - Insufflation of CO2 to av max 20mmHg
    ↺ non combustible, colourless, non toxic, highly soluble
  - Once intrabdominal pressure (IAP) exceeds physiological thresholds see organ effects

CVS Effects
  - ↑SVR:
    • Mechanical compression of abdo aorta
    • ↑release vasopressin and activation of renin-angiotensin-aldosterone axis
  - ↓CO:
    • Compression of IVC => ↓VR => ↓preload => ↓CO
      ↺ especially if hypovolaemic
    • Cephelad displacement of diaphragm => ↑intrathoracic pressure =>
      • ↓VR (as above)
    • Compression pulmonary vasculature => ↑RV afterload

Resp Effects
  - ↑IAP => ↓diaphragmatic excursion =>
    • ↑intrathoracic pressure
    • ↓compliance
    • ↓FRC
    • Atelectasis
    • Altered VQ relationships
    • Hypoxaemia
  - Absorbed CO2 => ↑PCO2 which is worsened by VQ mismatching

GI Effects
  - ↓kidney & liver blood flow - especially in mod/severe organ disease states
    ↺ IAP 20mmHg = ↓GFR ≈ 25%
    ↺ Mechanism thought to be ↓afferent flow (2nd to low CO) & ↓efferent flow (high venous pressure)
  - IAP persistently >20 = ↓40% blood flow to mesenteric & GI mucosa => ↑acidosis

Neuro Effects
  - ↑ICP => ↓CPP:
    • ↑IAP => ↑intrathroacic pressure => ↓cerebral venous drainage => cerebral oedema
      ↺ despite ↑ed mean cerebral arterial pressure

Pathological Effects of Laparoscopy
  - autonomic effects:
    • vagal stimulation => arrhythmia
    • SNS drive => HTN & ↑HR
  - CO2 effects =
    • ↑PaCO2 & acidosis
    • may require CO2 break if long surgery
  - gas insufflation into tissues:
    • SC emphysema esp Nissen fundoplication => check neck
    • pneumomediastinum
    • pneumopericardium
    • pneumothorax
  - venous gas embolism - less severe than with air due to ↑solubility
Effects of Steep Trendelenburg Positioning

- = Classic 45deg head down tilt

CVS system
- In healthy little long lasting effect due to quick compensation VD to overcome ↑VR
- No RCT evidence to support trendelenburg position is of benefit in correcting acute ↓bp
- In elderly or comorbidities with impaired vasomotor control may see ↑bp:
  - Capillaries and most of venous blood above heart
  - Incr VR ⇒ ↑preload ⇒ ↑stroke volume ⇒ ↑CO ⇒ ↑bp
  - deep inhalation: -ve pressure vent ⇒ ↑-ve intrathoracic pressure
  - high spinal/anaesthesia - sympathetic blocking ⇒ ↑VD ⇒ ↑VR
- Possibility of ↓bp is also argued:
  - ↓VR 2nd to intraabdo and pelvic organs compressing IVC
- Risk of adverse consequences in people with cormobidities:
  - Obese
  - Compromised RV EF ⇒ R heart failure
  - Pulmonary disorders
  - Head injuries
- Well leg compartment syndrome - combination of:
  - ↓arterial perfusion to raised LLs
  - Compression of leg vessels by SCDs
  - ↓femoral drainage by +/- pneumoperitoneum
- Resp system:
  - Raised diaphragm with gravity and weight of abdo cavity organs:
    - ↓VC, ↓FRC, ↑risk basal atelectasis
    - 20deg head tilt = ↓VC by 15%
  - Hypercarbia 2nd to shunt
  - Incr VQ mismatch: ventilation maximal at bases, perfusion maximal at apex 2nd to gravity
  - Endobronchial intubation - northward movement of pt with fixed position of ETT ⇒ relative southwards migration of tip of ETT further into lungs
  - Upper airway oedema 2nd to orthostatic forces (prolonged positioning)
- Airway/Positioning:
  - Movement of pt with gravity causing soft tissue damage to lips on ETT and tie
  - Danger of patient falling from surg table
- Digestive system:
  - Pooling of secretions in dependant part ie nasopharynx ⇒ ↑risk laryngospasm if not suctioning pre extubation
  - Increased risk of aspiration of gastric contents - if non secured airway
- Neuro:
  - Intra and extra cranial venous congestion ⇒ ↑ICP
  - ↑risk cerebral oedema
- Eye - ↑intraocular pressure

