Contents

By Surgery

Cystoscopic Procedures

Preoperative Management

- operations include:

1. cystoscopy
2. TURP - elderly
3. bladder neck incision
4. TURBT - common in smokers
5. ureteroscopy
6. stone removal
7. stent insertion

- co-morbidities: IHD, smoking, COPD -> be aware of chronic cough!, spinal injury + autonomic dysreflexia
- FBC (bleeding from bladder cancer)
- U+E (renal impairment)

Intraoperative Management

- flexible cystoscopy -> LA +/- sedation
- rigid cystoscopy -> GA or spinal +/- sedation
- spinal +/- sedation:
  - sensory reply:
    - S2 - S4 = urethra, prostate, bladder neck, bladder mucosa
    - T10-L2 = pain from bladder distension
  - ideal for COPD - if can lie flat without coughing
- previous spinal injury require multiple surgeries:
  - bladder distension may ⟹ autonomic dysrefexia
  - use spinal or GA
- check positioning of elderly patients in lithotomy
- Pacemaker in situ - diathermy fine as long as pad on thigh
- ICD - switch off pre-op
- erection -> deepen anaesthesia/ketamine
- routine gram –ve cover (gentamycin 3mg/kg)

Postoperative Management

- DVT cares; TEDS, intermittent pneumatic calve compressors, and even LMWH
- postop complications:
  - bladder perforation
    - can be masked if spinal
    - may need urgent re-surgery
  - bacteraemia
    - Rapid onset of shock despite simple procedure
    - Rx: IVF, gentamicin, cefuroxime
  - bladder spasm:
    - most common if no pre-op IDUC
    - responds poorly to analgesics
    - IV diazepam or buscopan
  - bleeding
  - APO

TURP

= cystoscopic resection of prostate using a ring diathermy wire (may be done with laser)
- Options for resection:
  - monopolar/glycine irrigation being replaced with bipolar resectoscopes & saline:
    - bipolar = ↓overall complication, ↓transfusions, ↓TURP syndrome
  - HoLeP Laser - Ho:YAG laser, excludes possibility of TURP syndrome & ↓↓blood loss but not good for pathology
- prostates >100ml open prostatectomy may be safer
  ↳ normal weight = 20g

Preoperative Management

- minimal pain
- often very elderly + many co-morbidities
- Bloods:
  - creatinine
  - Na - suggest postponing if sufficiently low as will fall further with irrigant
- uncontrolled heart failure = major risk factor for fluid absorption. preoptimise
- work out whether patient will lie still and be co-operative with a spinal and surgery
- ?size of prostate ≈ risk of blood loss

Intraoperative Management

- lithotomy +/- head down
- variable blood loss
- options:
  - spinal +/- sedation:
    - need T10 - L3 to cover bladder
    - benefits:
      - easier to detect changes in mental state & fluid overload
      - ↓bleeding
      - avoids resp problems
      - ↓stress response to surgery - although MI rate in both the same
      - better post op analgesia
    - watch for hypotension esp at end when legs down
  - GA (LMA or ETT) -
    - if unable to tolerate spinal
    - ↑ed risk of regurg
    - end of op single shot caudal epidural injection
- large IV
- warmed IVF
- antibiotics
- use intraoperative NSAIDS and opioids
- cautious fluid (Hartmans or Plasmalyte)
- replace blood loss with colloid or RBC's
- intra-op complications:
  - ischaemia - up to 25% (infarction 1-3%)
  - haemorrhage -
    - standard to lose 500ml
    - blood loss estimation difficult -> check Hb
    - blood loss dependent on; size and weight of prostate tissue excised, duration of resection and expertise of operator
    - prostatic capsular perforation ⟹ retroperitoneal bleeding
    - TXA 15-25mg/kg may help
  - obturator spasm
  - hypothermia
  - bladder perforation
  - TURP syndrome
  - penile erection - deepen anaesthesia

↳ considerable increased risk of complications with resections >1 hour

Postoperative Management

- post op complications:
  - TURP syndrome - Na
  - clot retention:
    - common to bladder irrigate with 3way catheter for ~24hrs
    - signs = painful distended bladder with vagal symptoms
  - bladder spasm
  - bleeding - Hb
  - DVT
  - MI
  - POCD
- unusual to require opioids post-operatively

TURP Syndrome

= fluid overload and hyponatraemia during TURP from large volumes of glycine being absorbed through venous sinuses

- Glycine:
  - ↓osmolality
  - metabolised to ammonia ⟹ acidic load
- incidence reduced with bipolar & saline
- laser HoLEP has eliminated syndrome
- mortality up to 25% if severe syndrome established

