

# Surgery

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# Deep Vein Thrombosis (DVT)

Formation of semisolid coagulum in a deep vein.

## Virchow's triad

- Abnormal surface (endothelial damage)
- Abnormal flow (stasis / turbulence)
- Abnormal blood (thrombophilia)

## Factors

- Immobility
  - Age
  - Obesity
  - Prolonged surgery
  - Pregnancy
  - Puerperium
  - Varicosity (effect of immobility, the rest are causes)
- Hormone-replacement therapy (high oestrogen)
- Previous DVT / PE
- Thrombophilia

## Common sites

- Popliteal vein
- Femoral "
- Iliac "

## Prevention

- Early mobilization
- Hydration
- Compression stockings
- Prophylactic LMW heparin
- Calf pumps
- Minimal use of tourniquets

# CABG

## Investigations for IHD

- ECG (first line)
- Cardiac enzymes (in acute coronary syndrome)
- Exercise tolerance test
- Echo: Evaluate
  - ventricular function
  - regional wall motion abnormalities
  - valvular lesions
- **Coronary angiography: gold std**
  - Extent, severity and location of stenoses
  - 70% reduction of diameter (i.e. >90% reduction of cross-sec) => severe

## Indications for surgery

- 50% stenosis of the left coronary artery (“*left main stem*”)
- 50% stenosis of the proximal *LAD*
- 2/3 main coronary arteries diseased (*RCA*, *LAD*, *LCx*)

## Graft selection

### Types

- **Venous:** long saphenous vein
- **Arterial:**
  - LIMA most common (left internal mammary / left internal thoracic artery)
  - Others
    - \* RIMA
    - \* Radial
    - \* Gastroepiploic
    - \* Inf epigastric

# Blood transfusion

## Indications

- Acute blood loss
- Periop anaemia
- Symptomatic chronic anaemia

## Complications

### Single transfusion

- Haemolysis (haemolytic transfusion reaction)
- Fever (febrile transfusion reaction)
- Allergic reaction
- Infections
  - Hep B, C
  - HIV
  - Malaria
  - Bacterial inf
- Air embolism
- Thrombophlebitis
- TRALI

### Massive transfusion

- Coagulopathy
- Hypothermia
- Hypo-Ca
- Hypo-K
- Hyper-K

## Blood & blood products

- Whole blood
- Components
  - Packed red cells
  - FFP
    - \* Plasma stored at -40 to -50°C
    - \* Rich in *coagulation factors*
    - \* 2y shelf-life
  - Cryoprecipitate
    - \* Supernatant of FFP
    - \* Rich in *factor VIII* and *fibrinogen*
    - \* Stored at -30°C
    - \* 2y shelf-life
  - Platelet concentrate
  - Prothrombin complex concentrate

## Clinical factoids

- Target Hb level: 10g/dL
- 1 unit transfusion = 1g/dL improvement

# Burns

## Mechanism of fluid loss

Intense inflammation in burnt areas  $\rightarrow$   $\uparrow$  permeability  $\rightarrow$  leakage of fluid into extravascular compartment

## Assessment

- Rule of 9:
  - First approx
  - Adult
    - \* Head-neck  $\rightarrow$  9%
    - \* Each upper limb  $\rightarrow$  9%
    - \* Torso front 18%
    - \* Torso back 18%
    - \* Each lower limb 18%
    - \* Perineum 1%
- Lund and Browder chart
  - More accurate
- For smaller burns, a piece of paper about the size of the hand to measure the burnt area directly. Size of hand  $\approx$  1%.

## Fluid resuscitation

### Indications

- **If  $>10\%$  TBSA in children or  $>15\%$  TBSA in adults (B&L)**
- To correct hypovolaemia
- " " electrolyte imbalance
- To prevent shock
- To provide nutrition

### Principles

- **Parkland formula:**  $4 \cdot W \cdot A$  mL fluid for the 1st 24h
  - Infuse  $\frac{1}{2}$  over 8h,  $\frac{1}{2}$  over 16h
- First 12h  $\rightarrow$  crystalloid only (massive fluid shift to extravascular compartment takes protein out with it)
- Then add colloid (human albumin solution)
  - Provides necessary oncotic pressure for keeping infused fluid within the vascular compartment

## Definitive management

### Superficial partial-thickness burns

- Regular dressing
- Heal spontaneously within 2 wks without scar irrespective of choice of dressing

### **Deep partial-thickness/full-thickness burns**

- Nanocrystalline silver dressing until surgery (to prevent colonisation)
- Escharotomy for circumferential full-thickness burns
- Debridement + split-skin grafting
- Without surgery, heal by hypertrophic scarring

### **Nanocrystalline silver dressing**

- 1% silver sulfadiazine
- 0.5% silver nitrate
- Mafenide nitrate
- Silver sulfadiazine + cerium nitrate



# Grafts and Flaps

## Graft

- Tissue transferred *without its original blood supply*
- Need to revascularise in recipient site

## Types of skin graft

- Split-thickness skin graft: epidermis + part of dermis
- Full-thickness skin graft: epidermis + whole dermis
- Composite skin graft: skin + cartilage, skin + fat etc.

