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ACS Cancer Research Program (CRP) Educational Series

Surgical Emergencies in Advanced Cancer Patients
January 28, 2021

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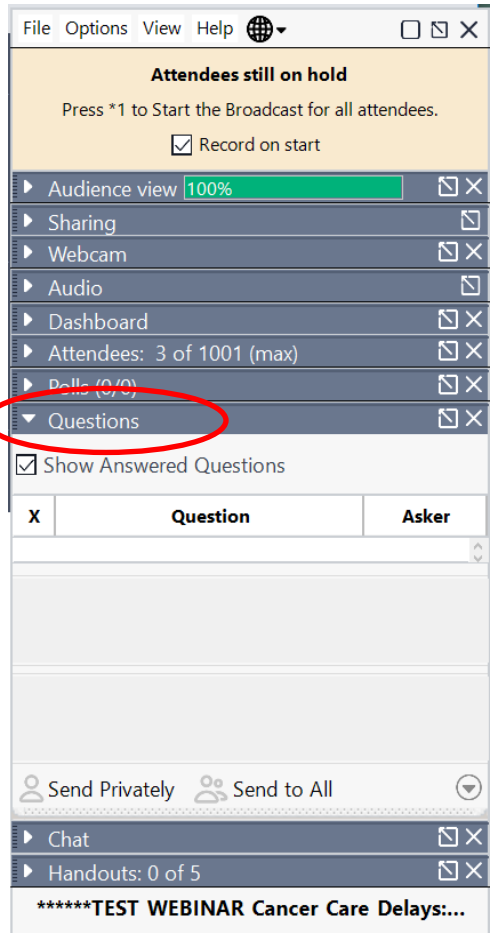

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Surgical Emergencies in Advanced Cancer Patients - Disclosures Reported

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Planning Committee / Editorial Committee

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Mayo Clinic
Christina Roland, MD, FACS – Research funds to institution from Bristol Myers Squibb
MD Anderson Cancer Center
Asa Carter, MBA, CTR—Nothing to disclose
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Linda Zheng – Nothing to disclose
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Program Objectives

Target Audience

- ✓ Breast surgeons
- ✓ Colorectal surgeons
- ✓ General surgeons
- ✓ Nurses
- ✓ Physicians in cancer accredited centers and programs
- ✓ Surgical oncologists

Learning Objectives

- ✓ Describe common indications for acute surgical oncology evaluation such as gastric outlet, small bowel or colonic obstruction as well as bowel perforation, neutropenic enterocolitis, anorectal infections and common acute surgical problems such as appendicitis and cholecystitis in advanced cancer patients.
- ✓ Discuss diagnostic criteria, treatment modalities, expected outcomes, and indicators of outcome for patients requiring surgical consultation for their malignancy or treatment-related complications of their malignancy.
- ✓ Apply management options including but not limited to when to operate and how to manage pre-, intra-, and postoperative choices to patients under their care.

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Moderator

Brian Badgwell, MD, FACS

Section Chief – Gastric, Peritoneal, & Acute Care Surgical Oncology
MD Anderson Cancer Center
Houston, TX

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Presenters

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Surgical Oncologist within the Hepatobiliary and Pancreas Division
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Introduction

Brian Badgwell, MD, MS

Section Chief – Gastric, Peritoneal, & Acute Care Surgical Oncology

MD Anderson Cancer Center

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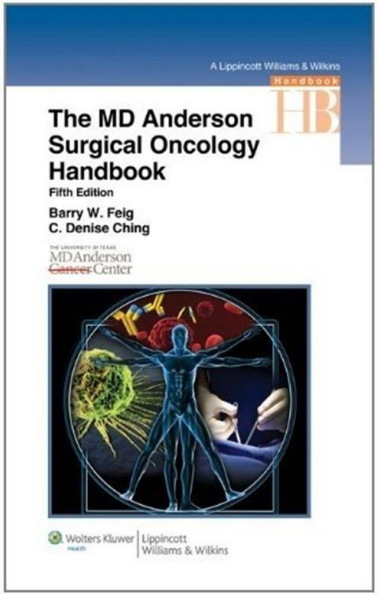
Oncologic Emergencies

1) **Extra-abdominal Emergencies:**
   - **Superior Vena Cava Syndrome**
   - **Spinal Cord Compression**
   - **Pericardial Tamponade**
   - **Paraneoplastic Crises**
   - **Hypercalcemia**
   - **SIADH**
   - **Hypoglycemia**
   - **Tumor Lysis Syndrome**
   - **Central Venous Catheter Sepsis**



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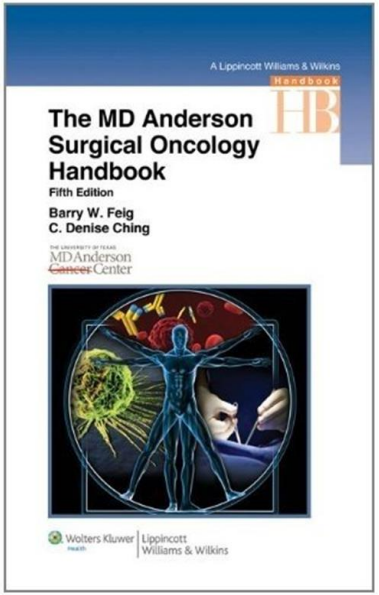
Oncologic Emergencies

2) Abdominal Emergencies:
   - Intestinal Obstruction
   - Intestinal Perforation
   - Biliary Obstruction
   - Neutropenic Enterocolitis
   - Hemorrhage

3) Anorectal infections

4) Palliation



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Surgical Emergencies

Bowel Obstruction

Cholecystitis & Biliary Problems

Free Air Including Perforation

Abdominal Pain with Neutropenia

Anorectal Pain, Abscess, & Fistula

Palliative Care Considerations

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Case Presentation

Patient with recently diagnosed gastric cancer

- Presented through the emergency room with dysphagia, dehydration
- Diagnostic laparoscopy and feeding tube placement, found to have peritoneal disease

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Case Presentation

Treated with chemotherapy for 2 treatments

- **Readmitted with nausea/emesis, diarrhea, dehydration**

- **Vital signs normal, abdomen non-tender**
- **Labs – slightly elevated BUN & Cr**

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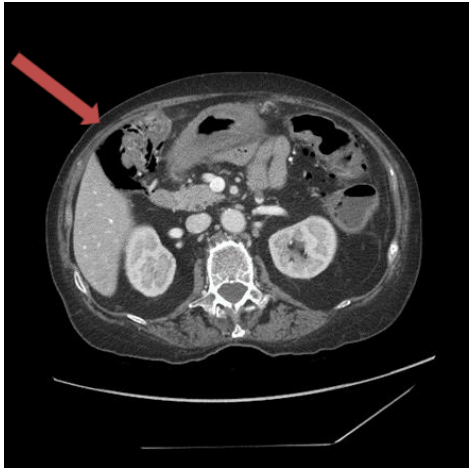
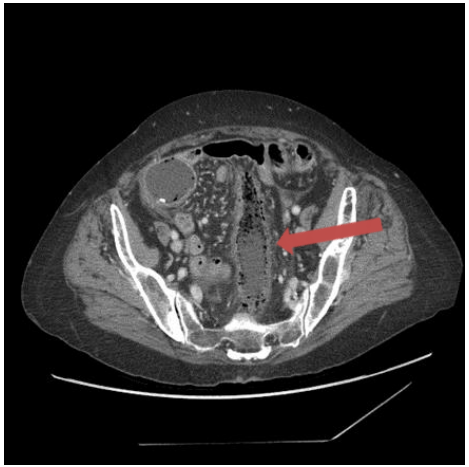
Imaging





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Options

Comfort Care

- **Risk:**

Death, may lose several months

- **Benefit**

No discomfort from surgery,

Focus on symptom control,

Limited survival from cancer

Non-operative

- **Risk:**

Sepsis, may lose chance for recovery

- **Benefit**

Might get through this without surgery, could avoid end ileostomy, possible path back to chemo

Surgery

- **Risk:**

Subtotal colectomy, ileostomy, likely will not get further chemo

- **Benefit**

Lowest risk of sepsis

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Palliative Surgical Evaluation – how often?

Study	Frequency
Miner, Ann Surg 04	1022 cases/year 6% of all endoscopic or operative procedures
McCahill, Ann Surg Onc 02	21% of cancer surgeries (based on self-report survey)
Badgwell, Support Care Cancer, 09	40% of all inpatient consultations at MDACC

Comprehensive geriatric assessment in cancer patients undergoing abdominal surgery, Badgwell, JSO, 2013

Surgery type		
Open	82	74%
Laparoscopic	29	26%
Palliative surgery		
No	83	75%
Yes	28	25%
Weight loss ≥10%		
No	94	85%
Yes	17	15%

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Palliative Surgical Evaluation

Indicators of surgery and survival in oncology inpatients requiring surgical evaluation for palliation

Brian D. Badgwell · Kerrington Smith · Ping Liu · Eduardo Bruera · Steven A. Curley · Janice N. Cormier

What percentage of surgical consults at a cancer center meet the criteria for palliative care?

What are the diagnoses requiring consultation?

Badgwell, Support Care Cancer, 2009.

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Palliative Surgical Evaluation

40% of all consultations met palliative criteria

Diagnosis	Number	Percent
Bowel obstruction	191	43
Wound problems	42	10
Gastrointestinal bleeding	35	8
Other	174	39

Chemo/biotherapy within 6 weeks	209	47
Neutropenia	38	9

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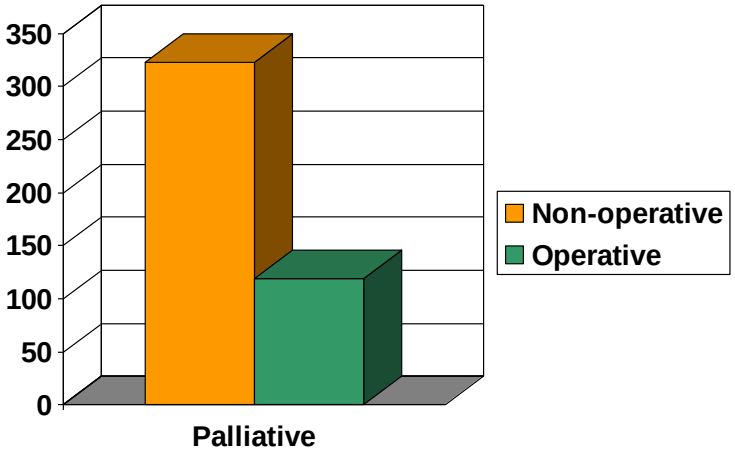
Palliative Surgical Evaluation

27% of palliative consults required surgical intervention



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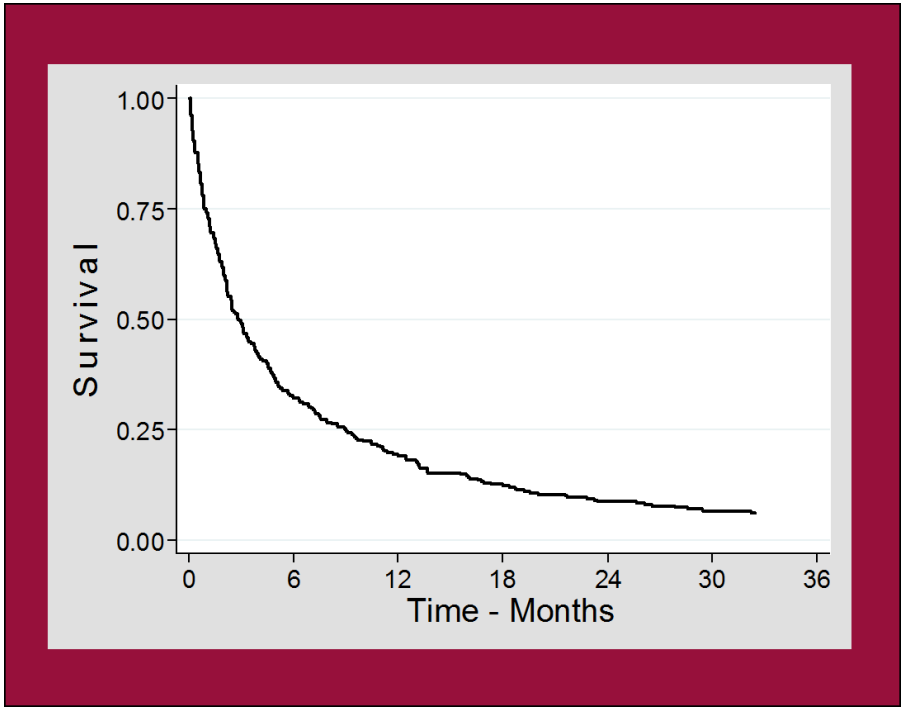
Palliative Surgical Evaluation

