

# *GENERAL COMPLICATIONS OF SURGERY*

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Thanks to: Eman Alrashidi,

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# Objectives

- ***The presentation will cover:***
- *Impact of complications on the outcome of surgery*
- *Brief description on ways to minimise complications*
- *Common general complications of surgery*
- *How to diagnose and manage*

# Notes

- *General complications of Surgery : Complications that can happen in any surgery!*
- *For Example: pt has cholecystectomy he may have similar complication as he has gastrectomy > so this is different than specific complications of each surgery (cholecystectomy can cause common bile duct injury ,duodenal injury While gastrectomy can cause splenic injury) !*
- *The Earlier intervenes of this complications would make a lot of results in the outcome of pt.*

# Notes

- *The doctor should recognize the Risk pts for this complications , anticipate them and try to prevent them !*
- *If after all this measures, this complication happen then we consider it as general complications (usual complications)*
- *But if there is any defect in predication or anticipation, recognition including good Hx taking, finding pts with co-morbidity, dealing with them like in pre-operative > than this malpractice !*

Why we operate in pts?  
To relieve their Symptoms  
and give them better life.

# Introduction

- *All surgeons expect speedy, uneventful recovery*
- *Risk of complications is well recognized*
- *Affects result of surgery: poor scar, hernia .usually the operation end with clean scar but if there is post operative complication like wound infection pt may have very ugly scar.*
- *Prolongs hospital stay and the risk of complications cost, it may also increase the risk of further complications, so if pt developed wound infection and have to stay more in hospital , he will have risk developing DVT, PE ,Hospital acquired infections e.g. pneumonia*
- *So it's cascade of complications that may follow one each other.*
- *Increased morbidity/ mortality (effects on life of pt /pt may die)*
- *Co-morbidity : disease that pt has apart of his original disease ex) pt complains of gall stones and in systemic Review he has HTN, DM,IHD, obesity)> this co-morbidity may change the outcome of the surgery (worse outcome or complications) so it's imp to take Hx*
- *Medico-legal issues, lots of complains from pts b/c they developed complications*

# *Reducing the risks of complications*

- *Good pre-operative evaluation, including good Hx*
- *Optimizing the general condition of patients*
  - *Medical issues, pre-operative if pt has co-morbid diseases by controlling these diseases > the Risk of complications will be reduced.*
  - *Nutritional issues (malnutrition, obesity)*
    - *low albumin level > tissue healing poor !*
    - *-malnutrition reduce immunity of pt to infections!*
- *Minimizing preoperative hospital stay*
- *Good surgical technique*
- *Early mobilization*

# *Phases of post-op. patient care*

- *The complications may start at operation room like haemorrhage but this can be handled b/c the pt with surgeons' hands and operation field is open .*
- *Recovery room, when pt recovering from anaesthesia*
- *Surgical ward*
- *On discharge*

# Complications developing in recovery room

- **Airway obstruction**, many times the pt will not be sent to the ward unless he extubated ,if the pt isn't well conscious before sending him to ward , he may have difficulty in breathing, mucus secretions > leads to obstruction !
- **Acute pulmonary complications** like aspiration his vomit if pt not well conscious , this complication can be exaggerated in form of pneumonia.
- **Cardio-vascular complications.** Pt in recovery room under supervision of anesthetist and surgeon duty to come and visit pt make sure he is ok before sending him to ward.
- **Fluid derangements**, pt maybe receiving less amount of fluids> he may have dehydration, Hypotension.
- pt may have bleeding from the site of operation
- hemodynamic instability like hypotension and tachycardia indicating the pt has haemorrhage.
- **Reactive haemorrhage**
  - Slipped ligature**
  - Dislodgement of clot**

Most of the time pts under anaesthesia are kept relatively hypotensive so the risk of bleeding is less , at the end of procedure the Bp will be going up to normal level and this may open some vessels which are closed during surgery



# General complications

- **Nausea/ vomiting**
- **Persistent hiccups** – *any laparotomy, or opening in abdomen there is some of ilues of all Gi system including the stomach therefore may delayed peristalsis so fluids may accumulate in stomach and cause dilatation.*  
*gastric distension may press on diaphragm (hiccups= irritation of diaphragm) so in management u will put nasogastric tube and aspirate fluids if still hiccups remains u have to exclude other causes like: renal failure*
- **Headache** – *common complication particularly of spinal anaesthesia b/c spinal canal is open by needle and anesthetic is injected > this puncture in Dura matter may leak CSF which will leads to headache !*
- **IV site-** *bruising, haematoma, phlebitis, vein thrombosis, air embolism, infection*
- *(this may happen in recovery or in word)*

