Postoperative complications

WOUND COMPLICATIONS

Wound Infection

❑ Risk of infection depends on type of procedure
• Clean < 1%
• Clean-contaminated < 10%
• Contaminated 15-20%
• Dirty 40%

❑ Most common etiologic agents = S. *aureus* (20%), E. *coli, enterococcus* (10% each)

❑ Predisposing factors
• Patient characteristics: age, diabetes, steroids, immunosuppression, obesity, burn, malnutrition, patient with other infections, traumatic wound, radiation, chemotherapy
• Other factors: prolonged preoperative hospitalization, duration of surgery (> 2 hrs), reduced blood flow, break in sterile technique, use of drains, multiple antibiotics, hematoma, seroma, foreign bodies (drains, sutures, grafts)

❑ **Clinical presentation**
• Typically fever post operative day (POD) # 3-6
• Pain, wound erythema, induration, frank pus or purulosanguinous discharge, warmth

❑ **Treatment**
• re-open affected part of incision, culture wound, pack, heal by secondary intention
• Antibiotics only if cellulitis or immunodeficiency present

❑ **Prophylaxis**
• Consider IV antibiotics
• Debridement of necrotic and non-viable tissue

❑ **Complications**
• Fistula, sinus tracts, sepsis, abscess, suppressed wound healing, superinfection

❑ **Note**
• *Streptococcus* and clostridium wound infections may present with fever within the first 24 hrs. postoperatively

Wound Hemorrhage/Hematoma

❑ Secondary to inadequate surgical control of hemostasis

❑ Risks: anticoagulant therapy, myeloproliferative disorders (e.g. polycythemia vera)

❑ Symptoms: pain, swelling, discoloration of wound edges, leakage

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Wound Dehiscence

❑ Definition = disruption of fascial layer, abdominal contents contained by skin

❑ Evisceration = disruption of all abdominal wall layers and extrusion of abdominal contents (mortality of 15%)

❑ Incidence = 0.3-5% of abdominal incisions

❑ typically POD 5-8

❑ Most common presenting sign is sero-sanguinous drainage from wound

Predisposing factors

Local

• Poor closure, increased intra-abdominal pressure (e.g. chronic obstructive pulmonary disease (COPD), ileus, bowel obstruction), poor wound healing (hemorrhage, infection)

Systemic

• Hypoproteinemia, steroids, age, DM, immunosuppression, sepsis, jaundice

Treatment

- Operative closure
- Evisceration is a surgical emergency
- Mild dehiscence may be treated expectantly with delayed repair of the resulting hernia

URINARY AND RENAL COMPLICATIONS

Urinary Retention

❑ may occur after any operation with general anesthesia (GA) or spinal anesthesia

❑ More likely in older males with history of prostatism

❑ Treatment - bladder catheterization

Acute Renal Failure

❑ defined as urine output < 25 cc/hr, increasing Cr, increasing BUN

❑ High associated mortality > 50%

❑ Classified according to primary cause e.g. pre-renal, renal, post-renal

❑ Treatment - according to underlying cause

❑ Decreased renal perfusion treated with fluid boluses

❑ Consider central venous pressure (CVP) line or Swan-Ganz catheter if patient does not respond to fluid bolus

RESPIRATORY COMPLICATIONS

Atelectasis

❑ comprises 90% of post-op pulmonary complications

❑ Clinical manifestations usually in first 24 hours post-op

• Low fever, tachycardia, crackles, decreased breath sounds, bronchial breathing, cyanosis, tachypnea, CXR (increased density)

Risk factors

• COPD
• Smoking
• Abdominal or thoracic surgery
• Over sedation
• Significant post-op pain

❑ Pre-operative prophylaxis

• Quit smoking
• Deep abdominal breathing and coughing

❑ Post-operative prophylaxis

• Incentive spirometry
• minimize use of depressant drugs
• Good pain control
• Frequent changes in position (postural drainage)
• Deep breathing and coughing
• Early ambulation and chest physiotherapy