Median survival 2.7 months



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Surgical Emergencies

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Anorectal Abscess, Fistula, and Pain

Brian Badgwell, MD, MS

Section Chief – Gastric, Peritoneal, & Acute Care Surgical Oncology

MD Anderson Cancer Center

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Case Presentation

25 year old male with leukemia, recent relapse

- Last treated with high-dose chemotherapy 5 days ago, plan for BMT
- Admitted with neutropenic fever and perianal pain for 3 days

- 38.4, 99, 95/57
- Perianal tenderness and erythema, no fluctuance

WBC 0.2, Hg 7.7, Plts 28,000

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Case Presentation

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Anorectal Infections in the Cancer Patient

- Early reports in immunosuppressed cancer patients with mortality as high as 50%
- Immunosuppression, steroid use, recent systemic therapy, previous radiation therapy, chronic pain, cancer-related prognosis
- Treatment may delay subsequent therapy
- Prognosis

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Management and Outcomes of Anorectal Infection in the Cancer Patient

Brian D. Badgwell, MD, MS[1], George J. Chang, MD, MS[2], Miguel A. Rodriguez-Bigas, MD[2], Kerrington Smith, MD[2], Philip J. Lupo, MPH[3], Ralph F. Frankowski, PhD[4], George Delclos, MD, PhD[3], Xianglin L. Du, PhD[3], and Janice Cormier, MD, MPH[2]

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100 Patients

- **24 Perianal inflammatory process**
- **76 Abscess**

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Treatment

	No Surgery (n=42)	Surgery (n=58)
Perianal inflammatory process	20	4
Abscess	22	54

Incision & drainage was the most common procedure (79%)

- **With seton (9%)**
- **With fistulotomy (3%)**

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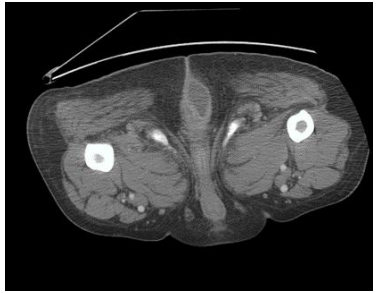
Treatment



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Treatment & Outcomes

Necrotizing soft tissue infection (n=2)

- **Radical Debridement (1 with colostomy)**

Only 19% were neutropenic at time of surgery

Recurrent infection in 17%
Fistula-in-ano in 9%
In-hospital mortality related to anorectal infection (n=1)

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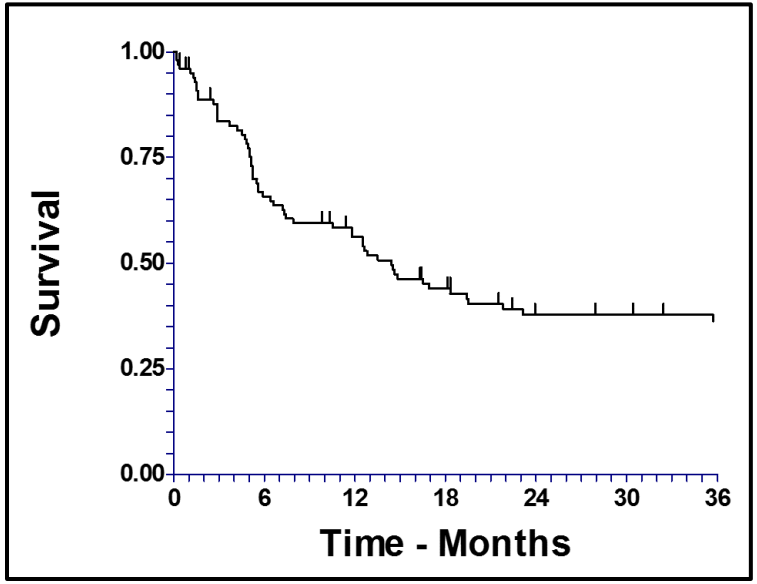
Associated Survival Outcomes

Kaplan Meier estimates of survival for the entire cohort. Median survival was 14.4 months (95%CI 7.9-19.5)



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Conclusions

- First rule out the necrotizing soft tissue infection
- Nonoperative management is a viable option – 42%
- Identification of an abscess, erythema on physical exam, and lack of thrombocytopenia were associated with surgery

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Anorectal complications in patients with haematological malignancies

Loureiro, et al, European Journal of Gastroenterology & Hepatology, July 2018.

- Positive blood cultures in 33%: Enterococcus, Klebsiella, E. coli
- 86% of non-septic recovered, and 85% of septic recovered
- Overall mortality 2.4%, 1 patient (1%) died due to perianal sepsis

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Treatment Summary

- Immunocompetent without need for systemic: Incision & drainage for any identified abscess

- Perirectal fluid on imaging without erythema/fluctuance: can be considered for nonoperative management
  - Neutrophil count
  - Platelets count
  - Performance status
  - Timing of systemic therapy

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Immunocompromised patient or need for urgent systemic therapy

- Exam under anesthesia, drainage, treatment of associated fistulae
- Incise abscess
- Identify fistula tract, draining seton
- Once/if immune system recovers, can consider a definitive procedure for fistula

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Free Air Including Perforation

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Pneumoperitoneum

- Pneumoperitoneum = the presence of gas (as air) in the peritoneal cavity
- Often mandates an emergent laparotomy
- Pneumoperitoneum is caused by bowel perforation in ~90% of cases
- Remaining 10% result from barotrauma, gynecologic insufflation, and retained postoperative or postprocedural air

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Nonsurgical Pneumoperitoneum

- **Defined as the presence of air in the peritoneal space that is detectable by imaging and either managed successfully by observation or results in a nondiagnostic laparotomy[1]**
- **Most cases after medical/procedural intervention**
- **Early descriptions describe as "benign pneumoperitoneum", "asymptomatic pneumoperitoneum", or "misleading pneumoperitoneum"**
- **Review- 196 cases reported, largest single series = 8 patients[1]**

1. Mularski RA, Sippel JM, Osborne ML. Pneumoperitoneum: a review of nonsurgical causes. Crit Care Med 2000; 28(7):2638-44.

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Pneumoperitoneum in the Cancer Patient

Increased risk for pneumoperitoneum:

- Local tumor invasion
- Immunosuppression
- Radiation therapy
- Chemotherapy
- Frequent endoscopic procedures

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Pneumoperitoneum in the Cancer Patient

- **Influence surgical decision-making:**
  - Neutropenia
  - Chemotherapeutic side effects
  - Radiation therapy
  - Steroid use
  - Chronic pain

- Choice of treatment that represents the best balance between clinical presentation and oncologic prognosis can pose a dilemma

- Scarce literature addressing the cancer patient

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Case Presentation

46 year old female with stage 4 colorectal cancer, carcinomatosis, and lung metastases

- Treated with 5FU, leucovorin, & oxaliplatin 24 hours ago
- Acute onset of abdominal pain, nausea, vomiting
- Called to see patient in ER for finding of pneumoperitoneum on CT scan

- AF, 116, 119/78
- Exam notable for diffuse abdominal tenderness, no peritoneal signs

- WBC count 6.8

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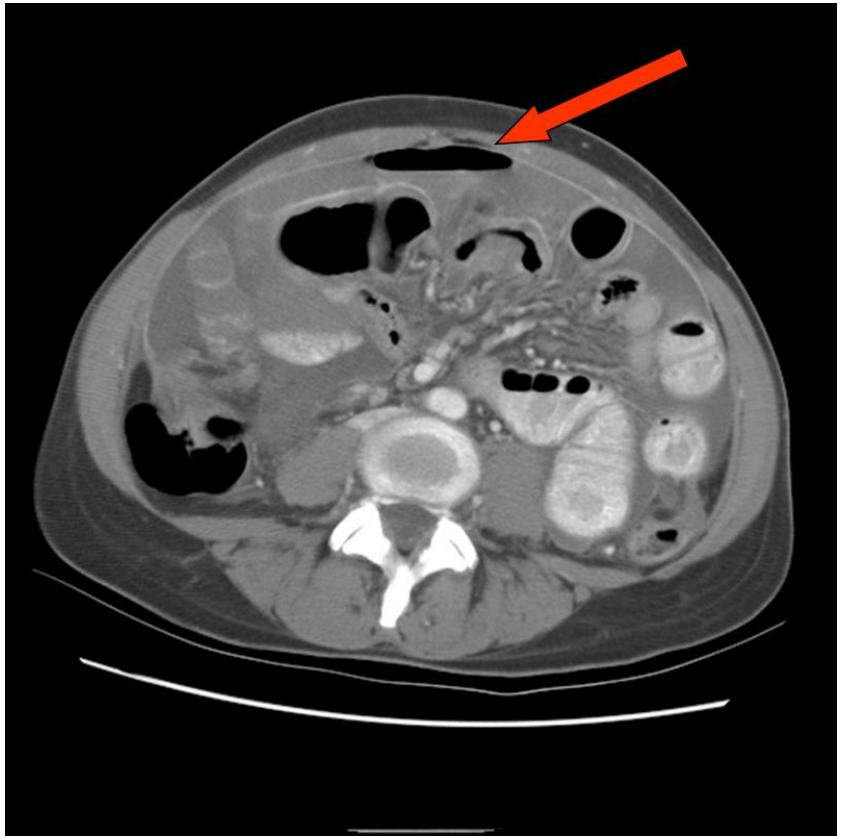
Case Presentation



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Annals of Surg Onc, vol 14, 11, 2007

Pneumoperitoneum in the Cancer Patient

Brian Badgwell, MD,[1] Barry W. Feig, MD,[1] Merrick I. Ross, MD,[1] Paul F. Mansfield, MD,[1] Sijin Wen, MS,[2] and George J. Chang, MD[1]

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[2]Department of Biostatistics and Applied Mathematics, The University of Texas M. D. Anderson Cancer Center, Houston, Texas 77030, USA

Purpose:

To characterize the clinical presentation, management, and outcome of patients with cancer and pneumoperitoneum

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Methods

- **<u>Study population:</u> patients with evidence of pneumoperitoneum on radiographic imaging as identified by chart review**

- **<u>Exclusion criteria:</u> abdominal surgery within 30 days, pneumoperitoneum secondary to respiratory trauma, or intraperitoneal air only in association with intraperitoneal abscess formation**

- **<u>Groups:</u>**
  1. **Comfort Care**
  2. **Non-Operative**
  3. **Surgical**

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Patient Demographics

	Comfort Care n=19 (%)	Non-Operative Management N=33 (%)	Surgery n=72 (%)
Median Age, y (range)	62 (18-92)	62 (45-76)	61 (31-83)
Origin of Pneumoperitoneum			
Gastroesophageal	0	2 (6)	2 (3)
Small Bowel	1 (5)	5 (15)	18 (25)
Colorectal	3 (16)	12 (36)	48 (67)
Indeterminate	15 (79)	14 (42)	4 (6)
Disease Stage			
I	0	1 (3)	4 (6)
II	0	3 (9)	3 (4)
III	0	2 (6)	10 (14)
IV	17 (89)	23 (70)	47 (65)
Unstaged	2 (11)	4 (12)	8 (11)

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Length of Hospital Stay and 30-day Morbidity & Mortality

	Non-operative N=33 (%)	Surgery N=72 (%)
Median LOS, d (range)	8 (0-50)	16 (2-77)
Complications	13 (39%)	33 (46%)
30-day Mortality	4 (12%)	11 (15%)