# ***Pulmonary complications***

- ***Largest single cause of post-op. morbidity***
- ***2<sup>nd</sup> most common cause of death in over 60 age, b/c they usually have pre-operative lung Dz***
- ***Higher risk to patients with chronic pulmonary disease (COPD), asthmatic pts, chronic smoker, chronic bronchitis, bronchiectasis.***

# ***Pulmonary collapse (atelectasis)***

- *Inability to breath deeply (very shallow breathing postoperatively) / cough up secretions > it's quite common in pts that we mentioned b/c they have loss the cilia which function as push the secretions up.*
- *Paralysis of cilia (b/c of chronic irritation), impaired diaphragmatic movement, abdominal distension, pain (cough after operation is very painful)*
- *Bronchus/bronchiole obstructed by secretions*
- *Distal alveolar space close (atelectasis) b/c the pt doesn't have deep breathing and expiration therefore a lot of fluid will accumulate within alveoli, In alveolar wall which make it solidify and rigid so they will not open in inspiration & expiration.*
- *Usually occurs within 24 hours*
- *Tachypnoea, tachycardia, mild fever, ↓ breath sound, ↓ PaO<sub>2</sub>*
- *Chest X-ray- areas of opacification*

# ***Pulmonary collapse (atelectasis)***

- **Untreated:** Infection- lobar or bronchopneumonia (*hospital acquired infections* )
- **Prophylaxis:** stop smoking, physiotherapy for COPD (*breathing exercise , tell pt I want u to do this similar thing after operation*)
- **Delay surgery if chest infection** (*if pts having URTI it's better to not operate and delay the surgery if it's an elective operation) b/c they have higher risk of atelectasis or lung infection.*
- **Treatment:** encourage deep breathing/cough, mobilization, analgesia (*give pt pain killer so he can breath deeply and get rid of the secretions*), chest physiotherapy
- **Severe hypoxia-** intubation, suction, bronchoscopy

# ***Pulmonary infection***

- *Follows atelectasis (if it's not well treated within 24h) , gastric aspiration*
- *Strep. pneumo., H influenzae or gram negatives*

## *Manifestations :*

- *Pyrexia, tachypnoea, greenish sputum*
- *↓ breath sounds, coarse crepit., bronchial breath.*
- *Chest X-ray: patchy fluffy opacities*
- ***Treatment:*** *antibiotics, encourage to cough*
- *Severe cases: O<sub>2</sub>, bronchoscopy (aspiration of secretions ), ventilation (when they have Respiratory failure )*

# ***Respiratory failure***

- *Rare but may happen particularly in pt with pre-existing lung diseases.*
- **Def:** *Inability to maintain normal PaO<sub>2</sub> & PaCO<sub>2</sub>*
- *Normal PaO<sub>2</sub> = 11.6 - 13 kPa*
- *Resp. failure PaO<sub>2</sub> < 6.7 kPa*
- *Central cyanosis*
- *ABG- key to early recognition*
- *Treatment: Intubation and ventilation*

# **Acute respiratory distress syndrome (ARDS)**

- *This complication may happen particularly in ICU, pt with severe trauma, major operation, pre-existing lung diseases.*
- *Impaired oxygenation, diffuse lung opacification and lung stiffness (↓ compliance)*
- *Systemic/lung sepsis, massive BT, aspiration*
- *Endotoxin activated leucocyte → oxygen-derived free radicals, cytokines & chemical ↑ capillary permeability → interstitial & alveolar oedema*
- *Manifestations:*
- *Tachypnoea, ↑ ventilatory effort pt use the accessory muscles of respiration, confusion, hypoxia*
- *CXR- bilateral diffuse fluffy opacities*
- *Lung-increasing stiffness, difficult to ventilate*
- *Treat: ventilation PEEP, sepsis, hypovolaemia*
- *Mortality: 50% so only half of pts will survive !*

