Objectives
At the end of this session, the participant will be able to:

1. Utilizing a case study patient, recognize and intervene on selected post-operative GI surgery complications.
2. Review important concepts in post-operative care including pain control, management of nausea and vomiting, initiating nutrition and thromboembolism prevention.

Case Study
- 64 yo female
- Hx of obesity, arthritis, left total knee replacement, & diverticulitis
- Presents with abdominal pain x 12 hrs with increased intensity last 75 min, nausea & diaphoresis
- 3 episodes rectal bleeding with bright red blood “filling the bowl” and on admission, 315 cc green, guiac negative emesis

Abdominal Pain
1. Distension: obstruction, constipation, fluid or blood sequestration…patients squirm and can’t get comfortable
2. Inflammatory: visceral peritoneum involvement may be diffuse; parietal involvement may allow localizing…patients want to lie still
3. Ischemic: usually sudden onset, very intense, progressive, not relieved with by analgesics…patients lie still

Rebound Tenderness
- Blood
- Bile
- Bacteria
- Feces...
Post Op GI Surgery, @ Tuggle

**Pain Quality**

- **Severe, Sharp**
  - Infarction
  - Rupture
  - Perforation

- **Severe, Controlled**
  - Pancreatitis
  - Peritonitis
  - Colic
  - Bowel Obstruction

**Pain Quality**

- **Dull, Intermittent**
  - Inflammation
  - Gastroenteritis
  - Bowel Obstruction (early)

**Abdominal Quadrants**

- **RUQ Pain**
  - Cholecystitis
  - Biliary Colic
  - Hepatomegaly
  - Hepatitis
  - Cholelithiasis
  - Spinal Nerve Root Inflammation

- **RLQ Pain**
  - Appendicitis
  - Cecal Diverticulitis
  - Meckel's Diverticulitis
  - Crohn's Disease

- **LUQ Pain**
  - Gastritis
  - Splenic Abscess
  - Splenic Rupture

- **LLQ Pain**
  - Sigmoid Diverticulitis

- **Upper Quadrant Pain**
  - Acute Pancreatitis
  - Peptic Ulcer
  - Peritonitis
  - Sickle Cell Crisis
  - Typhoid Fever

- **Lower Quadrant Pain**
  - Abdominal Abscess
  - Hematoma
  - Bowel Incarceration
  - Inflammatory Bowel Disease
  - Ruptured Abdominal Aneurysm
  - Cysts
  - Renal Stone
  - Pelvic Inflammatory Disease
  - Endometriosis
  - Ovulation Pain (Mittelschmerz)
  - Ectopic Pregnancy
  - Torsion (Teste or Ovary)
**Upper GI Bleeds**
- Peptic Ulcers
- Esophageal Tears
- Ruptured Varices
- Diffuse Ulceration

**Lower GI Bleeds**
- Carcinoma
- Diverticulosis
- Polyps
- Hemorrhoids
- Ulcerative Colitis

**Bleeding Characteristics**
- Bright red emesis: hemorrhage from above ligament of Treitz

**Bleeding Characteristics**
- Bright red emesis: hemorrhage from above ligament of Treitz
- Coffee ground emesis: old UGI blood
- Black (melena) or dark red stool: old lower GI blood; if fetid: digested UGI blood
- Bloody stools: any site along GI tract

**Case Study**
- **Vital Signs**
  - BP 124/78 *Supine* 100/60 *Sitting*
  - HR 108
  - RR 24
  - T 100.8 F

**Postural BP Check**
- ~ 35% Blood Loss Before Supine BP With Fall
**Case Study**
- Oxygen initiated...4 liters NP
- Foley inserted...115 ml dark urine
- Central line placed...CVP 3 mm Hg
- Normal Saline 500cc bolus plus 200/hr infusion
- Type & cross done
- Labs essentially WNL, except:
  - WBC 15,000 (4,500-11,000)
  - Hgb 9 (12-16)
  - Hct 27 (38-47)

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**Bowel Perforation**
- X-Ray Tip
  - Free Air on KUB
- Bedside Finding
  - Rebound Tenderness

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**Diverticulum**
*Aneurysm of the Bowel*

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**Medical vs Surgical Rx**
- **Surgical Intervention**
  - 21% Mortality
- **Medical Intervention**
  - 48% Mortality
Post Op GI Surgery

PE Prevention

Case Study
- 6 liters oxygen by NP
- D5 .5NS with 40KCL at 125/hour
- NG tube to LWS
- Midline dressing dry and intact
- VS stable
- H & H  9.5 / 28
- Absent bowel sounds
- Complaining of pain and mild nausea