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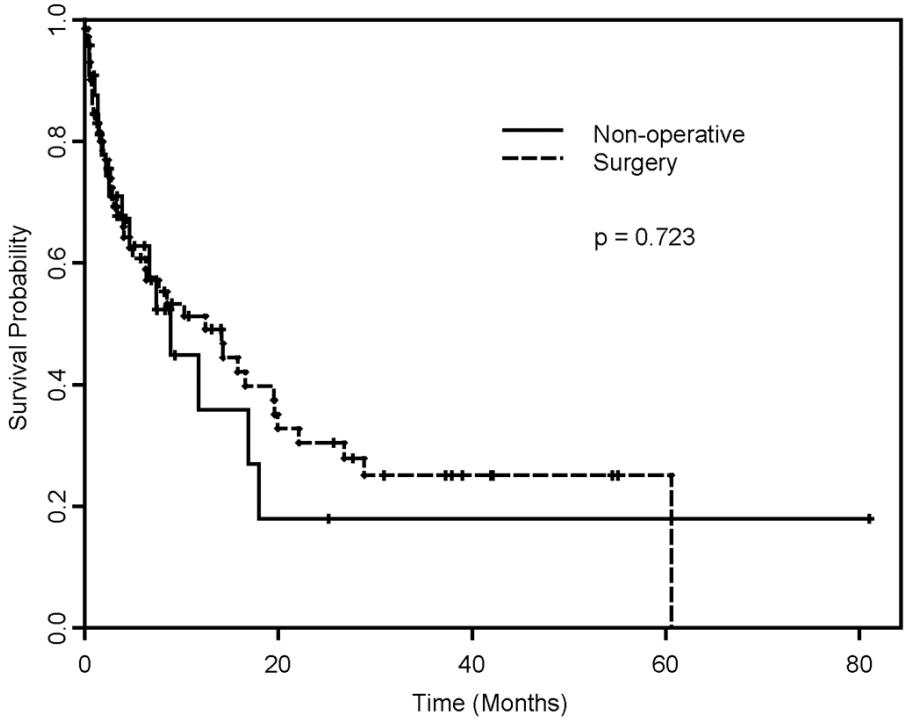
Kaplan-Meier curves for overall survival according to whether pneumoperitoneum was treated with surgery (n = 72) or non-surgical management (n = 33)



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Conclusions

- Most patients treated with surgery
- Treatment was based on patient, family, and practitioner decisions in the context of the clinical presentation and with respect to oncologic prognosis.
- Not applicable to population without advanced cancer
- It is okay to refrain from operative intervention in some situations and may not result in 100% mortality

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Management of Bevacizumab-associated Bowel Perforation

Brian D. Badgwell, MD[1], E. Ramsay Camp, MD[1], Barry Feig, MD[1], Robert A. Wolff, MD[2], Cathy Eng, MD[2], Lee M. Ellis, MD[1,3], Janice N. Cormier, MD, MPH[1]

[1]Department of Surgical Oncology, [2]Department of Medical Oncology, [3]Department of Cancer Biology

Annals of Oncology, Mar; 19(3):577-82, 2008.

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Background

- **The efficacy of bevacizumab, a humanized monoclonal antibody to VEGF (Avastin; Genentech, San Francisco, CA), in combination with chemotherapy has been demonstrated in several prospective, randomized phase III studies.[1-3]**
- **Being studied as part of the treatment regimen in a wide range of malignancies.**
- **Toxicity profile acceptable but includes hypertension, proteinuria, delayed wound healing, arterial thrombosis, and bleeding.**
- **GI perforation is a rare but well documented complication with incidence of ~1 to 2%.**

1. Hurwitz H, et al.. *N Engl J Med.* Jun 3 2004;350(23):2335-2342.
2. Giantonio BJ, et al. *J Clin Oncol.* Apr 20 2007;25(12):1539-1544.
3. Sandler A, et al. *N Engl J Med.* Dec 14 2006;355(24):2542-2550

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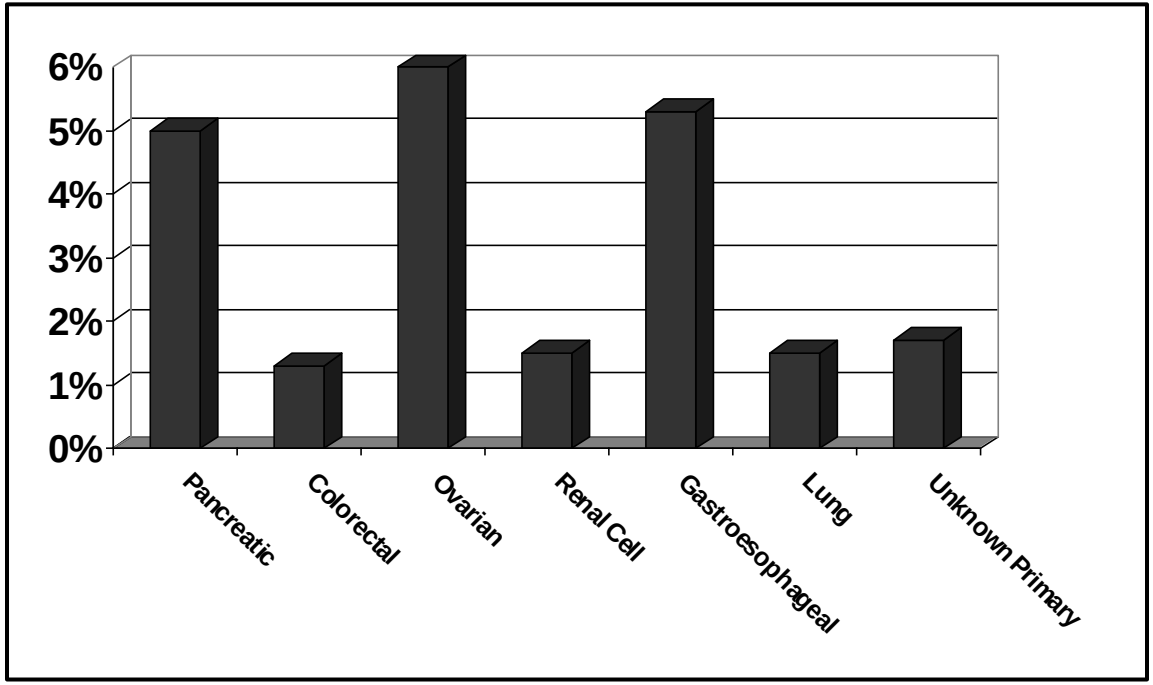
Results

- **We identified 1,442 patients who had been treated with bevacizumab over the study period with perforation occurring in 24 (1.7%)**



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Results

- **20 – Non-operative treatment**
  - **7 Required drains**
- **1 patient failed non-operative treatment for a perforated diverticulitis with abscess formation**

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Results

4 treated with immediate surgical exploration.

- 2 had perforated appendicitis.
- 1 patient perforated at the site of a GE junction tumor & underwent a gastrectomy with cervical esophagostomy
- 1 patient developed a perforation in the setting of ovarian carcinomatosis requiring a diverting loop jejunostomy.

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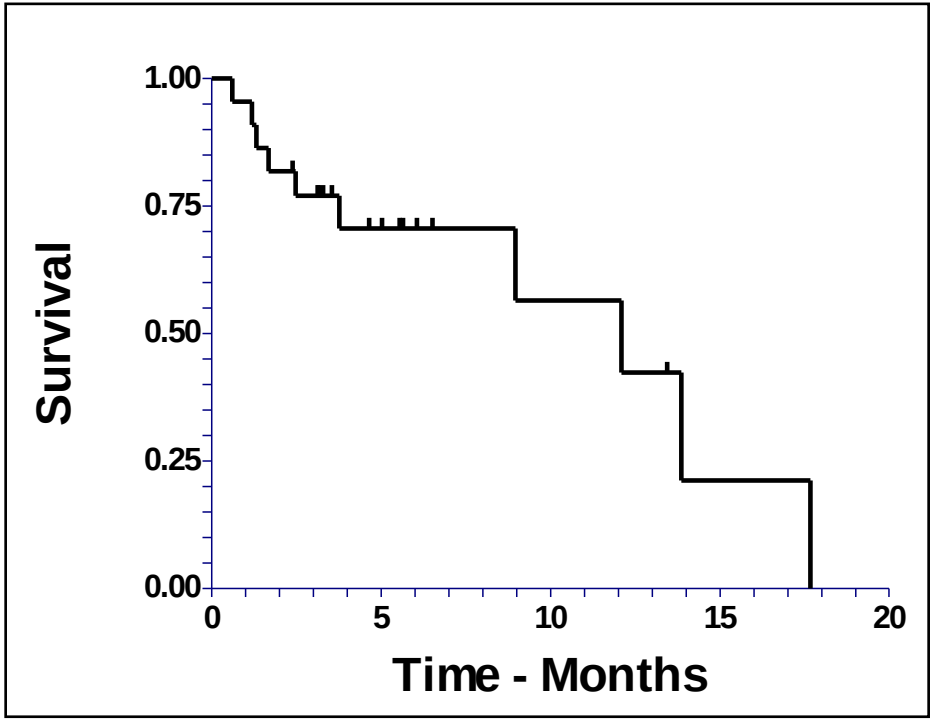

- The 30-day post-perforation mortality rate was 12.5 % (n=3/24)
- 60-day mortality rate was 25% (n=6/24)
- Median overall survival time after bevacizumab-associated perforation was 12.5 months

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Conclusions

- The low incidence (1.7%) of bevacizumab-associated bowel perforation in the present study appears to mirror that seen in earlier trials.

- Higher rates of perforation can be expected in patients with ovarian, pancreatic, or gastroesophageal cancer.

- Nonetheless, this serious adverse event can be managed successfully in selected patients without surgical intervention.

- Model for other/new agents

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Summary

- Most often advanced cancer and palliative scenarios
- Different presentation and treatment from non-cancer population
- Palliative care principles – goals of care
- Can the patient recover back to a meaningful quality of life
- Extremely challenging discussions at transition from therapeutic to palliative treatment

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Hepatobiliary Emergencies in Cancer Patients

Travis E. Grotz, MD | Mayo Clinic

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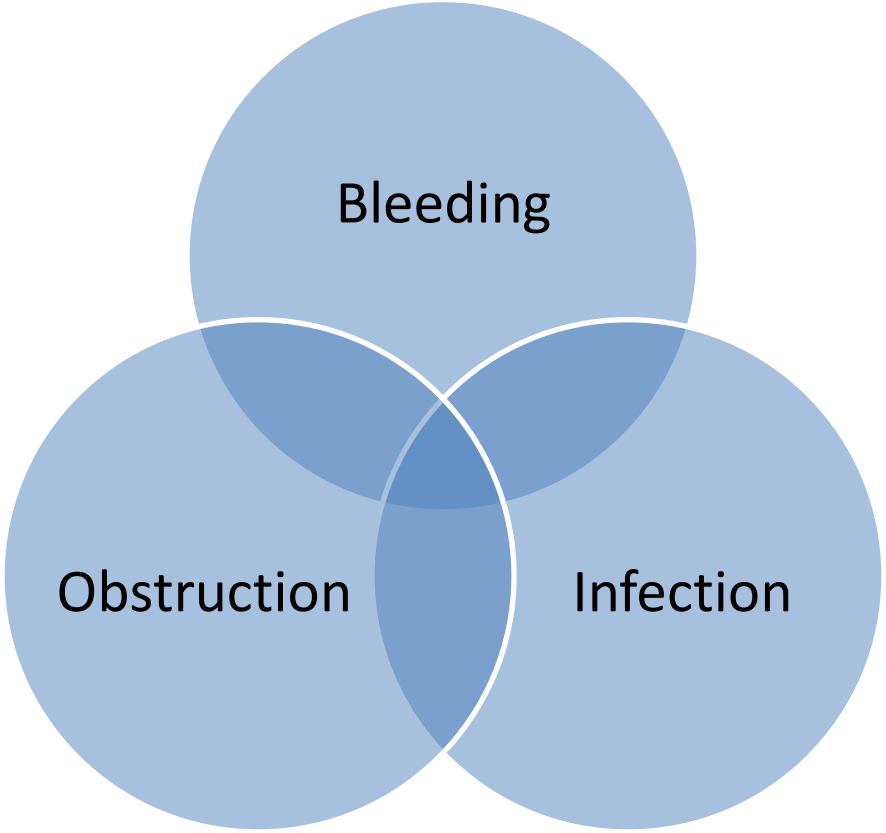

