

# *General Complications of Surgery*

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# Airway Obstruction

- *Obstruction by the tongue* may occur with a depressed level of consciousness
  - Loss of muscle tone causes the tongue to fall back against the posterior pharyngeal wall, and may be aggravated by masseter spasm during emergence from anaesthesia.
  - Bleeding into the tongue or soft tissues of the mouth or pharynx may be a complicating factor after operations involving these areas.
- *Laryngeal spasm* can occur at light levels of unconsciousness and is aggravated by stimulation
- *Laryngeal oedema* may occur in small children after traumatic attempts at intubation, or when there is infection (epiglottitis)
- *Tracheal compression* may follow operations in the neck, and compression by haemorrhage as after thyroidectomy

# Hemorrhage

- Types:

1. Primary that occur during surgery
2. Reactionary or Reactive bleeding is usually caused by a slipped ligature or dislodgement of a diathermy coagulum as the blood pressure recovers from the operation.
3. Secondary bleeding typically occurs 7–10 days after an operation and is due to infection eroding a blood vessel. Rigid drain tubes may also occasionally erode a large vessel and cause dramatic late postoperative bleeding.

# General complications

- Nausea and vomiting can be caused by surgery and/or anaesthesia, and an antiemetic can prove useful
- Transient hiccups in the first few postoperative days are usually subsiding
- Persistent hiccups can be a serious complication, exhausting the patient and interfering with sleep, and may be due to diaphragmatic irritation, gastric distension or metabolic causes, such as renal failure.

- Spinal anaesthesia may cause headache as a result of leakage of cerebrospinal fluid, and patients should remain recumbent for 12 hours after this form of anaesthesia

- Intravenous administration of irritant drugs or solutions can cause bruising, haematoma, phlebitis and venous thrombosis
- Sites of cannula insertion should be checked regularly for signs of infection, and the cannula replaced if necessary
- Arterial cannulae and needle punctures are the most common cause of arterial injury, and may rarely lead to arterial occlusion and gangrene.

# Pulmonary complications

- Respiratory complications remain the largest single cause of postoperative morbidity and the second most common cause of postoperative death in patients over 60 years of age
- Pulmonary complications are more common after emergency operations
- Once a patient has fully recovered from anaesthesia, the main respiratory problems are pulmonary collapse and pulmonary infection
- Pulmonary embolism is a major complication of deep venous thrombosis.

# Atelectasis & pneumonia

- A common complication of surgery and usually occurs after 36 hrs
- It leads to increased work of breathing and impaired gas exchange
- The clinical signs include rapid respiration, tachycardia and mild pyrexia, with diminished breath sounds and dullness to percussion over the affected segment
- The most common cause of D 1-2 fever secondary to inflammatory mediators



- Inability to breathe deeply and cough up bronchial secretions is the primary cause.
- Contributory factors include
  - Paralysis of cilia by anaesthetic agents,
  - impairment of diaphragmatic movement,
  - over-sedation,
  - abdominal distension and
  - wound pain.
- If untreated, secondary bacterial infection will supervene, causing lobar or bronchopneumonia.

# Aspiration

- usually presents with acute dyspnea and fever
- CXR might be normal initially but subsequently can demonstrate a pattern of diffuse interstitial infiltrates
- Therapy is supportive, and antibiotics are typically not given empirically

# Respiratory failure

- Respiratory failure is defined as an inability to maintain normal partial pressures of oxygen and carbon dioxide ( $PaO_2$  and  $PaCO_2$ ).
- Blood gas determinations are the key to its early recognition and should be repeated frequently in patients with previous respiratory problems.
- Severe hypoxaemia may result in visible central cyanosis.
- In type 1 respiratory failure there is hypoxia and in type 2 there is hypercarbia with hypoxia.

# Acute respiratory distress syndrome (ARDS)

- American- European consensus conference criteria
  - Bilateral Chest X ray infiltrate
  - Pulmonary artery wedge pressure  $\leq 18$  mmHg
  - Ratio of  $\text{PaO}_2/\text{FiO}_2$  ( partial pressure of arterial oxygen to fraction of inspired oxygen) of  $\leq 200$
- Acute onset

# Pleural Effusion

- Small pleural effusions are not uncommon following upper abdominal surgery, but are usually of no clinical significance.
- They may be secondary to other pulmonary pathology, such as collapse/consolidation, pulmonary infarction or secondary tumour deposits.
- The appearance of a pleural effusion 2–3 weeks after an abdominal operation may suggest the presence of a subphrenic abscess.
- Small effusions may be left alone to reabsorb if they do not interfere with respiration otherwise pleural aspiration is performed.

# Pneumothorax

- The most common cause of postoperative pneumothorax is the insertion of a central venous line, and a chest X-ray is necessary after this procedure to exclude this potential complication.
- There is also an enhanced risk of pneumothorax in patients on positive-pressure ventilation, presumably owing to rupture of pre-existing bullae.
- The insertion of an underwater seal drain is usually followed by rapid expansion of the lung

# MI

- The presentation of myocardial ischemia in the postoperative patient is often subtle, as incisional pain may be difficult to differentiate from chest pain.
- Frequently, perioperative MI is silent or presents with dyspnea, hypotension, or atypical pain.
- DDX of postoperative chest pain include myocardial ischemia or infarction, PE, pneumonia, and, less commonly, pericarditis, aortic dissection, and pneumothorax.

# Heart failure

- Clinical manifestations are progressive dyspnoea, hypoxaemia and diffuse congestion on chest X-ray.
- Excessive administration of fluid in the early postoperative period in patients with limited myocardial reserve is a common cause, which can be avoided by monitoring CVP.