Aspiration Pneumonitis

❑ Aspiration of gastric contents
❑ can be lethal
❑ Major determinant of degree of injury is gastric pH
❑ occurs most often at time of anesthetic induction and at extubation

Risk factors

• General anaesthesia
• decreased level of consciousness
• Dysphagia
• Nonfunctioning nasogastric tube

Clinical manifestations

• Respiratory failure
• increased sputum
• Fever
• Cough
• Decreased level of consciousness
• Tachycardia, cyanosis
• infiltrate on CXR

Treatment

• Immediate removal of debris and fluid from airway
• consider endotracheal intubation and flexible bronchoscopic aspiration
• IV antibiotics to cover oral aerobes and anaerobes

Pulmonary Embolus

❑ Blood clot from the venous system that embolizes to the pulmonary arterial system

Risk factors

• Operations, immobility, vessel injury, hypercoagulable states (low protein C, S)
• CHF, obesity, OCP, age, pregnancy, age, polycythemia vera

Clinical manifestations

• Dyspnea, tachypnea, pleuritic chest pain
• Hypotension, fever, hemoptysis, right ventricle strain
• ABG shows hypoxia and low pCO_2
• ECG shows S1Q3T3, right bundle branch block (RBBB) and right axis deviation (50% of cases)
• CXR findings

Treatment
• IV heparin (PTT = 2.0)
• Long term coumadin (INR = 2-3) for 3 months
• Greenfield filter if unable to anticoagulate
• Embolectomy if patient unstable
• Prophylaxis
• Compression stockings, ambulation if possible
• Subcutaneous heparin (5000 units Q12H beginning pre-op)

Pulmonary Edema
❑ Occurs during or immediately after operation
❑ Results from circulatory overload
• Overzealous volume replacement
• left ventricular failure
• Shift of fluid from peripheral to pulmonary vascular bed
• Negative airway pressure
• Alveolar injury due to toxins

Treatment
• O2
• remove obstructing fluid
• Correct circulatory overload
• Diuretics, positive end expiratory pressure (PEEP) in intubated patient

Respiratory Failure
❑ Clinical manifestations - dyspnea, cyanosis, evidence of obstructive lung disease, pulmonary edema, unexplained decrease in PaO2
❑ Earliest manifestations - tachypnea and hypoxemia (pO2 < 60, RR > 25)
• NB: hypoxemia may initially present with confusion/delerium

Treatment
• O2 by mask
• Pulmonary toilet (i.e. clear secretions from airway)
• Bronchodilators
• Treatment of acute respiratory insufficiency – intubation and ventilation
❑ If these measures fail to keep PaO2 > 60, consider actue respiratory distress syndrome (ARDS)
❑ Control of post-operative pain can decrease pulmonary complications
• Problematic with thoracic and upper abdominal operations

CARDIAC COMPLICATIONS

❑ Abnormal ECGs common in post-operative period (compare to pre-op)

❑ Common arrhythmia – supraventricular tachycardia (SVT)

❑ Atrial fibrillation (secondary to fluid overload, pulmonary embolus (PE), MI, pain)

Myocardial Infarction (MI)

❑ Surgery increases risk of MI

❑ Majority of cases on operative day or within first 4 postoperative days

❑ Incidence

• 0.5% in previously asymptomatic men > 50 years old
• 40-fold increase in men > 50 years old with previous MI

Clinical manifestations

• Often silent without chest pain
• New onset congestive heart failure (CHF) (dyspnea), cardiac arrythmias, hypotension
• Chest pain

Risk factors

• Pre-operative hypertension
• Pre-operative CHF
• Operations > 3 hours
• Intra-operative hypotension
• Angina pectoris
• MI in 6 months preceding surgery
• increased age