- glycine 1.5% in H_2O used (hyposomolar @ 220mmol/L) – non-conductive, non-haemolytic and has a neutral visual density
- patients absorb around 20mL/min
- average absorption = 1.5L (up to 4.5L)
- ↑absorption if:
  - ↑pressure of infusion (keep bag <60cm - never >100cm),
  - ↓venous pressure ⟹ ↑absorption
  - large blood loss ie ↑ed open veins
  - capsular perforation
  - length of surgery >1hr
  - ↑prostrate size >50g
- risk factor = poorly controlled CHF (balance of over IVF ⟹ APO vs TURP syndrome)

Presentation

(APO, cerebral oedema, hyponatraemia)

- restlessness
- headache
- tachypnoea
- reflex bradycardia
- ↑↓bp
- hypoxia
- N+V
- visual disturbance
- confusion
- seizure
- coma
- APO
- cerebral oedema
- hyponatraemia

- Investigation =
  - VBG = low Na

↳ acute fall to 120 always symptomatic

Management
- preventing is best
- expedite surgery & finish asap
- coagulate bleeding points
- otherwise supportive Rx of ABCD
- specific:
  - stop IVF - if must then use saline
  - frusemide 40mg IV - esp if APO
  - check Hb
  - seizures: benzo's & MgSO4
    ↳ (= anti NMDA effect to counteract glycine NMDA agony)
  - ↓Na ⟹ hypertonic saline :
    - if acute can correct quickly - aim 125
      - volume of 3% saline (mls) to raise Na by 1mmol = x2 TBW (L)
      - TBW~60% of weight ∴ 0.6 x 70kg = 42L
      - ∴ 2x 42L = 84mls 3% saline needed to raise Na by 1mmol/L
      - (in practise give 1-2ml/kg/hr of 3% saline until symptom improvement)
        ↳ gives rise 1-2mmol/L/hr
    - if chronic - raise Na+ by no more than 10mmol/24hours
- ICU admission
- invasive monitoring

TURBT
= cystoscopic diathermy resection of bladder tumour

Preoperative Management
- smokers!
- co-morbidities; COPD, IHD
- Hb
- U+E
- review previous anaesthetic charts - rpt'ed surgery

Intraoperative Management
- GA (LMA) or spinal +/- sedation (get block above T10)
- lithotomy
- variable blood loss
- obturator spasm ->
  - obturator nerve runs lateral to wall of bladder
  - risk of bladder perf, damage to surgeons head & ↓surgical field
  - Strategies to prevent/Rx:
    - NMBs
    - reduce diathermy current
- antibiotic prophylaxis
- surgeon may ask for a diuretic to 'flush' the bladder (ensure patient not hypovolaemic)

Postoperative Management
- bladder spasm +++
- NSAIDS

Open Simple & Radical Prostatectomy
= open excision of prostate +/- excision of pelvic lymph nodes with anastomosis

Preoperative Management
- elderly men - as TURP
- radical more likely only done in younger with less co-morbidities
- co-morbidities; IHD, COPD, smoking
- renal function (U+E)
- HDU bed for radicals

Intraoperative Management
- supine
- moderate -> large blood loss (normally <1 litre)
- GA (ETT) +/- epidural
- remi infusion good for intra-op analgesia
- big IV
- blood warmer
- heating blankets
- cautious use of epidural until bleeding controlled
- cell salvage beneficial in radicals
- consider invasive monitoring
- FAW

Postoperative Management
- pain ++++:
  - epidural
  - RSC & PCA & simple analgesics
- urine output difficult to measure c/o irrigation
- air embolism is a complication!

Nephrectomy & Partial Nephrectomy
= excision of kidney for tumour, other pathology or live donor

Preoperative Management
- note pathology requiring removal of kidney
- co-morbidities; HT, DM, renovascular disease, paraneoplastic issues (10-40%)
- BP
- Hb (renal tumours can cause anaemia without blood loss)
- U+E (renal failure, inappropriate ADH production from renal tumour)
- CXR: mets, effusions?
- consider autotransfusion preoperatively
- is procedure laparoscopic or open (now v rare)
- predict post op GFR = current/2
- discuss with surgeon how invasive tumour looks (IVC involvement) - prepare for massive blood loss

Intraoperative Management
- position:
  - supine
  - kidney position -
    - lateral with table broken, pt extended over hump
    - can get decreased VR from LL & IVC compression
    - pressure care impt
- GA (ETT + IPPV) +/- thoracic epidural or rectus sheath catheter or wound catheter
- variable blood loss
- tumour surgery -> paramedian or transverse laparotomy incision
- donor surgery -> loin incision with retroperitoneal approach
  ↳ requires kidney position

- have blood products ready
- large IV access
- invasive monitoring if indicated
- use epidural cautiously until bleeding controlled

Post-operative Management

- pain ++++
    - epidural - need cover to T7/8
    - PCA,
    - wound catheters
    - intercostals block - analgesia for several hours
    - NSAIDS