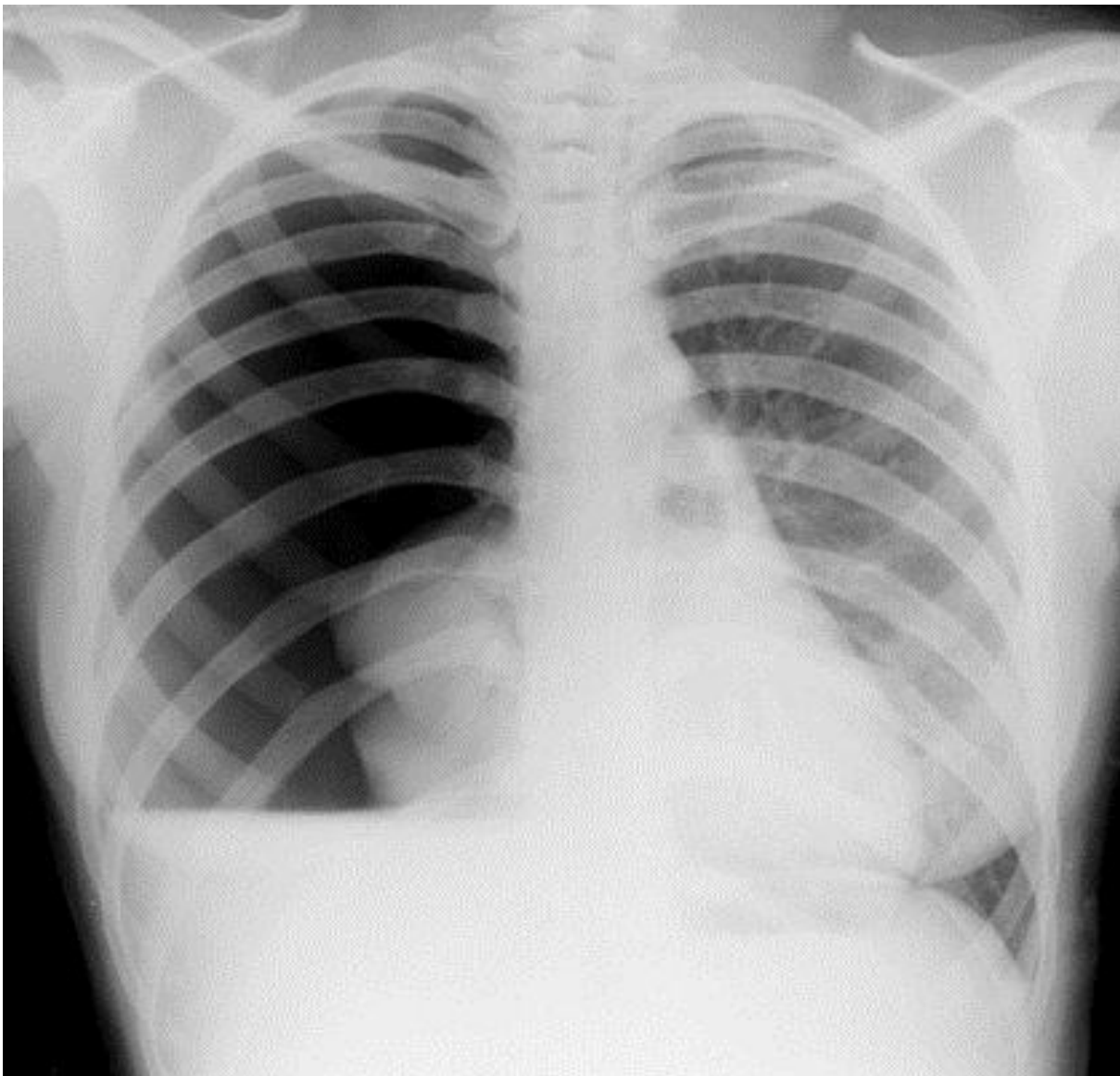
# PLEURAL EFFUSION

- **Pulmonary pathology:** collapse, consolidation, infarction, tumour deposit (*within the pleural cavity*)
- **Abdominal pathology:** subphrenic abscess (*it will irritate the diaphragm> enhance reactive inflammation in diaphragm this will leak fluids in pleural cavity*) .
- **Small effusions** left to reabsorb , *treated conservatively with antibiotics.*
- **Large effusions** aspirated for culture/ cytology, *so drainage through intercostal tube.*



# PNEUMOTHORAX

- *It's usually due Insertion of central venous line that may go outside the vein so air or even fluid goes to pleural cavity.*
- *Also it maybe b/c of Positive pressure ventilation- rupture of pre-existing bullae*
- *CXR after insertion central venous line is necessary*
- *If it's small > observe , If it's large Drained by underwater seal*



- Left lung is normal.
- Rt lung u can't see vascular marking, all air, lung collapsed , diaphragm flat