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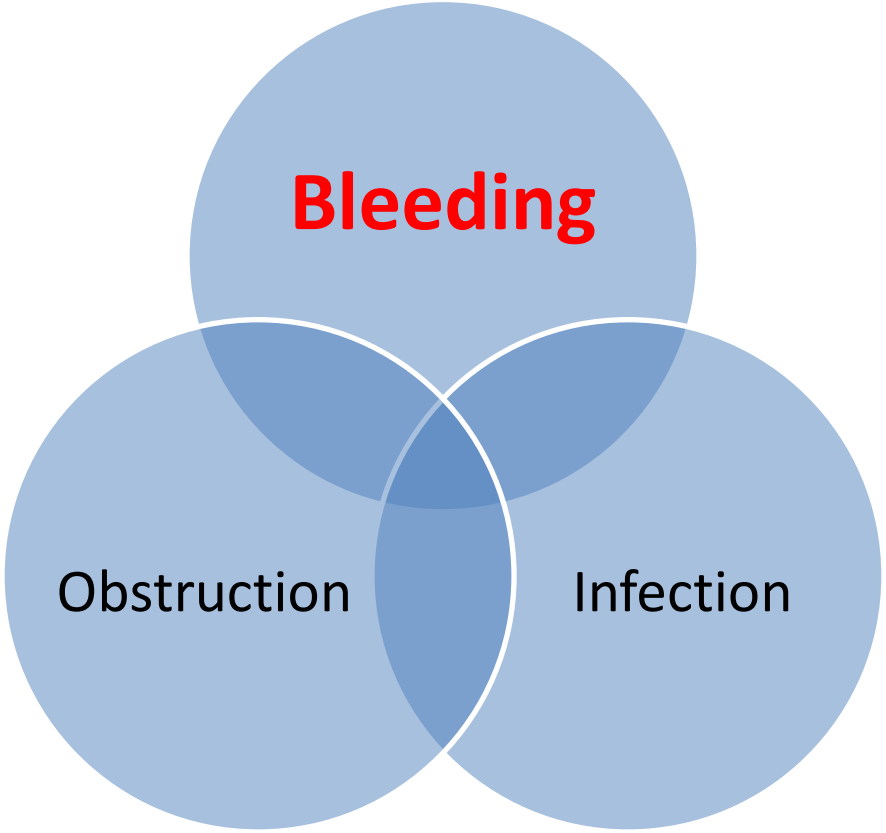

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HPB Bleeding Emergencies

7.9 x 7.6 x 7.2 cm solid mass with arterial enhancement and washout on delays

Blood products here and in the pelvis

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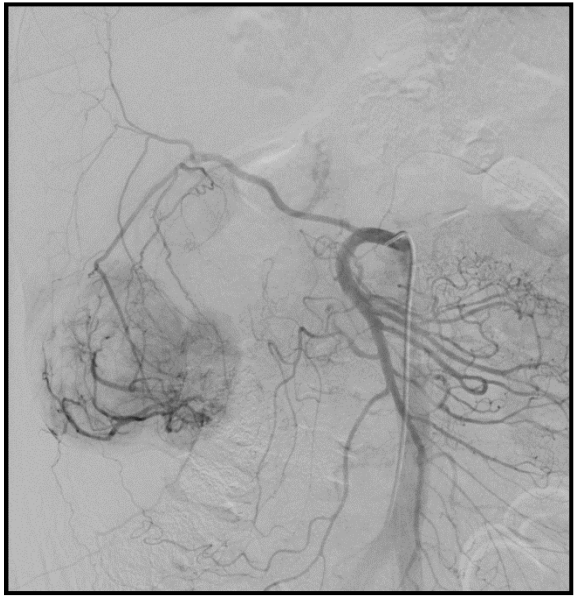
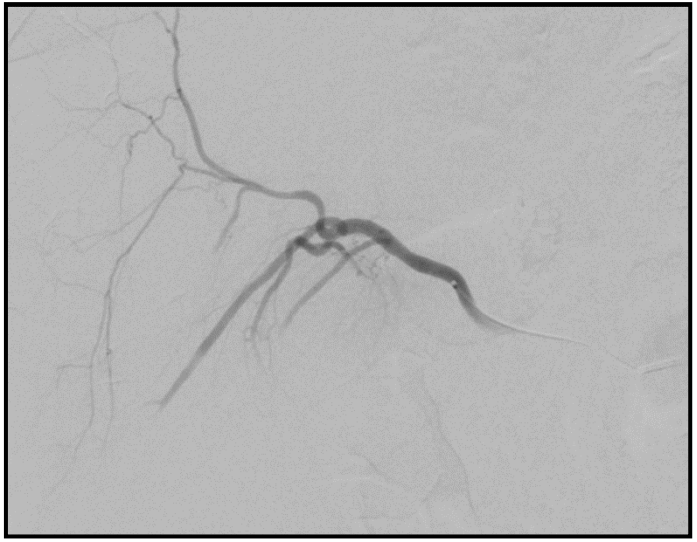
HPB Bleeding Emergencies

Pre-embolization



Post-embolization



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Post-embolization

Post-procedure scan shows necrosis and decrease from 8 cm to 6 cm.

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HPB Bleeding Emergencies

- Patients may present with
    - Hemorrhagic shock
    - RUQ/Back/shoulder pain
    - Abdominal distension
    - Peritonitis
- Spontaneous rupture of HCC is reported in 3% of cases
- Benign tumors- adenoma, less likely FNH or hemangioma
- Intrahepatic metastasis from lung, colon or renal cell carcinoma and melanoma
- Iatrogenic following perc liver biopsy, PTC or endoscopic biliary procedures (risk is 1-2%)

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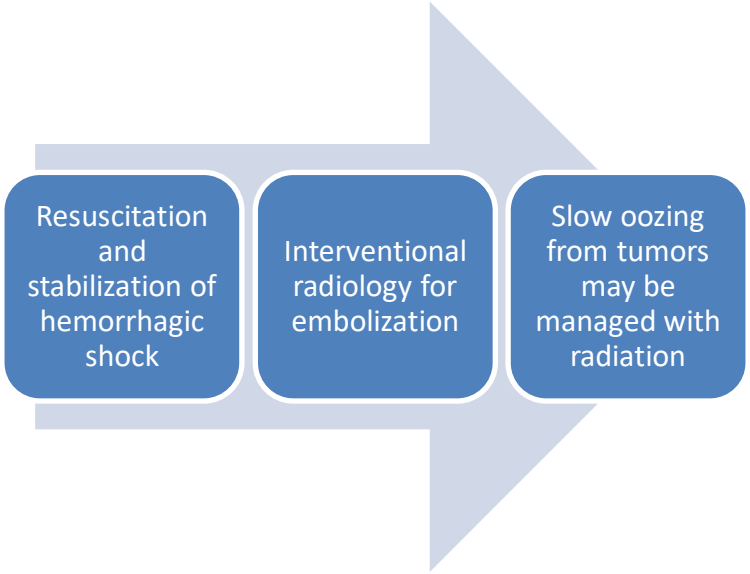
HPB Bleeding Emergencies

Management



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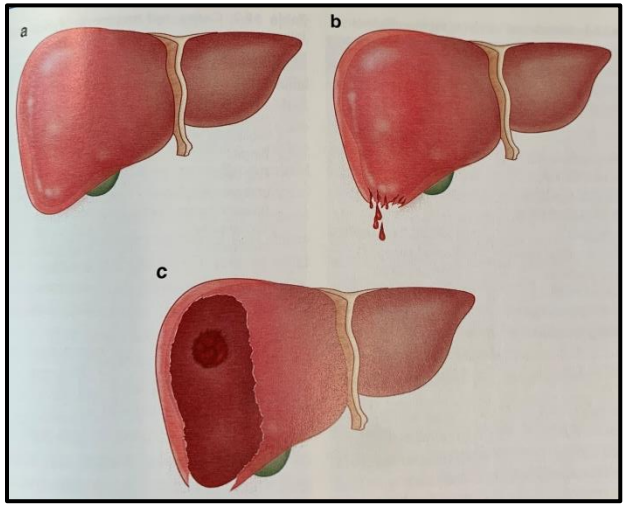
HPB Bleeding Emergencies

Subscapular hematoma- may result from PTC, biopsies etc.



Site of rupture may not be the site of hemorrhage

↓

Open Glisson's capsule to expose the bleeding vessel

↓

Obtain hemostasis at site of bleeding and entire area of stripped capsule

Fong, Y., Kauffmann, R.M., Marcinkowski, E., Singh, G., Schoellhammer, H. (Eds.) Surgical Emergencies in the Cancer Patient. Springer 2017.

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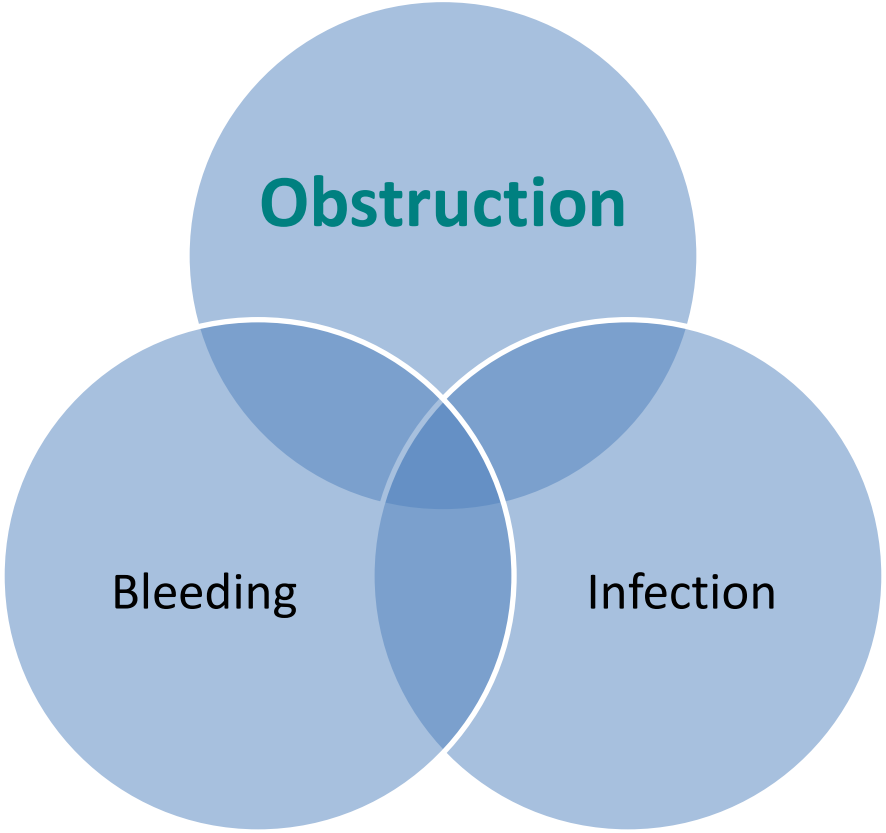
Hepatobiliary Emergencies



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HPB Obstruction Emergencies

Arises from

- Hepatic, biliary or pancreatic tumors, hepatoduodenal lymphadenopathy, radiation or anastomotic strictures

Presents with

- Jaundice, acholic stools, tea-colored urine, pruritus and/or cholangitis

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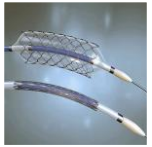
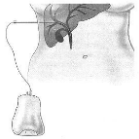
HPB Obstruction Emergencies



Endoscopic biliary drainage

- Plastic stents- removable, least durable
- Covered metal stents- most durable and removable but expensive
- Uncovered metal stents- moderate durable and not removable
- Risk of perforation pancreatitis and re-obstruction



Percutaneous biliary drainage

- Risk of bleeding
- Success and complication rates similar to EBD
- Electrolyte abnormalities and tube dislodgement
- Cholecystostomy tube is an alternative option

Surgical biliary drainage

- Trade off for increased initial complications for longer durability and fewer readmissions
- Consider in operative candidates with life expectancy > 6 months

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Obstruction w/ Infection = Emergency