Complications

- bleeding
- PTx
- PE
- post op pain
- vagal tone

Partial Nephrectomy

- ↑ingly used if well localised tumour or if only 1 kidney
- blood loss can be large - difficult haemostasis
- some surgeon request:
    - mannitol 12.5g , furosemide 10mg +/- heparin 3000 IUs before clamping renal artery
    - cooling with ice
    - = attempt to maintain perfusion & ↓ischaemia

Radical Cystectomy

= excision of bladder + urinary diversion (ileal conduit or bladder reconstruction)

Preoperative Management

- IHD, COPD, renal function
- FBC
- cross match
- book HDU bed
- VTE prophylaxis
- consider preoperative IVF to offset loss from bowel prep

Intraoperative Management

- pain ++++ ⟹
    - epidural - use cautiously until haemostasis
- lithotomy +/- head down
- GA + invasive monitoring
- cell salvage (discontinue once bowel open)
- antibiotics
- large IV access
- blood warmer
- blood on floor
- N/G
- hypothermia cares
- air embolism possible complication

Postoperative Management

- commonest post op complication = ileus
  ↳ enhanced recovery shown to ↓risk:
  - avoid bowel prep
  - late pre-op CHO meal (1hr preop) & early post op feeding
  - restrictive fluid incl minimising Na load in fluids,
  - early mobilisation,
  - regional analgesia:
    - wound catheters after first incision:
      - can run for up to 5days
      - visceral pain generally only last 24-36hrs post op - use IV or neuraxial opioids
    - spinal, epidural analgesia -
- NSAIDs - some evidence ↑anastomotic leak with use
- PCA or epidural for 2/7
- close fluid management - unreliable to measure UO out of conduit as is positional
- leakage of ureteric anastamosis = urine coming out of surgical drain

Robot Laparoscopic Prostatectomy

- comonest use of robot in radical prostatectomies
- advs to surgeon:
  - 3d vision
  - filtration of hand tremor
  - scaling of hand movements
  - ↑ed range of movement inside patient
  - stable comfortable position
- advs to patient:
  - ↓blood loss
  - ↓pain
  - ↓LOS
  - +/- ↓incontinence & urinary regurgitation

Preoperative

- steep head down tilt intraop ⟹ premed omeprazole 40mg + OG tube
- consider using bean bag to securely position pt
- operating team familiar with equipment - must be able to undock robot rapidly if emergency

Perioperative

- long operation with steep head down:
  - neurapraxia - brahcial & LLs
  - facial oedema
  - acid burns from GI reflux - place OG tube with drainage
  - ↑ed ICP & ↑IOP
- careful ETT placement
- good IV access - limited access to pt after starting
- A line - limited pt access
- must ensure no movement (gravely affects robot positioning) = infusion remi +/- mm relaxant

End of case

- leak test - to Ax for tracheal swelling

Postop

- risk of cerebral oedema - des & remi allow rapid wake up and assessment
- common to see some cerebral irritation

Percutaneous Stone Removal (PCNL)

= endoscopic excision of renal stone via nephrostomy

- generally for larger stones

Preoperative Management
- usually young health adults -> but stones may be due to underlying metabolic problem
- may have neurological disability (bladder dysfunction)
- check renal function

Intraoperative Management
- lithotomy (stent insertion) -> prone to place nephrostomy under II guidance
- GA (ETT - armoured)
- eye and pressure area cares
- support chest and pelvis to allow abdominal excursion
- antibiotic prophylaxis
- hypothermia cares - lot fluid used by surgeon
- nephrostomy often inserted near diaphragm (potential for pneumothorax/hydrothorax)
- rupture of renal pelvis can take place

Postoperative Management
- variable pain
- NSAIDS if not contra-indicated
- monitor for
    - bacteraemia - often gram -ve
    - Urinary obstruction

Complications
- bleeding
- prone risks
- fluid absorption - TURP syndrome
- ↓temp
- PTx or hydrothorax

Extracorporeal Shock Wave Lithotripsy (ESWL)

= non-invasive fragmentation of renal stones using pulsed U/S
- now uncommon to need anaesthesia or sedation
- stones <20mm in upper tract
- need unobstructed system to flush bits out

Preoperative Management
- premeds; diclofenac, pethidine
- review previous anaesthetic record
- pacemaker care
- often remote anaesthesia & day stay

Intraoperative Management
- sedation for adults, GA for children
    ↳ GA adult if long procedure planned/restless
- lateral position with arms above head
- antibiotic prophylaxis
- stones located with U/S or II -> shock wave focused on stones
- can cause arrhythmias -> can time shock waves with ECG refractory period
    ↳ (can use glycopyrulate to ↑HR ∴ ↑frequency of shocks to ↓overall time)
- if siting an epidural use LOR to saline as shock wave released when it meets an air/water interface
- Anti-emetics - GI bruising can ⟹ PONV