# Arrhythmia

- Sinus tachycardia is common and may be a physiological response to hypovolaemia or hypotension.
- It is also caused by pain, fever, shivering or restlessness.
- Tachycardia increases myocardial oxygen consumption and may decrease coronary artery perfusion.
- Sinus bradycardia may be due to vagal stimulation by neostigmine, pharyngeal irritation during suction, or the residual effects of anaesthetic agents.
- Atrial fibrillation is the most common postoperative arrhythmia.

# Urinary retention

- Inability to void postoperatively is common, especially after groin, pelvic or perineal operations, or operations under spinal/epidural anaesthesia.
- Postoperative pain, the effects of anaesthesia and drugs, and difficulties in initiating micturition while lying or sitting in bed may all contribute.
- Males tend to be more commonly affected than females.
- When its normal capacity of approximately 500ml is exceeded, the bladder may be unable to contract and empty itself.
- Frequent dribbling or the passage of small volumes of urine may indicate overflow incontinence, and examination may reveal a distended bladder

# Urinary tract infections

- UTIs are most common after urological or gynaecological operations.
- Pre-existing contamination of the urinary tract, urinary retention and instrumentation are the principal factors contributing to postoperative urinary infection.
- Cystitis is manifested by frequency, dysuria and mild fever
- Pyelonephritis by high fever and flank tenderness.

# Wound infection

- the most common complication in surgery.
- The incidence varies from less than 1% in clean operations to 20–30% in dirty cases.
- Subcutaneous haematoma is a common prelude to a wound infection, and large haematomas may require evacuation.
- Signs include local erythema, tenderness, swelling, cellulitis, wound discharge or frank abscess formation, as well as an elevated temperature and pulse rate.
- If a wound becomes infected, it may be necessary to remove one or more sutures or staples prematurely to allow the egress of infected material. The wound is then allowed to heal by secondary intention.
- Antibiotics are only required if there is evidence of associated cellulitis or septicaemia.

# Wound Dehiscence

- The incidence of abdominal wound dehiscence should be less than 1%.
- Wound dehiscence may be partial (deep layers only) or complete (all layers, including skin).
- A serosanguinous discharge is characteristic of partial wound dehiscence.
- The extrusion of abdominal viscera through a complete abdominal wound dehiscence is known as evisceration.
- Risk factors include obesity, smoking, respiratory disease, obstructive jaundice, nutritional deficiencies, renal failure, malignancy, diabetes and steroid therapy; however, the most important causes are poor surgical technique, persistently increased intra-abdominal pressure, and local tissue necrosis due to infection.
- The wound should be resutured under general anaesthesia.
- Incisional herniation complicates approximately 25% of cases.

# Haematology

- DVT
- PE

# ***SIRS***

- ***Two of:***

- hyperthermia ( $>38^{\circ}\text{C}$ ) or hypothermia ( $<36^{\circ}\text{C}$ )
- Heart rate ( $>90/\text{min}$ , no  $\beta$ -blockers)
- Tachypnoea ( $>20/\text{min}$ ), or  $\text{PaCO}_2 < 32 \text{ mmHg}$
- White cell count  $>12 \times 10^9/\text{l}$  or  $<4 \times 10^9/\text{l}$  or  $> 10 \%$  bands

- Sepsis
  - SIRS with a documented infection
- Severe sepsis
  - Sepsis with evidence of one or more organ failures [respiratory (acute respiratory distress syndrome), cardiovascular ( Hypotension responding to IVF ) renal (renal failure ), GI, hepatic, blood coagulation systems or CNS]
- Septic shock
  - Hypotension not responding to Fluid resuscitation requiring inotropic support



# Diagnosis of Surgical Site infection

- Superficial SSIs can be identified by pyrexia, local erythema, pain and excessive tenderness, and sometimes discharge.
- Deeper infection may present more insidiously with pyrexia, leucocytosis, and organ dysfunction such as prolonged postoperative ileus.
- Diagnosis may require radiological imaging and sometimes exploratory laparotomy.

# Prevention of SSI

- The risks of SSI can be reduced by:
  - Careful surgical technique to minimize tissue damage, bleeding and haematoma
  - Appropriate antibiotic prophylaxis
  - Avoidance of infective surgical complication if possible e.g. anastomotic leak
- CATS
  - Clipping of the Hair
  - Abx prophylaxis
  - Temperature: avoid hypothermia or hyperthermia
  - Sugar, tight control of blood sugar

# CLASSIFICATION OF SURGICAL WOUNDS

- **Clean** (no viscus opened & no prosthesis)
  - Usually no prophylaxis indicated unless
    - There is prosthesis eg mesh for hernia
    - Immunocompromised
    - Redo surgery
- **Clean-contaminated** (viscus opened, minimal spillage)
  - Prophylactic is indicated
- **Contaminated** (open viscus with spillage or inflammatory disease)
  - Not any more prophylactic it is therapeutic
- **Dirty** (pus, necrosis or perforation, or incision through an abscess)
  - Not any more prophylactic it is therapeutic

# Postoperative fever 7 Ws

- **Wind** Atelectasis, Day 1-2
- **Water** UTI, Day 3
- **Wound** including wound infection & anastomotic leak, Day 5-7
- **Walking** DVT & PE, day 7
- **Wonder Drug** anytime
- **Waste** C diff colitis, anytime
- **Waterway** blood stream eg central line infection, any time

*Thank You*