PARALYTIC ILEUS

❑ Normal bowel sounds disappear following abdominal surgery

❑ also follows peritonitis, abdominal trauma, and immobilization

❑ Return of GI motility following abdominal surgery varies

• Small bowel motility returns by 24-48 hours
• Gastric motility returns by 48 hours
• Colonic motility - up to 3-5 days

❑ Due to normal paralysis of myenteric plexus (adynamic ileus)

Two forms

• Intestinal ileus
• Gastric dilatation

❑ must rule out secondary causes

• Hypokalemia

• Narcotics
• Intraperitoneal infection

Symptoms

• Abdominal distension, nausea and vomiting
• absent or tinkly bowel sounds
• Flatus and stool indicate a resolving ileus

Treatment

• NG tube, fluid resuscitation and time
• For prolonged ileus, consider TPN

POST-OPERATIVE DELIRIUM

❑ Disturbance of sleep-wake cycle
❑ Disturbance of attention, distractability, disorientation
❑ Fluctuating course throughout day
❑ Incidence: 40% (likely an underestimate)
❑ under-recognized
❑ No correlation with type of anesthetic agent
❑ Risk factors

• > 50 years old or very young
• pre-existing cognitive dysfunction
• Depression
• Peri-operative biochemical derangements
• > 5 prescribed medications post-operatively
• use of anticholinergic medications preoperatively
• Cardiopulmonary bypass
• ICU setting
• Substance abuse

Treatment

• minimize non-essential medications if possible
• hydrate, maintain electrolyte balance
• treat underlyuing cause if possible
• Well-lit room, visual cues, exercise, family members present
• Benzodiazepines if necessary; try to avoid antipsychotics (e.g. Haldo)

POST-OPERATIVE FEVER

❑ Fever does not necessarily imply infection
• Timing of fever may help identify cause
• "**6W's**" - CLINCAL PEARL
• **W**ind (pulmonary)
• **W**ater (urine-UTI)
• **W**ound
• **W**alk (deep vein thrombosis (DVT) - pulmonary embolism (PE))
• **W**onder drugs (drug fever)
• **W**anes (rhymes with veins: IV sites)

❑ 0-48 hours
• Usually atelectasis
• consider early wound infection (especially *Clostridia*, Group A *Streptococcus*)
• Leakage of bowel anastomosis (tachycardia, hypotension, oliguria, abdominal pain)
• Aspiration pneumonia
• Addisonian crisis
• Thyroid storm
• Transfusion reaction

❑ POD# 3
• After day 3 infections more likely
• UTI- patient instrumented? e.g. foley catheter
• wound infection (usually POD 3-6)
• IV site - especially IVs in place > 3 days
• Septic thrombophlebitis
• Intra-abdominal abscess (usually POD 5-10)
• DVT (POD 7-10)

❑ Drug fever (POD 6-10)

❑ also consider - cholecystitis, PE, sinusitis, prostatitis, peri-rectal abscess, drug fever, URTI, factitious fever

Treatment
• treat primary cause
• Acetaminophen, aspirin

INTRA-ABDOMINAL ABSCESS

❑ A collection of pus walled-off from rest of peritoneal cavity by inflammatory adhesions and viscera; usually polymicrobial

❑ Danger: may perforate secondarily —> diffuse bacterial peritonitis

❑ Common sites

• Pelvis, Morrison's pouch, subphrenic, paracolic gutters, lesser sac, peri appenideal

Clinical manifestations

• Persistent, spiking fever, dull pain, weight loss, leukocytosis or leukopenia
• impaired function of adjacent organs (e.g. ileus, or diarrhea with rectal abscess)
• Co-existing effusion (pleural effusion with subphrenic abscess)

Diagnosis

• CBC, blood cultures
• Usually by U/S or CT (if > POD# 7)
• DRE (pelvic abscess)

Treatment

• Drainage (surgical or percutaneous)
• Antibiotics to cover aerobes and anaerobes (Clindamycin/Gentamicin, Flagyl/Gentamicin,3rd generation cephalosporin)

Enough

Enough

Enough

Muqdad fuad