Endobiliary pressure> 20 cm H_2O

↓

BILIARY-VENOUS REFLUX

No basal membrane between sinusoids and small biliary ducts

↓ bacteria toxins ↓

↓

Systemic circulation

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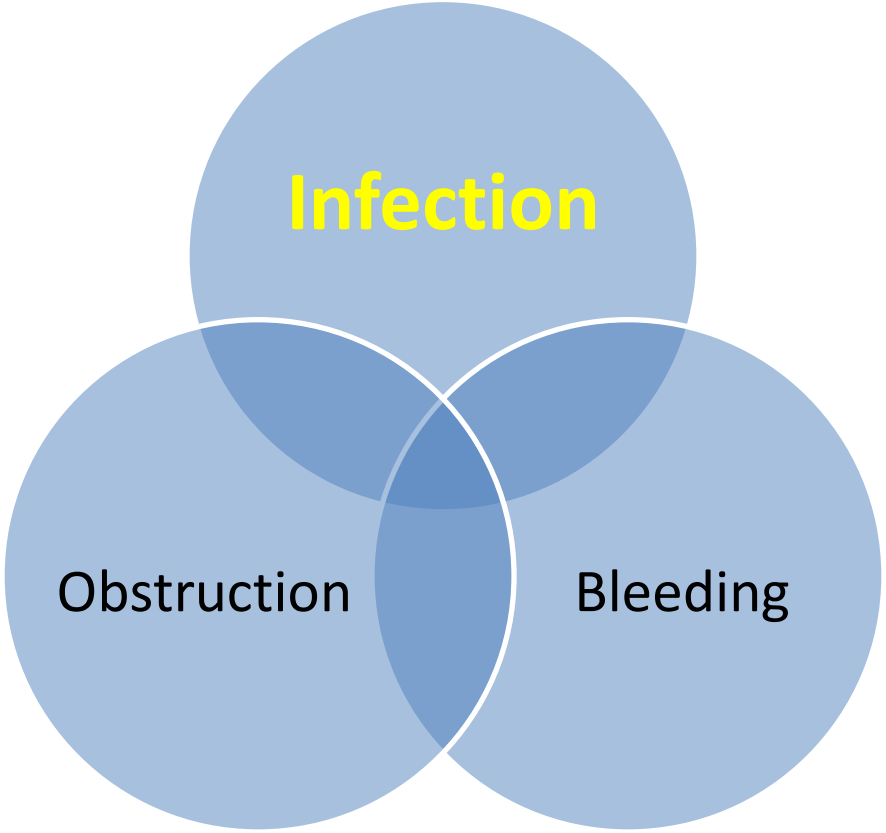

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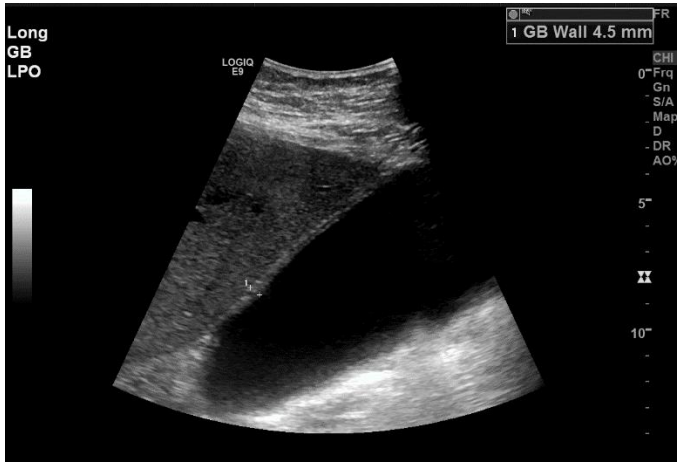
HPB Infection Emergencies

Distended gallbladder, wall thickening, pericholecystic fluid and fat stranding. No stones.



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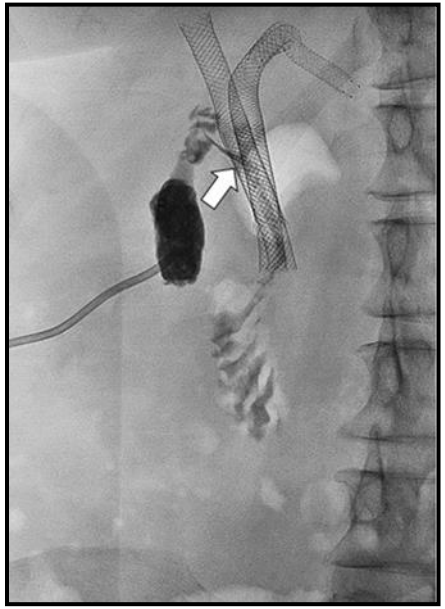
HPB Infection Emergencies

Has bilateral bare metal stents in a Y-configuration. Percutaneous cholecystostomy catheter was placed and initial contrast injection shows a non-patent cystic duct.

6 weeks later contrast shows patent cystic duct and the catheter was removed with no recurrence of cholecystitis



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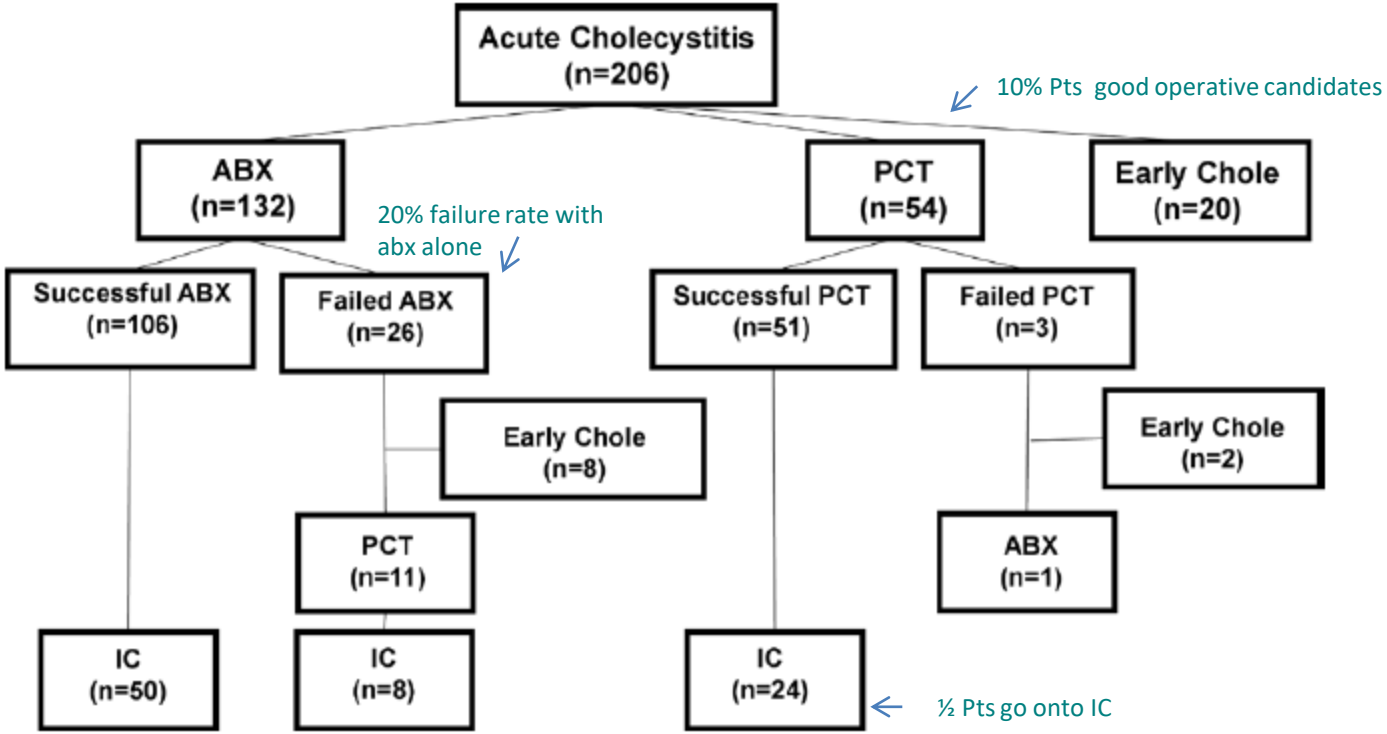
HPB Infection Emergencies



Santos D, Robinson Ledet C, Limmer A, Gibson H, Badgwell B. Use of non-operative treatment and interval cholecystectomy for cholecystitis in patients with cancer. Trauma Surg Acute Care Open 2020;5:e000439

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Infection

Table 4 Optimum strategy for the management of high-risk patients at 6-week follow-up after percutaneous cholecystostomy based on sensitivity analyses (strategies chosen based on the median values)

Expected survival (months)	Low risk of recurrence (10–20 %)	Moderate risk of recurrence[a] (20–30 %)	High risk of recurrence (30–40 %)[b]
3	No cholecystectomy		
6	No cholecystectomy	No cholecystectomy	Perform cholecystectomy
12	No cholecystectomy	Perform cholecystectomy	Perform cholecystectomy
24	Perform cholecystectomy		

[a] Patients with only one risk factor for cholecystitis may be considered at moderate risk

[b] Patients with multiple risk factors for cholecystitis or concern for isolated/symptomatic metastases

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Jayakrishnan, T.T., Groeschl, R.T., George, B. *et al.* Management of acute cholecystitis in cancer patients: a comparative effectiveness approach. *Surg Endosc* **28,** 1505–1514 (2014).

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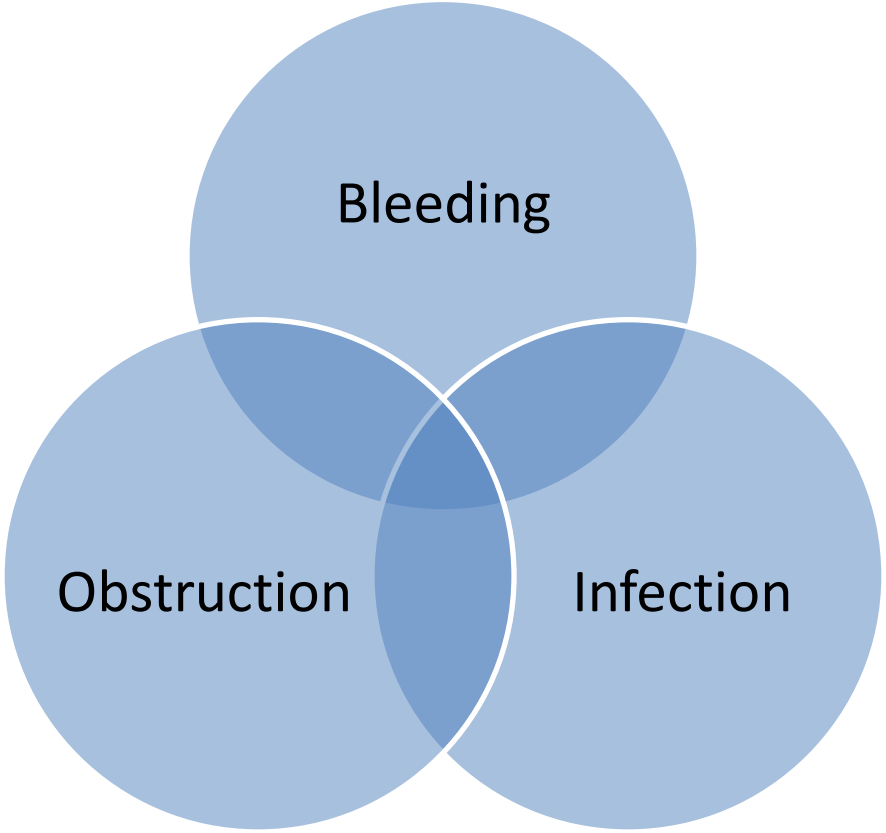
Hepatobiliary Emergencies



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Management of HPB malignancies

- Individualized based on
  - Current clinical status
  - Surgical risk
  - Current and future cancer treatments
  - Overall prognosis

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Abdominal Pain in the Setting of Neutropenia

Christopher Scally, MD, MS

| Assistant Professor, Surgical Oncology

University of Texas M.D. Anderson Cancer Center

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Background

- Abdominal pain is a relatively common complaint in patients undergoing cytotoxic chemotherapy with neutropenia
- More common in patients with hematologic malignancies
- Differential Diagnosis is broad:
  - Early case series of 58 patients noted 26 different clinical diagnoses

Location of pain	No. of patients
Right upper quadrant	
Cholecystitis	2
Liver	
Abscesses	2
Hepatitis	1
Tumor tenderness	1
Perforated peptic ulcer	1
Leukemic infiltrate	1
Neutropenic enteropathy	2
Right lower quadrant	
Typhlitis	2
Liver abscesses	1
Retroperitoneal hemorrhage	1
Fecal fistula at site of prior appendectomy	1
Epigastric	
Esophagitis	2
Hemorrhagic gastritis	1
Pancreatitis	1
Pneumonia	1
Left upper quadrant	
Splenic infarction	1
Hemorrhagic gastritis	1
Constipation	1
Tumor hemorrhage	1
Left lower quadrant	
Diverticular perforation	1
Pelvic hematoma	1
Tumor tenderness	1
Neutropenic enteropathy	1
Large bowel obstruction, Sigmoid stricture due to diverticulitis	1