Post-Op Pain

Delays Mobility
Amplifies Surgical Stress
Increases Pneumonia Risk
Prolongs Hospital Stay
Increases Costs
Causes Dissatisfaction

Post-Op Pain

Multimodal effective using local anesthesia, opiates & NSAID (ketorolac/Toradol)
- IV PCA better than IM on demand
- Epidural PCA better than IV PCA
- Intracostal blocks have limited with midline incisions
- Epidural most recommended

Post-Op N & V

Delays Mobility
Increases Pneumonia Risk
Causes F/E & A/B Imbalance
Stresses Suture Lines
Prolongs Hospital Stay/Cost
Causes Dissatisfaction

Post-Op N & V

High Risk? Prophylaxis
- total IV anestheia
- regional blocks/NSAIDS
- adequate hydration
- good pain control
- scopolamine patch 4-12 hrs prior to OR
Post-Op N & V

- High Risk? Prophylaxis
  - steroids at induction (if not contraindication)
  - antiemetic end of surgery
  - alternative approaches: prior to and into post-op
    - aromatherapy (ess. oils)
    - P6 acupoint pressure

P6 Acupoint

Neiguan Point

40 Cochrane Review Studies Rated Acupuncture/Pressure As Effective As Antiemetics!

Post-Op N & V

- NG Tube
  - Assumed “Pros”:
    - Reduces Nausea/Vomiting
    - Reduces Paralytic Ileus (?)
    - Reduces Anastomatic Leak
  - Recognized “Cons”:
    - Increases Pneumonia
    - Delays Enteral Feeding
    - Causes Patient Discomfort

NG Tubes Controversial

Probably Not Helpful...
Create Complications
Delay Recovery

NG Drainage Effects

Hypovolemia
Hyponatremia
Hypokalemia
Hypomagnesemia
Hypocalcemia
Metabolic Alkalosis

Paralytic Ileus

Causes
- bowel manipulation
- peritonitis
- inactivity
- electrolyte imbalance
- drugs
- air swallowing
- NPO

Clinical Profile
- decreased or absent BS
- distention
- tympany
- bloated sensation
- vomiting after ingestion
Chewing Gum

- LOS: gum chewers 4 days, controls 7
- End of Anorexia: gum chewers 64 hours, controls 73
- Passing Flatus: gum chewers 65 hours, controls 80
- First BM: gum chewers 63 hours, controls 89

Shuster, Archives of Surgery, Feb '06

ERAS
Enhanced Recovery After Surgery

Case Study
1st POD

- Temp spike 102 F

Post-Op Fever
1st POD: Atelectasis
Aspiration
? UTI

SCIP

Post-Op Fever
1st POD: Atelectasis
Aspiration
? UTI

4th-5th POD: Wound Infection
Anastomotic Leak
### SSI Rates

**Infection Rates By Wound Classification**

<table>
<thead>
<tr>
<th></th>
<th>1991</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>GI Tract Not Entered</td>
<td>Clean</td>
<td>1-5 %</td>
</tr>
<tr>
<td>GI Tract Opened</td>
<td>Clean Contaminated</td>
<td>3-11 %</td>
</tr>
<tr>
<td>Spillage</td>
<td>Contaminated</td>
<td>10-17 %</td>
</tr>
<tr>
<td>Gross Pus</td>
<td>Dirty</td>
<td>27 %</td>
</tr>
</tbody>
</table>

### Risk Factors

- Age Over 65 Years
- Emergency Operation
- Smoking History
- Cancer/Steroids/Diabetes
- Intra-Abdominal Sepsis
- Wound Infection
- Ascites / Obesity / Distention
- Coughing / Vomiting
- Hypoalbuminemia
- Blood Loss

### Anastomotic Leak

- Pain in the back or the left shoulder, pelvis or substernal area
- Hiccups
- Restlessness
- Unexplained tachycardia remaining >120/min after the first 12 hours
- Unexplained oliguria

### Peritonitis Abscess Fistula

- 5 Man Lift To Bed
- No Valsalva
- Semi-Fowlers Position
- Saline Soaked Gauze
- Check For Incarceration
- Notify MD & OR

### Surgical Emergency!
Case Study

1st POD

- Temp spike 102 F
- HR 98
- RR 24
- BP 106/68

Post-Op Hypotension

1st POD:
- Anesthetic Effects
- Over Sedation
- Under-Hydration

Later
- Sepsis

Severe Sepsis

Confirmed Or Presumed Infection Plus 2 or more SIRS Signs:
- T > 38°C or < 35°C (> 100.4°F or < 96.8°F)
- HR > 90 beats/min
- RR > 20 breaths/min
- WBC > 12,000 or < 4,000/mm³ or > 10% bands

PLUS:
- Organ Dysfunctions: altered LOC, oliguria, jaundice, thrombocytopenia, hyperglycemia (without DM), hypotension...

