General Complications of Surgery

With all courtesy to our colleagues, Raslan and his team, a lot of our work is based on their Manual to Surgery Booklet.

- **Important**
- Mentioned by doctors but not in slides
- Additional notes from Surgical Recall 6th edition or Raslan's booklet
- Not mentioned by the doctor

431 SURGERY TEAM

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▪ Pre&Post Operative Care and Surgical Complications

Pre Operative evaluation:

- History (very important) & Physical Examinations.
- Investigations and Radiologic diagnostic tools.

  Chest X-ray should be done for patient above 40 and smokers
- Routine lab, EKG, etc.

  Echo and ECG for patients above 65 with cardiac problems.

  If patient diabetic, refer him/her to endocrinologist for consultation to assess and manage the level of glucose before surgery.

Patient/Procedure Confirmation

- Surgical Consent

  Explain the possible risks and benefits of this surgery.
- Pre-operative marking (common complication).
- "Time Out" in the operating room

  Time out: Make sure that the patient has the same name, file number and going to same procedure then they ask the Anesthesiologist and the surgeon if they have any comment.

  Sign out: from nurse to nurse.

Pre-operative Preparation :

- **Testing**
  - Determines ability to sustain surgical insult
  - Determines type of anesthesia delivery
  - Blood Pressure, Diabetes, EKG, Liver function, CBC, Chest X-ray, UA
- **Medications**
  - Day before surgery, anti-inflammatory
  - Day of surgery, antibiotics.

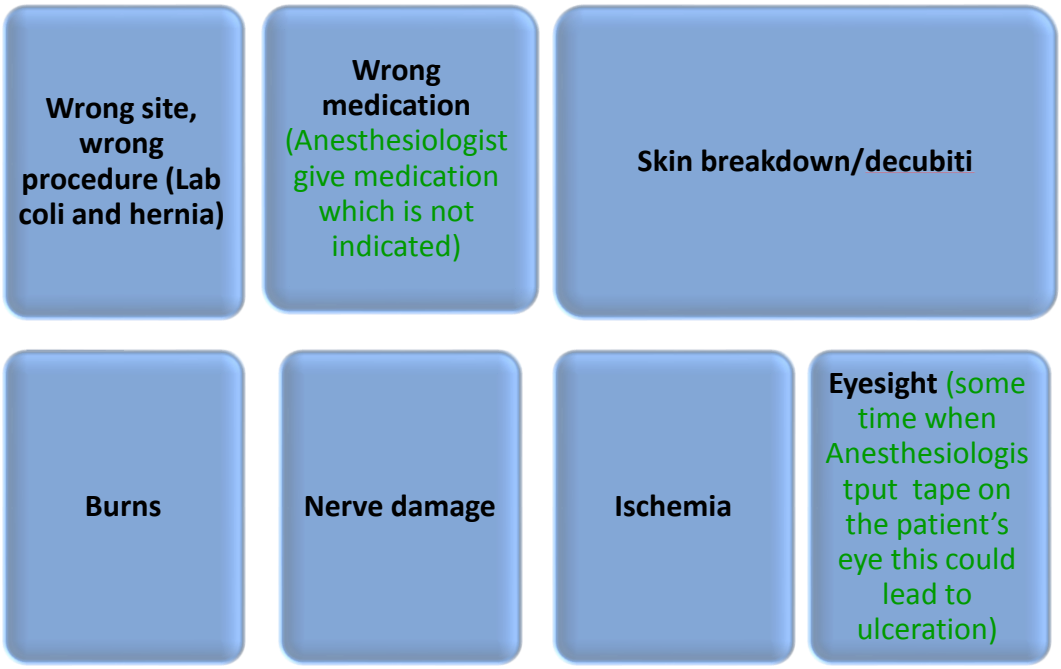
    When should you give antibiotics?

    1- Depend on the type of surgery, clean, clean contaminated or contaminated or dirty.

    2- 30 minutes to 1 hour before surgery (to reach its peak within the operation)
  - Post operation pain medications (to the patients with anxiety)
  - Smoking cessation

    Smoking should be stopped 6-8 weeks before surgery.