look for mill wheel murmur
↑↓EtCO2 as CO2 insufflated
trauma to organs/vessels - sometimes missed eg retroperitoneal
Anaesthesia

Preoperative assessment
- generally accepted absolute CIs:
  › ↑ed ICP
  › severe hypovolaemia
  › known R ⟹ L cardiac shunts or PFO
- relative contraindications –
  › IHD,
  › hypovolaemia,
  › valvular disease,
  › severe CKD,
- all patients need to be considered for conversion to open procedure
- anaesthesia for the obese patient may need to be reviewed
- premedications; aspiration medications, anxiolytics and analgesics

Intraoperative management
- GA – ETT gold standard, may need NG tube, PEEP to prevent atelectasis, selected cases may warrant use of any LMA (short, non-obese, no reflux)
- avoid stomach insufflation; decompress bladder
- avoid N2O
- monitor and maintain normocapnia
- use of peripheral nerve stimulator advised
- PONV incidence high
- epidural -> requires very high block (T2-4)

Postoperative management
- ask surgeon to get rid of as much gas as possible
- local, local, local
- better spirometry post op
- less atelectasis
- shoulder tip pain ->
- shorter stay in hospital

HYPOXIA DIFFERENTIAL
- hypoventilation – pneumoperitoneum and head down
- reduced Q – IVC compression, haemorrhage, myocardial ischaemia, VGE, extraperitoneal gas
- V/Q mismatch – reduced FRC, endobronchial intubation, atelectasis, VGE, aspiration, pneumothorax
- subcutaneous emphysema -> find source

Laparoscopic Cholecystectomy
- conversion to open ~5% due to:
  › unable to identify cystic duct
  › suspected common bile duct injury
  › uncontrolled bleeding from cystic artery
  › stones in CBD
  › acute inflam changes preventing adequate dissection

Preoperative
- classic = female, forty, fair, fat & fertile
- check for pancreatitis complications
- premed analgesia
**Perioperative Maintenance**
- high risk PONV - double anti-emetics
- pain -
  ▸ can be intermittently very painful
  ▸ LA to gall bladder bed very effective

**Laparoscopic Hemicolecetomy/Anterior Resection**
- laparoscopic colorectal surgery involves:
  ▸ small incisions
  ▸ extreme positioning
  ▸ ↓ post op pain but prolonged procedure
  ▸ ↑ risk of conversion to open

**Preoperative**
- routine pre op bloods
- likely steep head down - check no neuro problems eg ↑ICP, ICH

**Perioperative Induction**
- A line asleep
- OG tube post induction
- careful positioning
- IV opioids - remi a good option for long case
- restrictive fluid strategy shown better than liberal
- careful eye protection in case gastric reflux ⇒ eyes when steep head down

**Postop**
- conjunctival oedema common

**Appendicectomy**

**Preoperative Management**
- find out whether laparoscopic vs open
- patients often young and fit
- in elderly may be presenting complaint of caecal adenocarcinoma - right hemicolecetomy
- check fluid status + replace
- if considering ilioinguinal block warn of possible femoral nerve block

**Intraoperative Management**
- RSI
- relax with short acting agent
- NSAIDS + paracetamol
- infiltrate with LA or ilioinguinal block or R TAP

**Post operative Management**
- simple analgesia
- PRN opioid
- anti-emetics
- IVF until tolerating PO fluids
Inguinal Hernia Repair

Preoperative Management
- usually fit young males or small children
- often done as a day case

Intra-operative Management
- supine
- blood loss not significant
- time 30-60min
- with use of mesh -> give prophylactic antibiotics
- can be performed under

