Surgery

Susmit

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Contents

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 → ↑ permeability → leakage of fluid into extravascular compartment

Assessment

- Rule of 9:
  - First approx
  - Adult
    - Head-neck → 9%
    - Each upper limb → 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 ≈ 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 → 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 β-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 $\rightarrow \downarrow$ 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° survey

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

Potentially life threatening

Manage in 2° 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
  - *Spondylolysis*: defect in pars interarticularis without slippage
  - *Spondylolisthesis*: forward slippage of vertebral body
  - 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*

Investigations

- Plain X-rays
- CT: Best for assessing **bone anatomy**
- MRI: Detailed visualization of
  - Spinal cord
  - Meninges
  - Epidural space
  - Discs
  - Nerve roots
  - Bone marrow
- Bone scintigraphy
- DEXA (dual energy x-ray absorptiometry) scan: measure bone density
- Provocative discography
- Spinal biopsy

Orthopaedic emergencies

Open DESC

- Open fracture
- Dislocation
  - Because dislocation ⇒ ruptured synovial membrane ⇒ stoppage of synovial fluid production ⇒ articular cartilage, which has no blood supply and derives nutrition from synoFlu, eventually dies ⇒ waiting too long can lead to permanent joint immobility
- Epiphyseal injury
- Septic arthritis
- Compartment syndrome