Case Study

1st POD

- Temp spike 102 F
- HR 98
- RR 24
- BP 106/68
- Cultures Obtained
- Lactate 5

Surviving Sepsis Campaign: "Take Home" Messages

- Prevention
- Regular Screening / Early Identification
- Early Intervention: Source Control, Cultures
- Early Empiric Antibiotics
- Early Hemodynamic Resuscitation

Case Study

2nd POD

- Fluid resuscitation completed
- Requiring low dose noxerepinephrine
- VS stable
- Temp 99-100
- Respiratory rate increasing, SpO2 92% on 4 liters oxygen
- Complaining of continued abdominal pain / bloating
- Abdomen tight and distended
- No bowel sounds
- Urinary output declining, creatinine increased by 0.1
**Abdominal Compartment Syndrome**

- Primary: belly surgery, trauma...
- Secondary: major fluid resuscitation, capillary leak, burns

  Consider monitoring anyone requiring > 6-10 liters IVF

**Pathophysiolgic Effects Of IAH**

- An IAP > 15 mmHg can cause significant end-organ dysfunction, failure, and death

**Measuring Pressure**

Standard Pressure Monitoring System & Transducer

- Procedure
  - Supine Position
  - Relaxed Muscles
  - Mid Chest/Iliac Crest
  - End-Expiration
  - Infuse 25 cc NS, clamp, read in 30-60 sec
  - Measure q 4 hr & prn

**WSACS Medical Rx**

- World Society of Abdominal Compartment Syndrome

**WSACS Medical Management**

If IAP > 25 mm Hg (and/or APP < 50 mm Hg) and new organ dysfunction/failure is present, patient’s IAH/ACS is refractory to medical management. Strongly consider:

- SURGICAL ABDOMINAL DECOMPRESSION

**Case Study**

- 4th POD
- Great improvement
- VS stable
- Nutrition initiated
Enteral Nutrition

- EN is preferred over PN if oral intake not possible.
- Initiate within 24-48 hours of admission.
  - Advance to goal over next 48-72 hours.
- EN should be held until patient resuscitated/stable.
- EN does not require BS, flatus, stool.
- May feed stomach or small bowel.
  - If high risk of aspirations or high gastric residuals use small bowel feeds.
- If needs cannot be met by EN alone, supplement with PN after 7-10 days.

Early Post-Op Nutrition

- Early versus Traditional Postoperative Oral Feeding in Patients Undergoing Elective Colorectal Surgery: A Meta-Analysis of Randomized Clinical Trials
- Conclusions: Early oral feeding after elective colorectal resection was beneficial and safe in enhancing recovery; associated with less post-op complications and reduced LOS and hospital stay.

Feeding Tubes

- X-ray confirmation
- Residual rules vary:
  - ____ cc x 2 (Am Soc of PN & EN)
  - ____ cc (No Am Summit on aspiration in the Crit Ill)

AACN Practice Alert: NG Tubes

Expected Practice:
- Dye should not be added to enteral feeding as a method for identifying aspiration of gastric contents.
- Obtain radiographic confirmation of correct tube placement on all critically ill patients who are to receive feedings or medications via blindly inserted gastric or small bowel tubes prior to initial use.
- Mark and document the tube’s exit site from the nose or mouth immediately after radiographic confirmation of correct tube placement; observe the mark to assess for a change in length of the external portion of the tube.
- Use bedside techniques to assess tube location at regular intervals to determine if the tube has remained in its intended position. No one single technique has been shown to be reliable for continually assessing tube placement:
  a. Review routine chest and abdominal x-rays if they refer to tube location
  b. Helpful bedside techniques include measuring the pH and observing the appearance of fluid withdrawn from the tube.
  c. Do not rely on the ausculatory method to determine tube location.

Parenteral Nutrition

- Start PN only if EN is not possible/feasible.
- Previously healthy / no evidence of malnutrition.
  - Do not start PN until after first 7 days.
- Evidence of malnutrition at admission.
  - Start PN immediately.
- Major UGI surgery planned.
  - Malnourished: Feed for 5-7 days prior and into post-op period.
  - Otherwise, delay PN for 5-7 days.
  - Start PN only if patient expected to be fed >7 days (< 5-7 days shows little benefit and may be harmful).
References


References


World Society of ACS: wsacs.org