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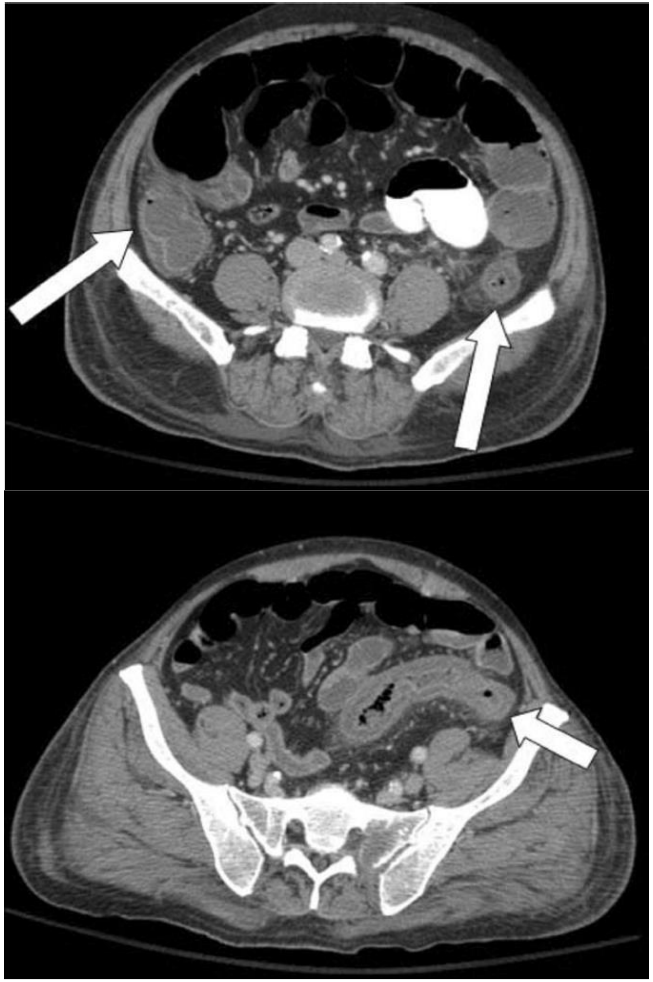
Background

- Most literature focuses on Neutropenic Enterocolitis
  - Neutropenic Enteropathy
  - Necrotizing Colitis
  - Typhlitis (Confined to cecum)
- Clinical Criteria for Diagnosis:
  - Neutropenia (<1000 WBC/uL)
  - Fever
  - Abdominal pain
  - Bowel wall thickening on imaging



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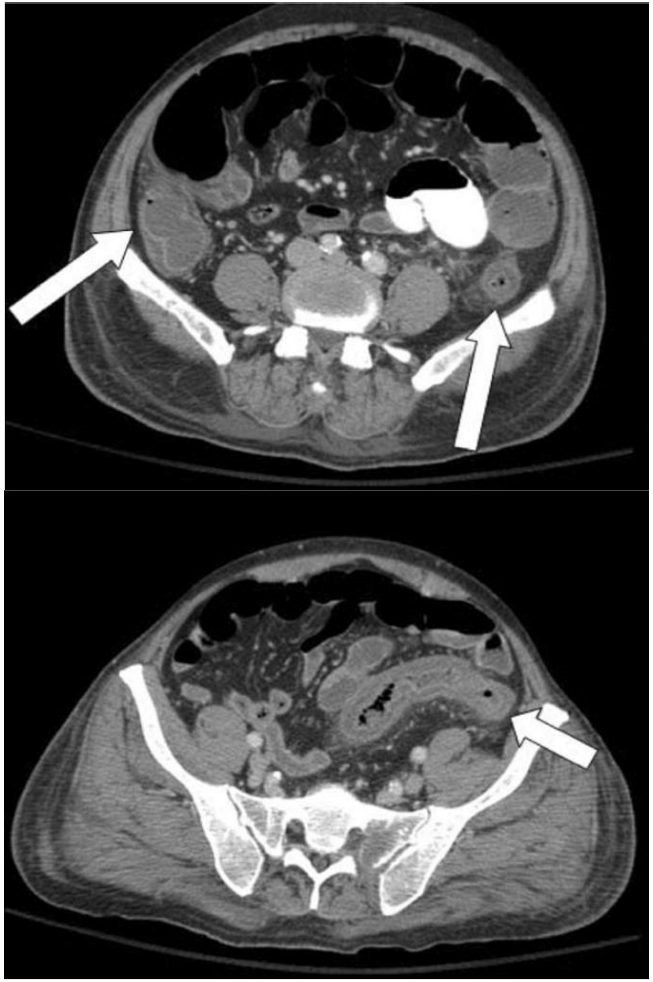
Background

- Historical Literature:
  - High mortality
  - Dismal results with surgical intervention (30-50% 30-day postoperative mortality, high complication rates)



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Challenges in Surgical Management of Abdominal Pain in the Neutropenic Cancer Patient

Brian D. Badgwell, MD, Janice N. Cormier, MD, MPH,* Curtis J. Wray, MD,* Gautam Borthakur, MBBS,† Wei Qiao, MS,‡ Kenneth V. Rolston, MD,§ and Raphael E. Pollock, MD, PhD**

- 60 patients undergoing surgical consultation for abdominal pain in the setting of neutropenia
- 58/60 patients received chemotherapy <8 weeks from surgical consult (median 10 days)
- 72% had hematologic malignancy
- High rates of comorbidity (68% at least one acute medical condition or coexisting infection)
- Lengthy hospital stay (12.5 days)

Contemporary Cohort

- Neutropenic enterocolitis most common etiology but <1/3 of cases
- All patients treated with broad spectrum antibiotics
- 73% treated with G-CSF stimulants
- 9 patients (15%) underwent operative intervention
  - 2 immediately
  - 5 surgery delayed to allow counts to recover
  - 2 developed late complications requiring surgery

TABLE 1. Study Population Demographics and Diagnoses (n = 60)

Parameter	No. Patients	% of Patients
Median age, yrs (range)	58 (22–84)	—
Sex		
Male	31	52
Female	29	48
Malignancy		
Hematologic	43	72
Solid tumor	17	28
Median ANC ×1000 cells/μL (range)	0.17 (0–0.99)	—
Median duration of neutropenia, d (range)	9 (1–120)	—
Cause of abdominal pain		
Neutropenic enterocolitis	17	28
Small bowel obstruction	7	12
Clostridium difficile colitis	4	7
Diverticulitis	3	5
Appendicitis	3	5
Cholecystitis	2	3
Colonic pseudo-obstruction	2	3
Splenic rupture	1	2
Unclear	21	35

ANC indicates absolute neutrophil count.

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Contemporary Cohort

- Overall poor outcomes:
  - 19/60 patients died in hospital
  - 2 discharged to hospice
- 30 day mortality 30%
- 90 day mortality 52%

- 9 surgical patients:
  - 3 deaths – none within 30 days
    - 10 mo, 11 mo, 3 mo
  - 3 surgical complications

TABLE 2. Clinical Indications for Surgery in the Study Population

Cause	Complication	Outcome
Small bowel obstruction	None	Death at 10 mo
Appendicitis	None	Alive at 45 mo
Diverticulitis	Wound infection, deconditioning	Alive at 7 mo
Appendicitis	None	Death at 11 mo
Cholecystitis	None	Alive at 34 mo
Splenic rupture	None	Death at 3 mo
Neutropenic enterocolitis	Deconditioning	Alive at 52 mo
Neutropenic enterocolitis	Ileus	Alive at 52 mo
Neutropenic enterocolitis	None	Alive at 62 mo

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Principles of Management

- Maintain broad differential
- Aggressive medical therapy
- Early onboarding of palliative/supportive care
- Realistic discussion of prognosis
- Non-operative/interventional radiology strategies
- Delay operative intervention when feasible

Thank You

Christopher Scally, MD, MS

cpscally@mdanderson.org

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1. Starnes HF Jr, Moore FD Jr, Mentzer S, et al. Abdominal pain in neutropenic cancer patients. Cancer. 1986;57:616–621.
2. Wade DS, Douglass H Jr, Nava HR, et al. Abdominal pain in neutropenic patients. Arch Surg. 1990;125:1119 –1127.
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4. Badgwell BD, Cormier JN, Wray CJ, et al. Challenges in the Management of Abdominal Pain in the Neutropenic Cancer Patient. Ann Surg. 2008;248: 104-109

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Bowel Obstruction in Advanced Cancer Patients

Alisa N Blumenthaler, MD

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Bowel Obstruction in Advanced Cancer Patients

- Causes:
  - Benign (~20%)
    - Adhesions
    - Hernia
    - Inflammation

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Baron, *Current Oncology Reports* 2009;
Pujara et al. *JACS.* 2017

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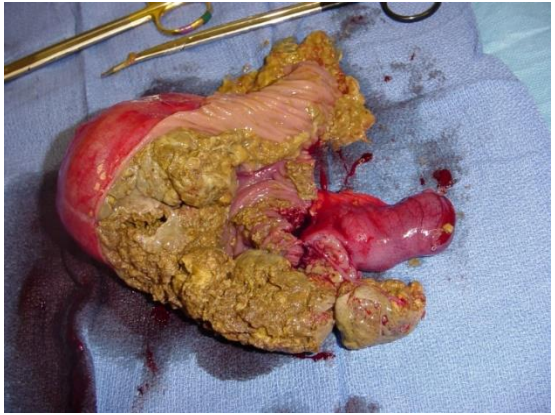
Bowel Obstruction in Advanced Cancer Patients

- Causes:
  - Benign (~20%)
    - Adhesions
    - Hernia
    - Inflammation



Baron, *Current Oncology Reports* 2009;
Pujara et al. *JACS.* 2017

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Bowel Obstruction in Advanced Cancer Patients

- Causes:
  - Benign (~20%)
    - Adhesions
    - Hernia
    - Inflammation
  - Malignant (~70%)
    - Intact primary tumor
    - Local recurrence
    - Intra-abdominal metastasis
    - Peritoneal disease
    - Mesenteric masses
    - Functional (invasion of nerve plexuses)

Baron, *Current Oncology Reports* 2009;
Pujara et al. *JACS.* 2017

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Malignant Bowel Obstruction (MBO)

- Burden of disease
  - 1,103,528 discharges in 2010
  - 13% of inpatient hospital admissions
- Most common indication for Palliative Surgery consultation

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Alese et al, *Cancer* 2015; Badgwell et al, *Supportive Care in Cancer* 2009; Badgwell et al, *J Surg Oncol* 2013

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Management

- Options:
  - Medical
  - Surgical
  - Non-surgical procedures (endoscopy, IR)
- Worse OS after endoscopy/IR procedures compared to others
  - 2/2 disease status

	GOO	SBO	LBO
Surgery	44%	25%	57%
Medical	22%	52%	25%
Endoscopy/IR	34%	24%	18%

Badgwell et al, *J Pall Med* 2011

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Treatment Options

- Surgical Options for MBO:
  - Bypass
  - Resection
  - Ostomy
- Outcomes:
  - Complications 7-58%
    - Wancata et al: 44% v 27% in benign obstruction
  - Postoperative mortality up to 32%

Olson et al. *JAMA Surg*. 2014.
Wancata et al. *J Gastrointest Surg*. 2017.

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Bateni *et al. BMC Cancer* (2018) 18:1166
https://doi.org/10.1186/s12885-018-5108-9

BMC Cancer

RESEARCH ARTICLE Open Access

CrossMark

Hospital utilization and disposition among patients with malignant bowel obstruction: a population-based comparison of surgical to medical management

Sarah B. Bateni[1], Alicia A. Gingrich[1], Susan L. Stewart[2], Frederick J. Meyers[3], Richard J. Bold[1] and Robert J. Canter[1*]

- Medical management:
  - Higher rates of re-obstruction, operation within 1 yr
- Surgical management:
  - Higher rates in-hospital death
  - Lower rates of discharge to home
- No difference in OS (~6.5 months)

Bateni et al. *BMC Cancer*. 2018.

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Treatment Options

- Increased morbidity:
  - Age
  - Male sex
  - American Society of Anesthesiologists score
  - Cirrhosis
  - Sepsis
  - Hypoalbuminemia
  - Small bowel resection

- Increased mortality:
  - Age
  - Hypoalbuminemia
  - Ascites
  - # disease sites on imaging
  - Disseminated carcinomatosis
  - Abdominal visceral metastasis
  - Intact primary tumor or local recurrence
  - Chemo within 6 months
  - Performance Status
  - Non-colorectal cancer primary

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Badgwell et al. *J Pall Med*. 2011; Blair et al. *Ann Surg Oncol*. 2001; de Boer et al. *Europ J Surg Oncol*. 2019; Wancata et al. *J Gastrointest Surg*. 2017

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Treatment Options

- Contraindications to operation:
  - Ascites
  - Carcinomatosis
  - Multiple sites of obstruction
  - Hypoalbuminemia
  - Palpable intra-abdominal masses

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Krouse. *J Surg Oncol*. 2019;
Roses. *Surgical Oncology Clinics of North America*. 2018

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Treatment Options – Non-operative

- Self-expandable metal stents:
  - Duodenal obstruction:
    - Technical success 97%, clinical success 90%
    - Re-obstruction 20%, migration 5%
    - Compared to Gastrojejunostomy:
      - Similar technical success
      - Similar complication rates
      - Shorter hospital stay
      - More common re-obstruction
    - Benefits may not be realized in cases of peritoneal carcinomatosis
  - In general, stent for patients with anticipated short survival; consider surgery when prognosis is more hopeful.