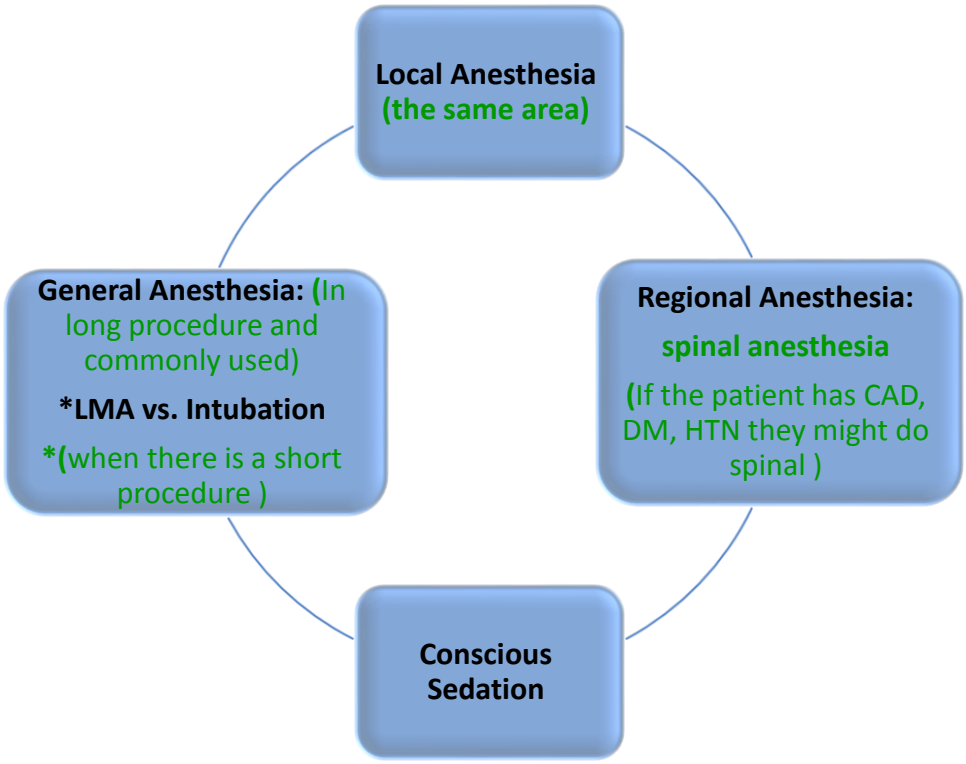
Types of Injuries:



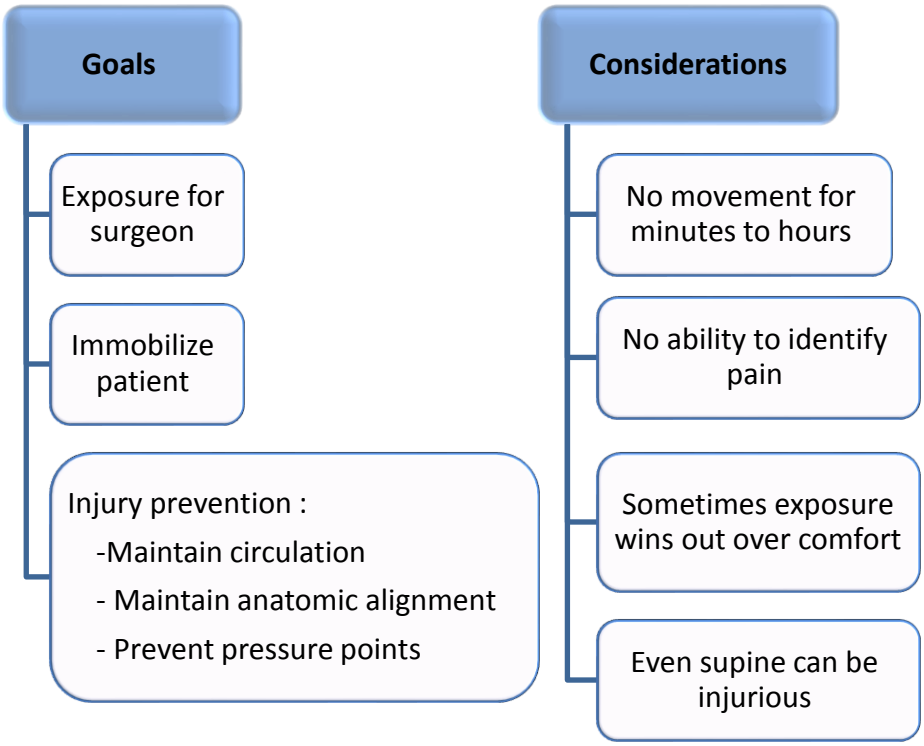
Anesthesia Choices:

