Post Operative Complications

- Best way to avoid complications is not to do surgery as every surgery carries risk of certain complications with it, e.g. 3% of wound infection is always present

- Ability to recognize, minimize and treat post operative complications differentiate between good and bad surgeons.

- Never ignore signs of complications as they need to be recognized early to reduce mortality and morbidity.

Classification of Complications

- **Immediate**: complications occurring during or directly after surgery:

- Primary Hemorrhage (to be explained later in the sheet)
- Pulmonary Embolism
- Sepsis
- Basal atelectasis (to be explained later in the sheet)
- Blood loss/ shock... Myocardial Infarction, renal problem during surgery

-**Early:** after procedure before going home

- Secondary Hemorrhage
- Confusion
- Bowel Obstruction
- Wound Infection
- Fever
- Pneumonia
- DVT
- UTI (urinary tract infection) or urinary retention
- Ileus

- **Late:**

- Incisional Hernia

- Fibrous adhesions (can lead to bowel obstruction if adhesion ,fibrous band due to healing, is present between serosa and serosa for example)
- Recurrent need of surgery e.g. due to malignancy
- Persistent wound sinus

**** We will now talk about some of the post surgical complications in more detail, including bleeding, DVT, respiratory, urinary and bowel complications, and anastomotic leaks.***

Bleeding

Bleeding can be classified into:

- **Revealed** (obvious external bleeding)

- **Concealed** (no obvious external bleeding e.g. ruptured spleen, haemothorax, bleeding inside of pelvis or abdomen, fracture of femur..)

Other classification of bleeding:

- Primary: Immediate bleeding during surgery or directly after

- **Reactionary**: Bleeding within 24 hours of operation due to dislodgement of blood clot (during anesthesia blood pressure was down and that kept the clot in place in small vessels, but when BP rises after removal of anesthesia the clot maybe dislodged causing bleeding)

- **Secondary:** 7 - 14 days after surgery due to infection, necrosis or malignancy.

**Other classification of bleeding include bleeding to surgical reason, or due to non- surgical reasons e.g. use of anti-coagulants as warfarin, heparin or coagulopathies (factor H and C deficiencies, platelet disorders) .*

Management of Bleeding

1) **Identify** that there is bleeding, notice: swellings, Hemoglobin level (anemic), blood pressure (hypotensive), hoarseness of voice (bleeding causes pressure on a laryngeal nerve)...
2)**Resuscitate** patient, give IV fluid, and take blood sample

3) Find the **Site** of bleeding

4) **Control** the bleeding (must determine cause; surgical, non-surgical)

Deep Vein Thrombosis (DVT)

- Virchow described DVT due to: **endothelial damage** (can be caused from lying supine for long time e.g. for 3-4 hours in surgery), **stasis** (patient is dehydrated; fasting for surgery, medication..), and **coagulopathy.**

Risk Factors:

- Strong: (odds ratio > 10)

- surgery, e.g. pelvic (especially major more serious surgeries)
- hip or knee replacement
- hip or leg fracture
- spinal cord injury
- major trauma

- **Moderate** (odds ratio 2 - 9)

- Previous DVT
- Thrombophilia
- Paralytic stroke
- Central venous line
- Congestive heart failure
- Oral Contraceptive Pills (OCP)
- Hormone replacement therapy
- Pregnancy or recent pregnancy
- Chemotherapy
- Malignancy

- **Low** (odds ratio <2)

- No movement (immobility)

Diagnosis

- Clinical examination is not useful, so can't be sure if DVT is present, need to do doplex scan

Prevention

Risk assessment must be done. Early mobilization after surgery, pneumatic compression (tubes inserted on calf muscles to keep them contracting), elastic stoking (something like long socks), chemical prophylaxis (e.g. heparin) can be used to reduce DVT risk

Fig1: Pneumatic compression

Respiratory Complications

- **Atelectasis** : failure of lung expansion (collapse of alveoli) and is the most common respiratory complication, and usually on 2nd post-op day in basal alveoli.

Signs of atelectasis post-op include: raised temperature on the first or second day with tachypnea, tachycardia...

Treatment: Mobilization, Physiotherapy (encouraging deep breathing and coughing), positive pressure ventilation (PPV), No antibiotics

- Other respiratory complications include pneumonia, bronchitis, respiratory failure..

Risk factors for respiratory complications post-op generally speaking:

- Smoking/ COPD
- Heart Failure
- Long duration of surgery
- Low level of consciousness after surgery
- Obesity
- Alcohol use
- Age
- **Type of surgery**: the **closer** the surgical incisions to the chest the more likely respiratory complications will develop, e.g. greater risk with upper abdomen (closer to diaphragm) or chest incision than lower abdomen incision. Also **neurosurgery** can affect level of consciousness increasing the risk. Incisions causing more **pain** post-op carries greater risk, e.g. midline incisions more painful than transverse incisions so greater chance for respiratory complication, and open incisions are more painful than use of laparoscopy so greater risk. Also more risk with emergency surgeries, and head/neck surgeries. So better post-op pain control and higher level of consciousness can be protective, e.g. use nerve blocking agents or epidural anesthesia instead of narcotics.

Urinary Complications

Urinary Retention: very common, occurs with10% of patients post-op, can cause pain and risk for infection.

Risk factors:

- Old Age
- Male
- Long surgery
- Anal surgery
- A lot of fluid given during surgery especially for patients with prostatic enlargement or past urinary retention history

Kidney Injury

- Can be due to prolonged dehydration, blood loss, hypotension or use of contrast. It can occur due to ignorance of underling kidney disease as many are subtle.

Bowel Complications

Paralytic Ileus: Late return of bowel function; temporary disruption of peristalsis

- **Signs**: Delayed passage of gas or stool, abdominal distention, nausea, anorexia, vomiting

- **Risk Factors**:

- Any post-op complications as hemorrhage, pneumonia...
- Abdominal surgeries
- Narcotics, e.g. morphine
- Too much IV fluid intake (leads to gut edema causing paralytic ileus)
- Hypokalemia
- Sepsis, infection, peritonitis

* Always **monitor** patient nutrition in a case of paralytic ileus; usually recover in couple of days. Patients with ileus for more than 1 week will require parental nutrition and correction of any underlying cause (think risk factors).

* Other bowel complications include bowel **adhesions** and **obstruction**.

Anastomotic Leaks

- It is a complication in which an anastomosis of blood vessels done by the surgeon leaks after surgery.

- Can be minor or major enough to kill the patient.

- **Risk Factors/ Causes**:

- **Distal** anastomosis more likely to leak than proximal, e.g. greater risk in distal colon than in small bowel.
- Poor **nutrition** (is the most important risk factor, e.g. in Crohn's patients)
- Sepsis/ peritonitis
- Poor surgical technique
- Peripheral **Vascular** Disease (compromise blood supply): suspect in long time smokers

* **Note**: suspect anastomotic leak if sepsis/peritonitis occur on 5th day post-op, and if anastomotic leaks occur on the 1st day then suspect poor technique. Remember that signs of sepsis include tachycardia, tachypnea, hypotension, fever and atrial fibrillation may also occur.

Conclusion

- Each procedure has its own specific complications
- Early recognition improves outcome
- Timing of complication is critical
- Prevention: always assess the risk factors and avoid doing certain procedures on high risk patients or take certain precautions, e.g. early mobilization of obese patients to avoid DVT, avoid anastomotic techniques in smokers or patient with poor nutritional intake like alcoholics, physiotherapy post-op in patient with high risk of respiratory complication..
- Review outcomes

Note: This sheet covers what the dr. said in the lecture and whatever relevant information we were able to write down from the slides during the lecture.

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