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Baron, *Current Oncology Reports* 2009;
Jeurnink, *BMC Gastroenterology,* 2007

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Treatment Options – Non-operative

- Self-expandable metal stents:
  - LBO:
    - Technical success 93%, clinical success 91%
    - Perforation 3.8%
    - Re-obstruction 7.3%, migration 15%
    - Compared to open surgery:
      - Shorter LOS
      - Fewer serious adverse events

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Baron, *Current Oncology Reports* 2009;
Jeurnink, *BMC Gastroenterology,* 2007

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Treatment Options – Non-operative

- Decompressive tubes:
  - Gastrostomy:
    - When luminal patency cannot be achieved
    - Symptom palliation
    - Relative contraindication: ascites
  - Jejunostomy
- Medications
  - Somatostatin analogs, pro-kinetic, anti-nausea

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Baron, *Current Oncology Reports* 2009;
Jeurnink, *BMC Gastroenterology,* 2007

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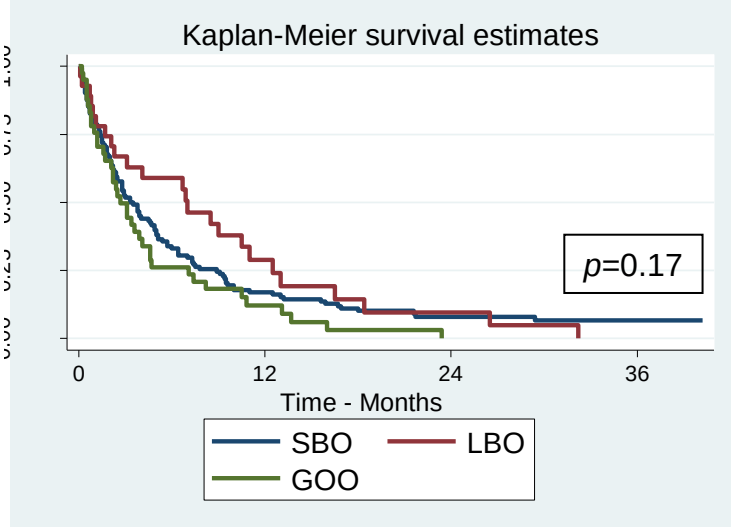
Survival - Optimal Outcome Measure?

- Overall, the prognosis for patients with MBO is poor.
  - OS ranges 3-6 months in most studies

- The optimal outcome is poorly defined:
  - Survival?
  - Symptom improvement?
  - QOL?



Median Survival:
GOO – 2.7 months
SBO – 3.5 months
LBO – 7 months

Badgwell et al, *J Pall Med*, 2011.

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Optimal Outcomes – Symptom Improvement

Selective Approach for Patients with Advanced Malignancy and Gastrointestinal Obstruction

CrossMark

Deep Pujara, MPH, Yi-Ju Chiang, MSPH, Janice N Cormier, MD, MPH, FACS, Eduardo Bruera, MD, Brian Badgwell, MD, FACS

- Factors negatively associated with eating at discharge:
  - Intact primary/local recurrence
  - Carcinomatosis
  - Albumin < 3.5
- No difference in tolerance of diet at discharge based on intervention type (surgery v medical v endoscopy/IR)

Pujara et al. *JACS.* 2017

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Optimal Outcomes – Symptom Improvement

Annals of Surgical Oncology, **8**(8):632–637
Published by Lippincott Williams & Wilkins © 2001 The Society of Surgical Oncology, Inc.

Outcome of Palliative Operations for Malignant Bowel Obstruction in Patients With Peritoneal Carcinomatosis From Nongynecological Cancer

Sarah L. Blair, MD, David Z. J. Chu, MD, and Roderich E. Schwarz, MD

- 45% discharged tolerating a regular diet
- Factors negatively associated with tolerating solid food:
  - SBO
  - Ascites
  - Albumin < 3.5

Blair et al, *Ann Surg Onc*, 2001.

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Optimal Outcomes - QOL

- QOL considered as outcome for decision-making
- Lack of QOL and patient reported outcomes data
- High attrition rates due to short survival, and high symptom burden

Ann Surg Oncol (2012) 19:3651–3658
DOI 10.1245/s10434-012-2420-5

Annals of SURGICAL ONCOLOGY
OFFICIAL JOURNAL OF THE SOCIETY OF SURGICAL ONCOLOGY

ORIGINAL ARTICLE – HEALTHCARE POLICY AND OUTCOMES

Frequent and Early Death Limits Quality of Life Assessment in Patients with Advanced Malignancies Evaluated for Palliative Surgical Intervention

Brian Badgwell, MD, MS[1], Robert Krouse, MD[2], Janice Cormier, MD, MPH[3], Caesar Guevara, BS[1], V. Suzanne Klimberg, MD[1], and Betty Ferrell, PhD[4]

[1]Department of Surgical Oncology, The University of Arkansas for Medical Sciences, Little Rock, AR; [2]Department Surgical Oncology, University of Arizona, Tucson, AZ; [3]Department of Surgical Oncology, The University of Texas M. D. Anderson Cancer Center, Houston, TX; [4]Department of Surgical Oncology, City of Hope National Medical Cent Duarte, CA

Clinical Surgery-American

A prospective observational study examining quality of life in patients with malignant gastric outlet obstruction

Carl Schmidt, M.D.[a], Hans Gerdes, M.D.[b], William Hawkins, M.D.[a], Erica Zucker, B.A.[a], Qin Zhou, M.A.[c], Elyn Riedel, M.S.[c], David Jaques, M.D.[a], Arnold Markowitz, M.D.[b], Daniel Coit, M.D.[a], Mark Schattner, M.D.[b,*]

[a]Department of Surgery; [b]Department of Medicine; [c]Department of Epidemiology-Biostatistics, Memorial Sloan-Kettering Cancer Center, New York, NY, USA

JOURNAL OF PALLIATIVE MEDICINE
Volume 17, Number 1, 2014

DOI: 10.1089/jpm.2013.0240

Outcome Measures Other than Morbidity and Mortality for Patients with Incurable Cancer and Gastrointestinal Obstruction

Brian Badgwell, MD, MS,[1,2] Robert Krouse, MD,[3] Suzanne V. Klimberg, MD,[1] and Eduardo Bruera, MD[4]

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Optimal Outcomes

- Optimal outcomes and optimal treatment approaches remain elusive.
- The decision-making process is complex
  - Include: patients and their families
  - Assess: goals and values
  - Considerations:
    - Disease specific
    - Treatment options
    - Patient wishes

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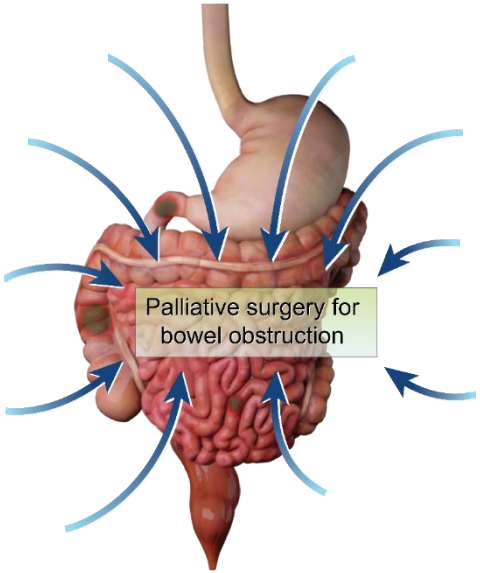
Complex Decision-Making



Pujara et al. *JACS.* 2017

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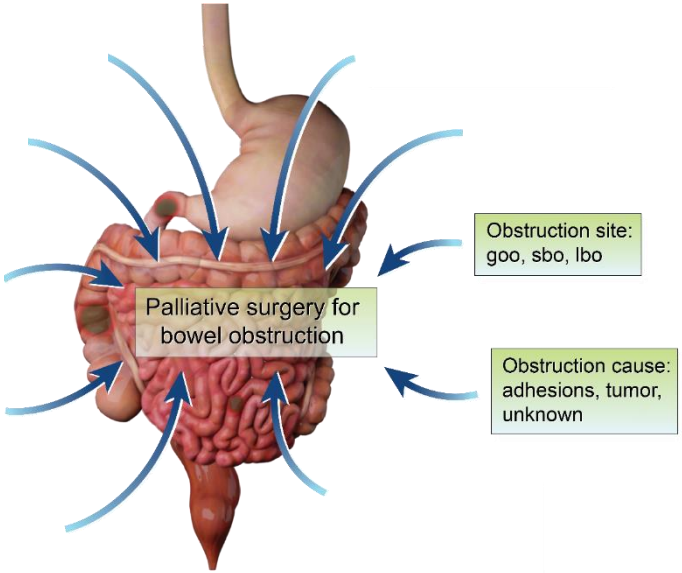

Pujara et al. *JACS.* 2017

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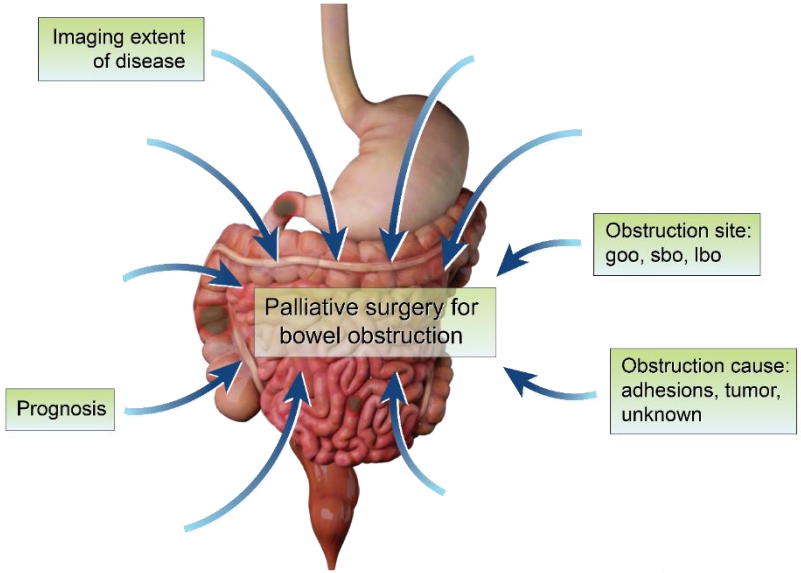

Pujara et al. *JACS.* 2017

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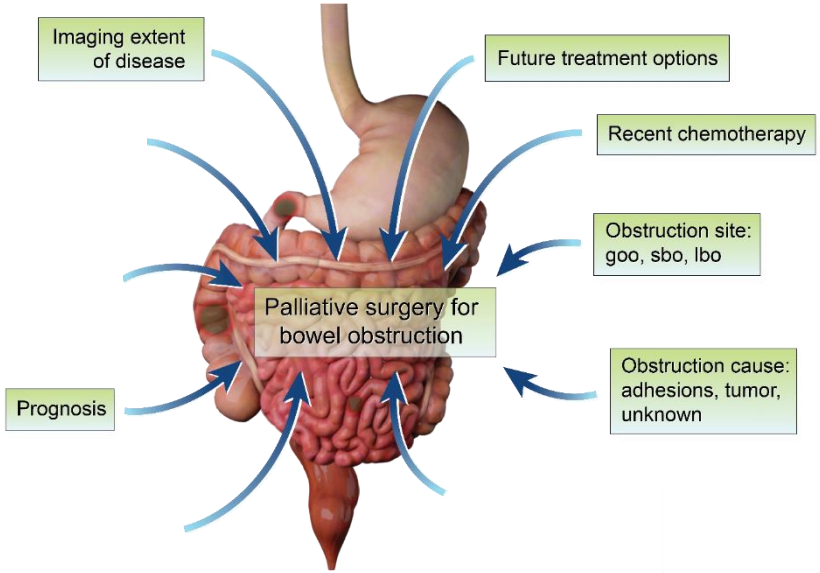