– Goals of anesthesia

- Exposure, Relaxation
- Keep patient alive
- Pain free, unaware, stable



Surgical Positioning:



Classification of Post Operative complications:

1st classification:

Avoidable (Preventable, non Preventable "e.g. air embolism")

2nd classification:

Physiological, Biochemical, e.g. Anemia, Coagulopathy (medical bleeding not surgical)

3rd classification:

- Related to timing: (IMP)

Immediate, 0-24Hrs: - Secondary to :	• Anesthesia . • Pain. • Bleeding. • Shock,Renal failure
-Intermediate 1-30 days [avr. 7 day] (LOS): Secondary to :	• Organ • Systems • Other Systems
Late > 30 Days, after D/C	• changing in the skin • hypertrophy of the skin

4th classification:

Due to:

1- Anesthesia:

The anesthetic complications depend upon the mode (General, Regional & Local) and types of anesthetic (the anesthetic agent toxicity).

2- Surgery:

Specific (Procedure Related)

Perioperative: includes: befor op, within op and in recovery room. <1 day (day 0 and before)	**Postoperative**
• Haemorrhage • organ damage • electro-cautery related	• which may be considered under 2 headings: • I. Immediate or early • II. Late

I. IMMEDIATE OR EARLY POSTOPERATIVE COMPLICATIONS:

- **Respiratory:**

➢ Collapse (of the lung secondary to anesthesia it self, encourage spirometry will help in lung improvement), consolidation (Pneumonia), aspiration (during intubation the Anesthesiologist forgot to ask the patient when the last time he/ she ate) , etc.

- **Cardiovascular:**

➢ Haemorrhage (Primary (from the site of surgery), Reactionary, Secondary).
➢ Shock (Hypovolemic, septic, cardiogenic, neurogenic).
➢ Myocardial infarction.
➢ Deep venous thrombosis.
➢ Thromboembolic.

- **Septic:**

➢ Wound, abscess collections.

- **Gastrointestinal:**

  - Intestinal obstruction.
  - Anastomotic leakage, intraabdominal abscess formation, enterocutaneous fistulae.

- **Wound complications:**

  - *Infections, **dehiscence (opening of the fascia).

  *2 organisms could cause infection in the first day (clostridium and group A streptococcus)

  **Dehiscence: When we open and the organ still inside the abdomen

  Laceration: When we open and the organ go out side

- **Renal:**

  - Oliguria, acute renal failure.

  When there is a patient in the recovery room and start to have hypotension, urinary output low. Patient on maintenance and it was 60. Hypoperfusion caused oliguria, acute renal failure. Could we prevent this?

  Yes, increase maintenance and give fluids.

- **Hepatic:**

  - Jaundice, hepatocellular dysfunction/ insufficiency.

  Hepatic: there is a patient booked for lab Chole (removing the gall bladder through laparoscopy, direct bilirubin high (if it is > 50% of total bilirubin → patient has obstructive jaundice) no one saw that. They remove gall bladder. After the surgery, the patient could have pancreatitis. Can we prevent tis? Yeas, instead f sending him to surgery you should send him for ERCP.

- **Cerebral:**

  - Psychological, Neuropsychiatric complications (delirium, etc.).

- **Drug-related:**

  - Anesthetic, antibiotics, specific medical disease treatment toxicity.

  Drug related: medication that could lead to complication.

Ask about family hx because some patients have genetic problems

- **Nerve injuries:**

  - Compression, *traction, cautery, severed, etc.

  Traction: when we do thyroid surgery, we could cause problem to the nerve. Dissection around the nerve→ decrease blood supply to the nerve

II. LATE POSTOPERATIVE COMPLICATIONS:

- **Wound:**

  - Hypertrophic scar, keloid, wound sinus, implantation (when they put foreign body it could cause formation of abscess) dermoids, incisional hernia.