1. LA infiltration with sedation
2. GA (ETT or SV with LMA)
3. Inguinal field block (use for high risk patients) - see regional anaesthesia page
4. Spinal

- need opioid if LA not used

Post operative Management
- discharge with paracetamol, NSAID +/- tramadol

Haemorrhoidectomy

Preoperative Management
- standard care

Intraoperative Management
- position usually lithotomy
- normally 20min
- minimal blood loss
- painful (use short acting opioid or get deep)

- can be performed under:

1. GA (LMA + SV) -> use ETT if patient obese or has GORD
2. spinal – saddle block
3. caudal

- usually LA infiltration by surgeon adequate analgesia
- anal stretching – ensure deep anaesthesia to avoid: bradycardia, asystole, laryngospasm or coughing

Post operative Management
- simple analgesics
- avoid PR drugs

Breast Surgery

Preoperative Management
- patients often anxious - midaz premed
- warn patients of post operative pain and PONV sometimes difficult to manage
- gain rapport
- explain anaesthesia
- chart premedication if required
- check most recent chemo (may be immunocompromised)
- check FBC
- often have difficult IV access
- reconstructive procedures -> increased blood loss (G+H)

Intraoperative Management
- long procedures require active warming
- avoid venous access of side of surgery
- invasive monitoring maybe require for reconstructive procedures
- look out for potential nerve compression
- balanced, multimodal analgesia
- PONV high risk (30-40%)
- regional analgesia sometimes appropriate;
  ▪ may be overkill considering risks
  ▪ better in more radical surgery
  ▪ paravertebral block, thoracic epidural, intercostals blocks, and intrapleural block

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuate surgical stress response</td>
<td>Significant failure rate with continuous techniques (20% epidural, 10% PVB)</td>
</tr>
<tr>
<td>Superior analgesia</td>
<td>Local anaesthetic toxicity (very rare)</td>
</tr>
<tr>
<td>Less or no opioid consumption</td>
<td>Pneumothorax (1% PVB, 2%)</td>
</tr>
<tr>
<td>Less PONV</td>
<td>Intravenous (1%, 2% intercostal)</td>
</tr>
<tr>
<td>Early mobilisation</td>
<td>Bleeding risk (especially epidural haematoma)</td>
</tr>
<tr>
<td>Avoids immune function inhibition</td>
<td>Dural puncture</td>
</tr>
<tr>
<td></td>
<td>Contra-indicated in local infection</td>
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<tr>
<td></td>
<td>Hypotension</td>
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<td></td>
<td>Urinary retention</td>
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Post-operative management
- HDU may be required after extensive procedures
- chronic pain syndrome:
  ▪ 25-30% at 1yr
  ▪ located anterior chest wall, ipsilateral axilla or upper arm (phantom breast pain)
- don't cannulate affected side long term:
  ▪ increased risk of infection and lymphoedema
  ▪ but limited evidence of problems
  ▪ ok to cannulate affected side & remove at end of procedure

Day Case Colonoscopy

Preoperatively
- standard

Intraoperatively
- standard monitoring + O2 FM & ETCO2 monitoring
- IVF (balanced crystalloid) - corrects hypovolaemia from bowel prep and augment preloads
- position patient in lateral position (as guided by surgeon)
- titrate propofol either by IV infusion (TCI) 0.5-3 mcg/mL
- allow colonoscopy to be carried out
- once finish turn propofol off
- propofol sedation advs:
  ▪ rapid, predictable sedation
  ▪ rapid, cleared headed recovery
profound anti-emetic properties (good for day case procedures)

Post-operatively
- transfer to recovery area
- treat any side effects (PONV, discomfort)
- allow discharge once criteria met:
  - patient mobile, pain free, no PONV, has eaten, obs normal, fully awake & orientated
  - suitable carer to escort home and monitor
  - doesn’t live far from hospital
  - has access to a telephone,
  - clear plan to gain help if develops troublesome symptoms