# CARDIAC COMPLICATIONS

- Risk of anaesthesia/surgery high in patients with cardiovascular disease *b/c anaesthesia medications leads to vasoconstriction or vasodilation with some hypotension, tachycardia , direct effect on heart.*
- Whenever possible, treat these before surgery
- Aortic stenosis impairs heart response to increased post-operative demand> *Surgery and anaesthetic medications increase the pumping of heart to meet the need of body.*
- *So this abnormality have to be dealt with before operation .*
- Severe aortic/mitral valve dis.- carefully monitor iv fluid administration > *prophylactic antibiotic to prevent Infective Endocarditis !*

# ***Myocardial Infarction***

- *Usually history of preceding cardiac disease*
- *Gripping chest pain, hypotension*
- *ECG changes*
- *Cardiac enzymes. E.g troponin high*
- *Cardiologist consultation*
- *1/3<sup>rd</sup> postoperative MI fatal*

# Arrhythmias

- **Sinus tachycardia:** *the main cause is hypovolaemia, hypotension, pain, fever, restlessness*
- **Sinus bradycardia:** *anaesthetic agents like atropine they usually give this medication to decrease secretion from lung and bronchi, pharyngeal suction this will stimulate vagus nerve.*
- **Atrial fibrillation** *may need medications*

# ***Post-operative shock***

- ***Hypovolaemic:** Inadequate fluid replacement, bleeding*
- ***Cardiogenic:** acute MI, arrhythmias*
- ***Manifestations :** ↑ pulse, ↓ BP, sweating, pallor, vasoconstriction, ↓ urine*
- ***Septic:** (in later stages in operation )early-hyperdynamic circulation, bounding pulse, fever, rigor and warm extremity.*

*Later- hypotension and peripheral vasoconstriction*

# *Cardiac failure*

- *Ischaemic or valvular diseases, arrhythmia*
- *Fluid overload*
- *Progressive dyspnoea, hypoxaemia*
- *CXR- diffuse congestion*
- *Treatment: avoid fluid overload, CVP monitoring*
- *Diuretics ( to reduce load), cardiac inotropes (to help heart to pump)*
- *Cardiologist consultation*

# Urinary complications

## Post-op. urinary retention

- Groin , pelvic, perineal surgery, operations under spinal/epidural anaesthesia > this may interfere with sympathetic activity that leads to distension of bladder.
- Pain (imp cause for this retention), effect of anaesthetic drugs, lying/sitting position, BPH
- Males > females
- Palpable distended bladder, dull on percussion
- Catheterization

Pt has perineal surgery e.g hemorrhoidectomy, hernia , anal fissure > he may have difficulty in urination b/c of pain therefore if pt already has enlarged prostate with difficulty of micturition this problem will be augmented and if this continue postoperatively he may have recurrent operation (hernia) b/c of pressure during micturition.



# *Urinary tract infection*

- *Most common nosocomial infection*
- *Pre-existing UTI, urinary retention, catheterization*
- *Frequency, dysuria, fever, flank tenderness*
- *Urine culture*
- *Adequate hydration, urinary drainage, antibiotics*

# Renal failure

- ARF: protracted inadequate renal perfusion
- Hypovolaemia, sepsis, nephrotoxic drugs
- Susceptible- pre-existing renal disease *e.g long standing HTN or DM they may have some element of subclinical renal disease that maybe augmented if pt has dehydration or bleeding , jaundice*
- Prevention: adequate IV fluid, urine  $>0.5\text{ml/kg/hr}$  (if pt 70 kg man *he has to pass more than 35ml/hr* )
- Treatment: *with referral to nephrologist , give the initial treatment which is replace fluid loss+ 500ml*
  - restrict dietary protein to  $<20\text{Gm/day}$*
  - u/e monitoring, haemodialysis (in sever cases)*
- Polyuric phase: monitor of fluid intake and u/e (*when the pt recovers they will have initially produce a huge amount of urine*)
- Recovery 2-4 weeks
- Mortality up to 50%

# Neurological complications

- **Cerebrovascular accidents (CVA):** *manifested by sudden ↓ in BP during/ post surgery, in hypertensive patients or pt with previous CVA.*