- **Adhesions:**

  - Intestinal obstruction, strangulation.

  Patient underwent a surgery and he came with distended abdomen (growing up, not passing gases) after 30 days? bowel obstruction secondary to adhesion.

  Adhesion: abnormal tissue fibrous band formed after any open surgery the most common cause of small bowel obstruction (Almost all studies showed that it is late complication but in some cases it happens immediately after 7 days to 2 weeks ”rare”

  Bowel obstruction secondary to adhesion.

  While they are closing the abdomen, they close it with the small intestine. After 2 weeks the patient has distension and wound infection→ abscess formation and intestinal fistula.

- **Altered anatomy/Pathophysiology:**

  - Bacterial overgrowth, short gut syndrome, postgastric surgery syndromes, etc.

- **Susceptibility to other diseases:**

  - Malabsorption, incidence of cancer, tuberculosis, etc.

Note: DDx of hyperthermia after the operation:

-1st day: could be from pneumonia, atelectasis or wound infection (group A streptococcus and clostridium)
-2nd day: atelectasis, pneumonia, thrombophlebitis.
-3rd – 5th day: UTI (start by urinalysis)
-5th- 7th day: DVT or pulmonary embolism.
-7th – 10th: wound infection.

* Before start thinking of DDx, you should take Hx and do physical examination.

PULMONARY COMPLICATIONS	
ATELACTASIS	Inability to breathe deeply/ cough up secretions Usually occurs within 24 hours Tachypnoea, tachycardia, mild fever **(most common cause of increased temperature after operation),** ↓ breath sound on affected side, ↓PaO2 ⓘ • Chest X-ray- areas of opacification. Treatment: encourage deep breathing/cough, mobilization, analgesia, chest physiotherapy
PULMONARY INFECTION	Follows atelectasis, **gastric aspiration Strep. pneumo., H. influenzae or gram negatives** are the most common causatives.
RESPIRATORY FAILURE	Definition: **Inability to maintain normal PaO_2 & $PaCO_2$ levels** Normal PaO2= 11.6 -13 kPa Resp. failure PaO2 < 6.7 kPa Central cyanosis Treatment: **Intubation and ventilation**
(ARDS)	Characterized by: **Impaired oxygenation, diffuse lung opacification** and lung stiffness (↓ compliance) Signs: **Tachypnoea, ↑ventilatory effort, confusion, hypoxia**
PLEURAL EFFUSION	Causes: usually happens after surgery only if the patient has another form of pulmonary pathology like: collapse, consolidation, infarction, tumour deposit. **Small effusions left to reabsorb, while large effusions aspirated for culture/ cytology.**
PNEUMOTHORAX	Insertion of central venous line is the most common cause of post-operative pneumothorax **• CXR after insertion central venous line is necessary to exclude this complication.**

CARDIAC COMPLICATIONS	
MI	Usually history of preceding cardiac disease. Patients my experience Gripping chest pain.
ARRHYTHMIAS	Sinus tachycardia: hypovolaemia, hypotension, pain, fever, restlessness. Sinus bradycardia: anaesthic agents, pharyngeal suction. Atrial fibrillation may need medications
POST-OPERATIVE SHOCK	Hypovolaemic: Inadequate fluid replacement, bleeding Cardiogenic: acute MI, arrhythmias ↑pulse, ↓BP, sweating, pallor, vasoconstriction,↓ urine Septic: **Early**: hyperdynamic circulation, bounding pulse, fever, rigor and warm extremity. **Later**: hypotension and peripheral vasoconstriction
CARDIAC FAILURE	Happens in context of Ischaemic or valvular diseases, arrythmia Causes: CF is commonly caused by excessive fluid administration in a patient with limited Cardiac reserve. Signs: Progressive dyspnoea, hypoxaemia, and – diffuse pulmonary congestion on x-ray

URINARY COMPLICATIONS:	
URINARY TRACT INFECTIONS	**Most common nosocomial infection, including in postoperative patients.** Pre-existing UTI, urinary retention, cathterization Frequency, dysuria, fever, flank tenederness Urine culture Treatment: Adequate hydration, urinary drainage, antibiotics
RENAL FAILURE	ARF: protracted inadequate renal perfusion Causes: **Hypovolaemia** (most common cause), sepsis, nephrotoxic drugs like certain antibiotics. Prevention: **adequate IV fluid, urine >0.5ml/kg/hr.**

*Cases mentioned by the doctor in the lecture:

1-Assume there is a 55-year-old patient smoker came to your clinic for a surgery which will be after few weeks, what should you do to decrease the complications (We all know that there are complications, but we should decrease them from)?