Postoperative Management
- simple analgesia

Renal Transplant
= transplant of cadaveric or live donor organ
- 95% 5yr graft survival

Preoperative Management
- Indications are ESRF 2nd to:
    - DM
    - GN
    - HTN - chronic
- major contraindications:
    - active malignancy or infection
    - severe vascular disease
    - recent ACS
    - end stage organ disease
    ↳ ↑ingly relaxed rules around who can receive transplant
- CRF related co-morbidities:
    - CVS eg HTN, IHD, LVF
    - Resp eg pulmon oedema, effusions
    - CNS eg periph neuropathies, autonomic neuropathy
    - Haem eg Anaemia, R shift OHDC (↑2,3DPG), ↓platelets
    - GI: Peptic ulcers, N&V
- Last dialysis - to within 0.5Kg of IBW
- Degree of hypovolaemia
- Anti-coagulation
- fistulae
- FBC, U+E
    - chronic anaemia common & does not need to be overly corrected
        ↳ EPO used to target Hb 95
    - check K post dialysis
- donors must be ABO compatbile (HLA matching not as strict)
- donor organ cold ischaemic time can be up to 72hrs but ideally <18hr

Intraoperative Management
- IV lines - avoid large antecubital veins & AV fistula
- palpate AV fistulas regularly to ensure remain patent
- fluid load prior to induction
- supine
- GA (ETT) - note ↑risk of aspiration (due to uraemia)
    - Drugs:
        - consider avoiding sux ⟹ ↑K
        - alfentanil/remi to cover induction HTN
- invasive monitoring - A line, CVL for CVP monitoring
- methylprednisolone on induction
- target MAP 80-90
- pain +++
- sevo, atracurium, fentanyl
- at re-perfusion - transient ↑K 0.5 mmol/l
- gradual increase CVP to 10-12mmHg prior to graft insertion (may need up to 60ml/kg of fluid)
- normothermia
- ↑graft survival: post graft perfused use drug cocktail as protocol (hydrocortisone 100mg, mannitol 20% 60ml, frusemide 80mg)

Postoperative Management
- fentanyl PCA
- epidural -
    - may not be required in terms of pain
    - risk of residual anticoagulation & platelet dysfunction
- avoid NSAIDs
- maintain mild hypervolaemia (follow local protocol)
- monitor U&Es closely
- HDU post op

Living Donor
PreOp
- Majority ASA 1&2 patients
- generally need ABO match but if living donor, with time & Rx (immunosupressant) can even donate against ABO
- HTN no longer a contraindication as long as creatinine norm & no urinary protein
- DM is a contraindication for donor

IntraOp
- no routine prophylactic Abx
- prophylactic LMWH
- epidural/PVB/wound catheters with GA
- avoid NSAIDs
- fluid loading to minimise use of vasopressors
- heparin before arterial clamping then protamine after isolation
- high normal urine output
- fentanyl PCA

Post Op
- LMWH for 5/7
- complications:
    - standard surgical problems
    - transient rise in creatinine - usually norm within 1 month

Special Points
- unilat nephrectomy in otherwise healthy donor doesnt affect mortality
- remaining kidney hypertrophies $\Longrightarrow$ long term renal function at 75%

Testicular Surgery
Preoperative Management
- removal/biopsy of testis, marsupialisation of hydrocele, vasectomy, testicular torsion
- painful
- day procedure

Intraoperative Management
- supine
- painful
- can do with GA, LMA +/- spermatic cord block (best done by surgeon), RSI if emergency, spinal or LA infiltration
- regional techniques need to cover (T10-S3):
    - somatic innervation (L1-S3) via ilioinguinal, genitofemoral, pudenal, post scrotal branches
    - autonomic innervation
        - SNS (T10-L4)
        - PNS (S1-S3)
- Spermatic cord block:
    - adjunct to GA or part of wider LA technique
        ↳ supplement scrotal skin also required
    - covers all nerves except pudendal & post scrotal branches
    - method:

    - blind: feel for spermatic cord as enters scrotum; place 10ml LA around it
    - surgeon: (best) performed under direct vision
- be aware of vagal stimuli

Post operative Management

- simple analgesia

Brachytherapy

- for localised tumour post volume planning
- insert radioactive iodine or palladium seeds = short range radiation
- implant procedure
- Lithotomy = rectal US probe guides insertion
- day stay/overnight procedure
- Generally GA
- Abx cover
- NSAIDs
- Urinary alkaliser
- radiation precautions

Paraplegics

- autonomic hyperreflexia
- latex allergy
- resp compromise
- ulcers
- ↓temp control
- Difficult positioning
- DVT prophylaxis