*Carotid endarterectomy, cardiac surgery*

- **Psychiatric disturbance:** *elderly, dementia due to cerebral atrophy, use of sedatives/ hypnotics> these pts very sensitive to sedatives medications*
- **Acute toxic confusion:** *sepsis, hypoxia, uraemia, electrolytes imbalance (disturbance of osmolarity of blood)*
- **Sleep deprivation particularly in ICU** *b/c nurses keep awaking the pt and instruments sounds disturb sleeping.*
- **Delirium tremens** *(especially in alcoholic, drug addicted they will have withdrawal symptoms): agitation, tremors, hallucinations*

# Deep venous thrombosis (DVT)

- **Virchow's triad:** stasis, ↑coagulability, vessel wall injury

*The most imp in post-op is stasis and stasis can acquire even before operation if pt admitted long time before procedure.*

- **Risk factors:** old age, obesity, prolonged or major surgery, pelvic/ hip surg. malignancy, past DVT, varicose veins, pregnancy,  
use of oral contraceptive pills, *advise them to stop it at least one cycle before operation.*

- **Presentation:** painful swollen tender calf & fever.

- **Homans' sign**, pain in the calf or popliteal region with examiner's abrupt dorsiflexion of the patient's foot at the ankle while the knee is fully extended> we don't use it anymore b/c it leads to propagation of the thrombus.

- **Diagnosis:** Duplex ultrasonography

- **Prevention:** Compression stockings, mechanical compressions of calf during surgery, subcutaneous heparin, *in addition to pre-op measures like u don't admit pts long time before procedure if it's elective surgery and discharge them early, mobilize them immediately post-op.*

- **Treatment:** iv bolus/ infusion heparin, LMWH,  
Warfarin for 3-6 months (INR 2-3 times normal)

# *Pulmonary embolism*

- *It can happen in pt with pre-existing DVT , or may happen suddenly in pt don't have DVT b/c DVT can acquire in leg vein or pelvic vein which is difficult to evaluate preoperatively.*
- **Massive PE:** *severe chest pain, pallor & shock*
- *CP resuscitation, heparinization, CT angiography, streptokinase/ urokinase ( if 6 days post surgery)*
- **Small PE** (*more common than massive PE which is fatal*): *chest pain, tachypnoea, haemoptysis*
- *CXR, ECG , V/Q scan, spiral CT*
- *Heparinization*
- *Warfarin for 3-6 months*

# Wound infection

- The most common complication
- Incidence 1% (clean *operation*) to 30% (dirty *operation*)
- Haematoma formation common before infection  
(*inadequate haemostasis at the end of operation or tight suturing , foreign body, technical problem* )
- Manifests within **7 days** of surgery
- Fever, tachycardia, increased pain at operation site  
(*normally pt will not have pain in surgical wound after 48 h*)
- Red, tender, swollen, discharging wound
- Remove few sutures to drain the wound, *take swab for culture*
- Antibiotics, if septicaemic

# ***Malignant hyperthermia***

- *Trigger by GA in susceptible patients*
- *Halogenated anaesthetics, succinylcholine, suxamethionine*
- *Abnormal release of  $\text{Ca}^{+}$*
- *Prolonged muscle activation and heat generation*
- *Patients develop high fever*
- *Dantrolene + cooling of patient*

# ***Postoperative fever***

- ***2/3<sup>rd</sup> postoperative patients***

- ***48-72 hours after surgery***

*Lung atelectasis- commonest cause*

*Streptococcal or clostridial infection- uncommon*

- ***4-5 days postoperative***

*Chest infection*

*Urinary tract infection*

*Wound infection*

*DVT*





- Pt had laparotomy with bowel resection and ileostomy
- Leakage from bowel contents comes to main wound and start infections

# Wound dehiscence

- *Opening of wound after close it*
- *involves abdominal wall. Incidence <1%*
- *Partial (deep layer S.C left apart , skin intact so bowel just lying underneath skin, may develop incisional hernia), Complete (deep+ skin, pt has to be taken to OR emergency and reclose the wound)*
- *Serosanguinous discharge, evisceration*
- *Manifests within 2 weeks*
- *Risk factors: Obesity, resp. disease (coughing > increase abdominal pressure ) , infection, malnourishment, renal failure, malignancy, diabetes, steroid use,& poor surg. Technique*
- *Resuture under GA. Develops hernia later*

# ***Recommended book***

## ***Principle & Practice of Surgery***

***5<sup>th</sup> edition***

***Garden, Bradbury, Forsyth & Parks***

- الاسئلة ما راح تطلع من المحاضرة  
- حتكون سيناريو بجيب لكم مثلا واحد بعد عملية صار عنده كومبليكشن  
معين ايش سببه (=