-Starting by history, what should I tell the patient?

Stop smoking for at least 5-8 weeks before surgery, why?

In indirect way smoking can decrease healing, atelectasis (lung collapse), decrease complications instead of 50% we make it 5%).

-Do Physical examination.

- **Investigations**: what should I order for him?

Do chest X-ray→ because he is a smoker and above 40. Any patient smoker and above 40 and he don't have an x-ray in the hospital you should do it.

2-There is another patient on aspirin and his surgery is in 10 days, what should I tell him?

Stop aspirin for 5 days prior to surgery to prevent bleeding (before it was 7 days).

*Plavix (Clopidogrel)→ you should stop it at least for 7 days before the surgery.

3- There is a patient with coronary artery disease, what do you want to do for him? He has hernia for 2 years. He told you that he has something they called it angina and he is not on any medication just aspirin. You said you should stop aspirin and he said yes I would do it. You ask for cardiology counseling and you do Echo. This is part of the assessment it is called preoperative evaluation, starts by HX and examination the you do investigation (in Hx we take the most important things that could increase patient's complications. Why you are warred if the patient has CAD? because he might have MI. You need to protect yourself first, unfortunately in KSA we don't think about this.

Labs: (When you want to do something you should do it for a reason)

CBC: to know the number of platelet and if there is chronic anemia

EKG: There is a clear guideline, if the patient have coronary artery disease, any symptoms, older than 50 and there is no ECG in the system.

*Any patient his surgery is tomorrow and he is in the hospital now, from today tell tomorrow (Preop)

*Patient underwent a surgery, now he is in recovery room and complaining of low oxygen (Hypoxia)→ the lungs are collapsed due to anesthesia

*While you oncall they call you to see this patient who has HR: 130 and BP: 140/90 when you give him analgesics HR will go down.

*There is a Hypotensive patient when you go and assess him you find huge hematoma at the inscional side.

*The day of Surgery (0) →Tomorrow (day 1)

*Let us say that we do a local anesthesia and unfortunately the doctor did not remember that we are not using epinephrine in finger and toes. Then he used epinephrine in the toes and the patient has necrosis and ischemia

*Spinal anesthesia: Patient unfortunately misses the clinic, the doctor wanted to finish quickly. Pt was on aspirin and he did not stop it. When they put the spinal anesthesia he develop hematoma (We can prevent this complication).

*General anesthesia: Patient with CAD and type2 DM, poor assessment by the doctors before the surgery. Unfortunately, they did General anesthesia. After the surgery, he is in the recovery room. He starts to have chest pain. When they did ECG they found MI because this patient has poor assessment by the doctor. They should send him to cardiologist and do ECHO and before surgery.

*What is common complication Pre op (day 0)? Immediate (relating to timing)

*Patient underwent a surgery and the surgeon put a mesh (foreign body). After surgery he start to have skin changes. It could be wound infection.

*Wound infection is a common complication post op in which day? 7-10

*While you are oncall intern, they call you and told you that there is a patient in recovery room with 39 Temp and he is post op, What you should do? Take Hx to know the cause and do physical examination.

You should ask these questions:

-When they did the surgery?

-Which type of surgery he had?

-Did he receive blood transfusion?

-Which medication he is on and for how long?

***High Temp and post op there is 5 causes:**

1-Missed infection, e.g. Pneumonia, before the surgery and the doctors did not investigate and they did not diagnose this disease.

2- Reaction to drug.

3- Malignant hyperthermia.

4- Receiving blood transfusion intra op.

5- intra op manipulation (Abscess or tumor) → necrosis → high Temp