***General surgery***

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***Postoperative Complications :***

*The ability to minimize, recognize, and treat postoperative complications is one of the most important aspects of surgery*

we have different typs of complications :

1) Immediate :

***Primary haemorrhage:*** either starting during surgery or following postoperative increase in blood pressure - replace blood loss and may require return to theatre to re-explore the wound.

***Basal atelectasis:*** minor lung collapse.

***Shock:*** blood loss, acute myocardial infarction, pulmonary embolism or septicaemia.

***kidney problems ,Low urine output:*** inadequate fluid replacement intra-operatively and postoperatively.

2 ) Early :

* + Acute confusion: exclude dehydration and sepsis.
  + Fever
  + Secondary haemorrhage:.
  + Pneumonia.
  + Wound or anastomosis dehiscence.
  + DVT.
  + Acute urinary retention.
  + Urinary tract infection (UTI).
  + Postoperative wound infection.
  + Bowel obstruction.
  + Paralytic Ileus

3 ) Late :

* + Bowel obstruction due to fibrous adhesions.
  + Incisional hernia.
  + Persistent sinus.
  + Recurrence of reason for surgery - eg, malignancy.

we will start with bleeding :

bleeding has several classifications either 1 -*Revealed or Concealed*

* + ***Revealed or Concealed :***
    - Revealed : obvious external bleeding
    - Concealed: not obvious > inside the lung or in to chest/ abdomen / pelvis / femur

the second type of classifications *: Primary / Reactionary / Secondary bleeding classification:*

* + ***Primary / Reactionary / Secondary bleeding:***
* Primary: during surgery or in ICU when the patient still unstable or hen we put drain. There is drop in Hb and change in vital signs (but not very important because young patient may loss up to 30% of total volume of the blood without show an signs of bleeding or change in vital signs).

-signs of bleeding:

1- Tachycardia (early sign) and will not be seen in patients on beta blockers.

2-Hypotention.

-Usually these patients need re-exploration and return to surgical room.

* Reactionary: during 24 hours, nothing in the surgical room and everything ok then in the night or first day postop. bleeding start.

-Causes:

1-Dislodgement of clot.

2-Vasodilation🡪 usually patients under anesthesia are in the hypotensive phase so when they wake up their blood pressure will increase and causes the bleeding.

* Secondary: within 7-14 days , due to sloughing of the wall of vessel.

-Causes:

1-infection🡪 hydrolysis of the fibers that makes clots.

2-pressure necrosis.

3-malignancy.

the third type of classifications is *Surgical or non Surgical*

***Surgical*** *: result of injury or Surgery*

***Non-surgical*** *: general ooze from raw surface due to coagulopathy*

-Management of bleeding:-

1-Identify hemorrhage.

2-Resuscitation.

3-Identify site of bleeding.

4- Hemorrhage control.

*other type o complicationafter surgery:*

\*Deep venous thrombosis(common type)

-Thrombosis in deep venous system.

-Deep veins🡪 femoral, internal jugular, popliteal.

-superficial veins🡪 under skin

-Thrombophlebitis: thrombosis in superficial venous system.

(Phleb) means vein and (itis) means inflammation + thrombus

-not every inflammation is infection.

-Most of patients when we put cannula for them will have high fever (39c) because of the cannula that makes thrombophlebitis (chemical inflammation).

*As described by* ***Virchow:***

1-Abnormality in vessel wall (epithelial injury that activate platelets)🡪 cannula makes the wall abnormal and thrombogenic.

2-Stasis: no return of blood (no backflow).

3-Coagulopathy: inherited or acquired diseases

-most common acquired🡪 smoking

-most common inherited🡪 abnormal factor x so the blood is thrombogenic and the thrombosis will occur when the patients are sleep or without surgery , no risk factors , occur in abnormal sites.

-Normally DVT occur in left leg.

-DVT in upper limbs is less common.

***Risk factor for DVT:***

* *Strong risk factors (odds ratio >10):*

1-Fractures that interfere with mobility (hip or leg).

2-Hip or knee replacement.(highest)

3-Major general surgery (more than 2 hours), most of DVT occur during surgery.

4-Major trauma.

5-Spinal cord injury.

* *Moderate risk factors (odds ratio 2–9):*

1-Arthroscopic knee surgery: just inter by scope and repair.

2-Central venous lines.

3-Chemotherapy (make injury to epithelium).

4-Congestive heart or respiratory failure (stasis).

5-Malignancy (can be due to invagination of malignant cells or interferon gamma or malignancy in abdomen that make compression on veins (stasis)).

6-Hormone replacement therapy.

7-Oral contraceptive therapy.

8-Paralytic stroke.

9-Pregnancy, postpartum (after delivery).

10-Previous venous thromboembolism.

11-Thrombophillia🡪 congenital predisposition of thrombosis in veins.