## Flap

- Tissue transferred *with its original blood supply*

## Causes of graft failure

- Inadequate vascularity of recipient site: due to
  - residual pus
  - residual exudate
  - residual dead tissue
- Haematoma
- Shearing forces
- Group A  $\beta$ -haemolytic streptococcal infection
  - can destroy grafts completely
  - hence, contraindication to grafting

## Important anticancer drugs

- **Mitosis interferers**
  1. Vincristine
  2. Vinblastine
  3. Taxanes (e.g. Paclitaxel)
- **Antimetabolites** (i.e. DNA synthesis inhibitors)
  1. Methotrexate
  2. 5-FU
- **DNA damagers**
  1. Platinum drugs
    - Cisplatin
    - Carboplatin
    - Oxaloplatin
  2. Cyclophosphamide
  3. Bleomycin
  4. Doxorubicin
  5. Etoposide
- **Hormones**
  1. Tamoxifen: ER blocker (Breast ca)
  2. Goserelin: GnRH analogue; downregulate ant. pituitary → ↓ testosterone (Prostate ca)
  3. Flutamide: Androgen antagonist (Prostate ca)
  4. Bromocriptine: D2 agonist; blocks ant. pituitary stimul (Pituitary tumour)

# Varicose veins

## Management principles

- Avoid prolonged standing
- Compression stockings
- **Endothermal ablation**
  - *Laser ablation*
  - *Radiofrequency ablation*
- US-guided sclerotherapy
  - Sclerosing agent: sodium tetradecyl sulfate
- Open surgery
  - Sapheno-femoral junction (SFJ) ligation + great saphenous vein (GSV) stripping (*Trendelenburg operation*)

# Deadly Dozen and ATLS

## “Deadly dozen” of chest injury

### Immediately life threatening

*Manage in 1<sup>o</sup> survey*

- Airway obstruction
- Tension pneumo
- Open pneumo
- Massive haemothorax
- Flail chest
- Pericardial tamponade

### Potentially life threatening

*Manage in 2<sup>o</sup> survey*

- Tracheobronchial injury
- Oesophageal injury
- Aortic injury
- Myocardial contusion
- Pulmonary contusion
- Diaphragm rupture

# Lung cancer

## Types

- Non-small cell (NSCLC)
  - Squamous
  - Adeno
  - Large cell
  - Carcinoid
- Small cell (SCLC)

## Features

- Cough (esp. changing cough)
- Dyspnoea
- Haemoptysis
- Wt loss
- Chest pain
- Clubbing
- Pancoast → compress sympathetic trunk → *Horner's*
  - Miosis
  - Enophthalmos
  - Anhidrosis
  - Partial ptosis
- Paraneoplastic features (SCLC)
  - SIADH
  - Cushing
  - Lambert-Eaton

## Investigations

### Diagnostic

- Chest X-ray
- Chest CT
- Sputum cytology
- Bronchoscopy + biopsy
- PET-CT

### Staging

- USG whole abdomen
- X-ray skull
- Bone scintigraphy (aka isotope bone scan)
- Pleural fluid cytology (if effusion)

## Treatment

- If NSCLC && within T3 N1 M0
  - Surgery: Choice depends on extent of pathology
    1. Segmentectomy
    2. Lobectomy
    3. Pneumonectomy
  - Chemo:
    1. Platins
    2. Gemcitabine
  - Radio
- Else (i.e. SCLC and > T3N1M0 NSCLC)
  - Palliative therapy
  - Surgery not helpful
  - Median survival: a few months

# Low Back Pain (LBP)

## Causes

- **Strenuous work**
- **Primary Back Pathologies**
  - *Spondylosis*: degenerative arthritis of the spine
  - *Spondylolisthesis*: forward slippage of vertebral body
  - *Spondylolysis*: defect in pars interarticularis without slippage
  - Lumbar *disc herniation*
  - *Spinal stenosis*: narrowed spinal canal → compression of spinal cord/nerve roots
  - *Fractures*
  - *Cauda equina syndrome*
    - \* Compression of cauda equina nerve roots
    - \* Most freq cause ⇒ lumbar disc protrusion at L4/5
  - *Scoliosis*
  - *Discitis*
- **Infections**
  - *Epidural abscess*
  - *Pott's disease*
- **Metastatic disease**
  - Sources:
    - \* Thyroid
    - \* Breast
    - \* Lung
    - \* Kidneys
    - \* Prostate
- **Autoimmune conditions**
  - *Ankylosing spondylitis*