* *Weak risk factors (odds ratio <2):*

1-Pregnancy, antepartum (before delivery)🡪 after delivery up to 40 days risk of DVT are more but before delivery risk of varicose veins are more.

2-Obesity.

3-Varicose veins🡪 can be as a manifestation of previous DVT. Because the major blood in the lower limbs return to the heart through deep venous system and when these veins closed by DVT the blood will return through the superficial veins that become dilated and varicose.

4-Laparoscopic surgery.

5-Immobility.

6-Bed rest more than 3 days.

Notes: any long general surgery you should give patient prophylactic

***DVT diagnosis:***

-Clinical exam is correct in ruling out DVT in 50 % of cases only

-Require radiological examination by Duplex Scan.

***DVT diagnosis*** -(Prevention of DVT):-

1- Risk assessment.

2- Early mobilization.

3-Pneumatic compression🡪 artificial device we wrap it around the legs or lower limbs of the patients to prevent stasis because this device act like calf muscle (second heart that pumps blood from lower limbs).

4-Elastic stocking🡪 make gradient pressure ( patients with varicose veins most commonly use it ).

5-Heparin prophylaxis.

***Respiratory Complication***

-Most common🡪 Atelectasis.(most common cause of hypertension after 24hs after surgery

-Failure of lung expansion

-Most common cause of Raised temperature in the first and second day postop. Tachypnea and tachycardia

-Management: physiotherapy and mobilization.

**-Other respiratory complications:-**

1-Pneumonia.

2-Bronchitis.

3-Respiratory failure.

-Risk factors:- 1- Related to patient:

a-supported by good evidence:

COPD

b-supported by fair evidence:

impaired senseorium

2-Related to procedure.

\*Common urinary complications

***-Retention:***

Inability to pass urine after surgical procedure ((the doctor said the best management for the retention::1-analgesia then relaxation 2-psycological management patient hear water sound 3- the last thing catheter

Can be up to 10 %

***Risk factors :*** old age, males, prolonged surgery , anal surgery , previous urinary retention and problems and the use of extra IV fluids intraop.

May require catheterization and medical treatment Alpha – Blockers

-How to know if the renal complications are realted to surgery ?

1-History.2-Clinical examination.3-Invastigation.

***UTI :***

-Risk : catheterization .

-Recognize early and treat with antibiotics

***Acute kidney injury:***

-This may be caused by antibiotics, obstructive jaundice and surgery to the aorta.

-It is often due to an episode of severe or prolonged hypotension.

-It presents as low urine output with adequate hydration.

-However, it is essential to differentiate it from pre-renal failure due to hypovolaemia which requires rehydration.

-In severe cases haemofiltration or dialysis may be needed while function gradually recovers over weeks or months.

***Complication after bowel surgery***

a- Ileus (paralytic ileus):

-Ileus is a blockage of the intestines caused by a lack of peristalsis. Peristalsis is the pumping action of the intestines that helps move food through the digestive system. Ileus is used to describe both full

and partial blockages. Solids (food), liquids, and gases are not able to move properly through the body when ileus occurs.

-Delayed return of function

-Temporary disruption of peristalsis: the patient may complain of nausea, anorexia and vomiting and it usually appears with the re-introduction of fluids

-Could be prolonged and require nutrition supplements

-Paralytic ileus🡪 functional

-We can't differentiate between functional and mechanical by symptoms.

-How to differentiate ?

1-History🡪 related to activity of the patient (lazy patient after surgery) and bowel feeding.

2-Electrolytes disturbances🡪hypokalemia, hypomagnesemia.

3-X-ray🡪all bowel dilated, while in mechanical obstruction the dilation distally

causes of ileus::

Intestinal blockage can be caused by injury or trauma, lack of activity, or abnormal chemical reactions in the intestines (burning). It may also be a side effect of certain pain medications, such as morphine and oxycodone.

Ileus is often caused by colon cancer, kidney disease, abdominal infection, or inflammation resulting from other conditions, such as diverticulitis. Ileus can also be caused by:

volvulus (twisted colon)

improper muscle or nerve functioning in the intestines due to surgery

infection

certain pain medications and antidepressants

disorders of the muscles or nerves (e.g. Parkinson’s disease)

b-Mechanical bowel obstruction🡪

Adhesion

Conservative management

May require surgery

c-*Anastomotic leaks*

Can be minor or majoy

Can be life threatening

Variable risk according to site of anastomosis

Risk factors ::

Poor nutrition

Poor technique

Sepsis

Peripheral vascular disease

Present with picture of sepsis and peritonitis about 5th post operative day

Treatment depend on the circumstances

***Conclusion:***

* Each procedure has its own specific complication
* Early recognition improve outcome
* The timing of the complication is critical
* Prevention

**GOODLUCK EVERYONE**