Pujara et al. *JACS.* 2017

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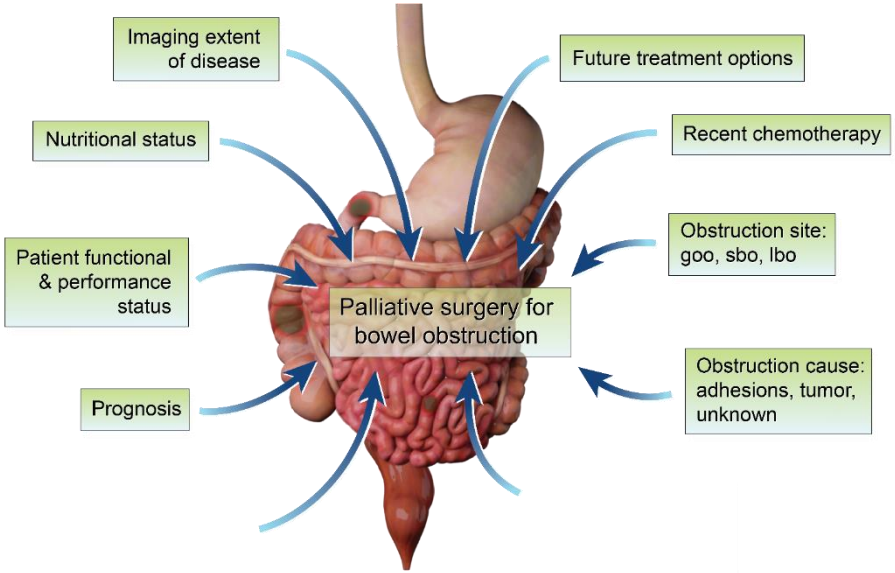

Pujara et al. *JACS.* 2017

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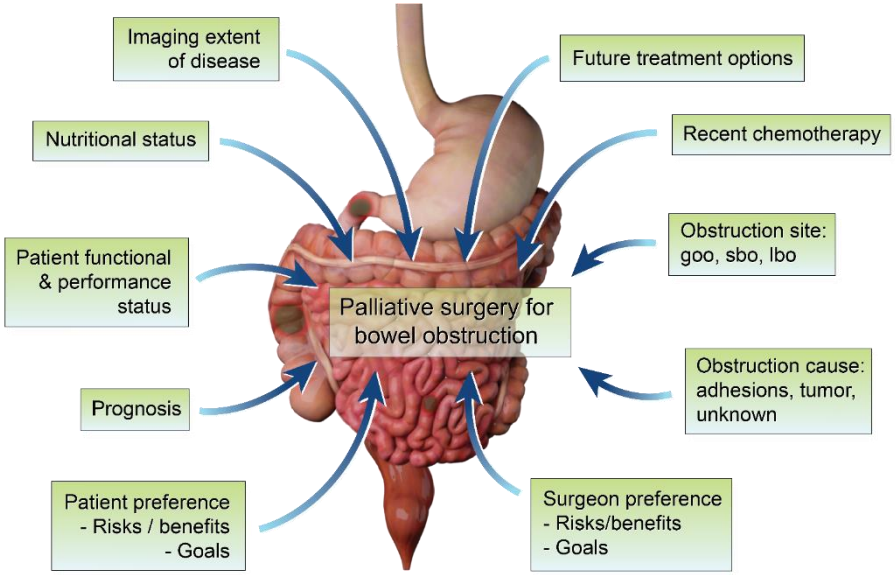

Pujara et al. *JACS.* 2017

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Ongoing Trial

- SWOG S1316 (NCT #02270450):
  - Multi-institutional hybrid observational - randomized clinical trial
  - Patients with intra-abdominal cancer and MBO
  - Compare outcomes after therapeutic surgical intervention vs non-operative management
  - Including symptom improvement, PROs

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Palliative Care

- Interdisciplinary approach
- Four domains of QOL:
  - Physical
  - Functional
  - Psychosocial
  - Spiritual
- Patients with MBO experience significant QOL altering symptoms:
  - Nausea/vomiting, pain, feeling ill, side effects
- NCCN guidelines: malignant bowel obstruction or requiring palliative stenting or venting gastrostomy tube.

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Cella, *J Pain and Symptom Management*, 1994;
Badgwell et al, *J Surg Oncol*, 2014;
Dans et al, *NCCN Clinical Practice Guidelines*, 2020.

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Palliative Care

- A recent study:
  - 61% of patients admitted with malignant GI obstruction were referred to Palliative Care service.
  - Lower PC rate in patients treated with surgery
  - Of those without PC consult, 78% stage IV, and 36% related to peritoneal carcinomatosis.

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Blumenthaler et al. Amer Coll Surg Clinical Congress. 2020

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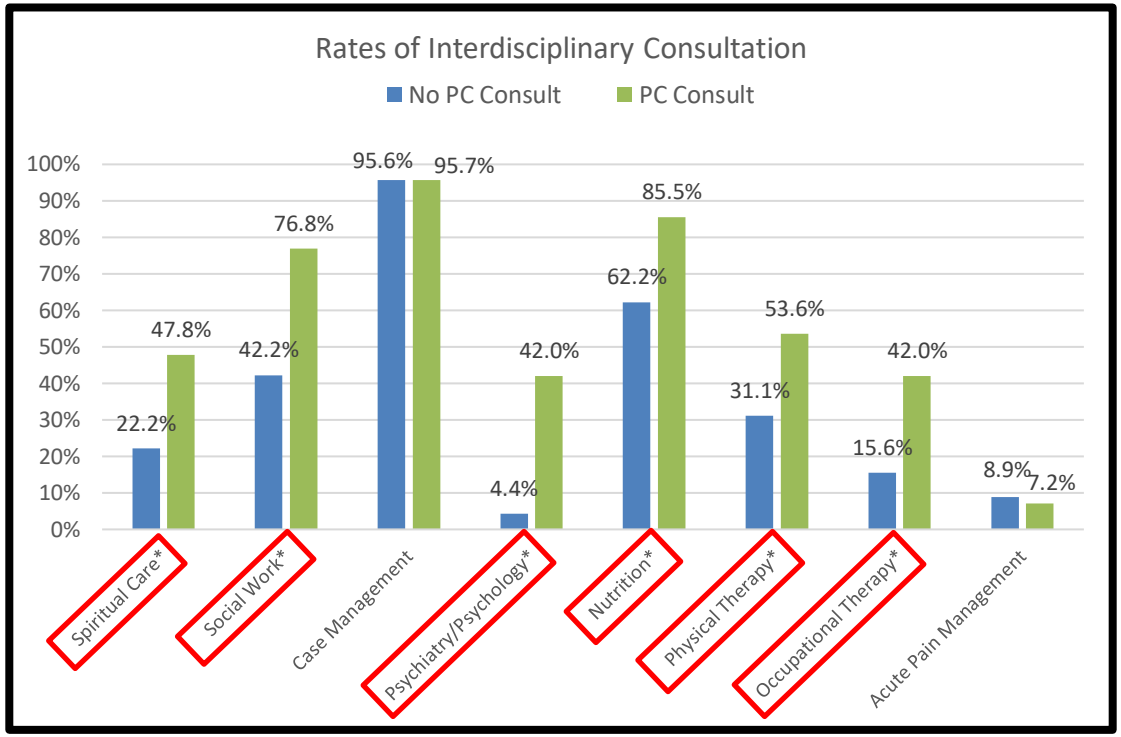
Palliative Care

- Patients with PC consult receive broader interdisciplinary care.



Blumenthaler et al. Amer Coll Surg Clinical Congress. 2020

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Summary

- Limited survival in MBO
- High operative risks
- Patient selection is paramount
- Complex decision-making
- High symptom burden, consider Palliative Care involvement

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Questions or Comments

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Palliative Care Considerations

Caite Hodge, MD/MPH | Palliative Medicine Fellow

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Inspiring Quality: Highest Standards, Better Outcomes

100+ years

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WHO Definition Palliative Care

"Palliative care is an approach that improves the **quality of life** of patients (adults and children) and their families who are facing problems associated with life-threatening illness. It **prevents and relieves suffering** through the early identification, correct assessment and treatment of pain and other problems, whether **physical, psychosocial or spiritual**."

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WHO. Palliative Care. 2020. who.int/news-room/fact-sheets/detail/palliative-care

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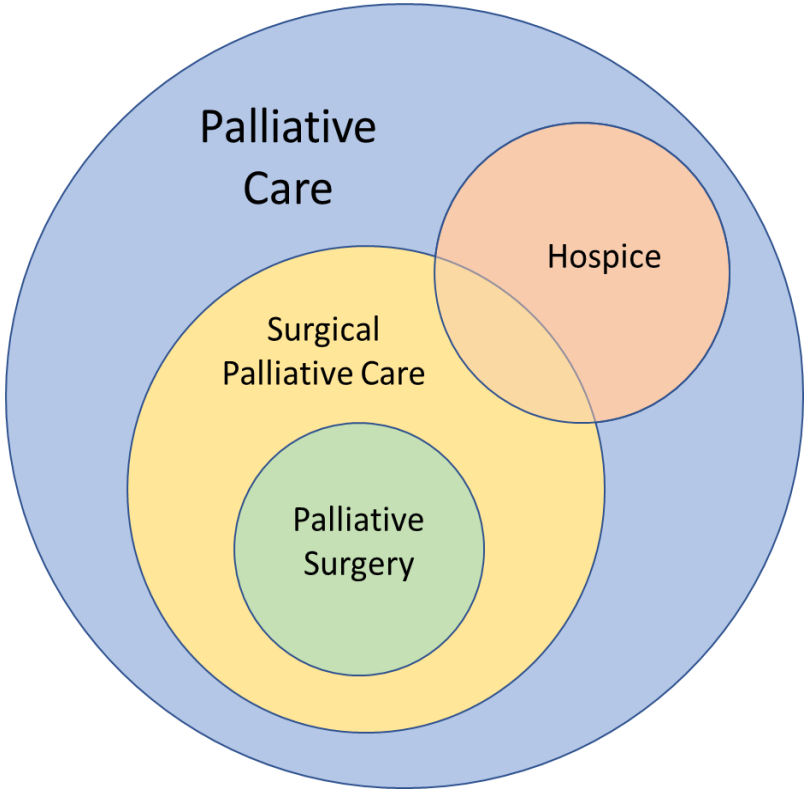
Definition of terms

- **Palliative Care/Supportive Care**
  - Care focused on symptom management and QoL at ANY point during the disease course
  - Not just hospice
- **Surgical Palliative Care[1]**
  - Can be thought of broadly as palliative care for the surgical patient
  - Focuses on QoL, decreasing suffering
- **Palliative Surgery[1]**
  - Part of surgical palliative care
  - Surgical intervention intended to treat symptoms
- **Noncurative Treatment**
  - Intervention to treat patient without curing disease
  - Can be life-prolonging or palliative



1. Wilcox, A and S Wong. *Trends in Palliative Surgical Care*. Adv Surg. 2019 Sep;53:69-81.

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Patient Evaluation for Palliative Surgery

- No best metric
- Various criteria have been proposed:[1]
  - symptom control, prognosis, preop PS, QoL, tumor burden amenable to palliation, procedure-related M&M, feasibility, non-surgical options, anticipated duration of hospitalization, requirement for additional palliation, and cost
- Framework:[2]
  - Patient-related considerations
  - Procedure-related considerations
  - Tumor-related considerations

1. Foster, D., et al., *Palliative Surgery for Advanced Cancer: Identifying Evidence-Based Criteria for Patient Selection: Case Report and Review of Literature.* J Palliat Med, 2016. 19(1): p. 22-9
2. Fahy, B. *Prognostication in Oncology.* J Surg Onc. 2019;120:10-16

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Patient-related Considerations

- Is the patient fit for surgery?

Composite Scores	Single Assessments
Palliative Index (tumor indication, ASA, Cr, active dz)	Karnofsky Performance Score
UC-Davis Nomogram (alb, functional status, DNR, resp function, ascites, Cr, WBCs)	Eastern Cooperative Oncology Group (ECOG) Performance Status
LENT Score (ECOG, pleural fluid LDH, primary tumor type)	ASA
Glasgow Prognostic Score (alb, CRP)	NCI Fatigue Score

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Cohen, J and T. Miner, *Patient selection in palliative surgery: Defining value.* J Surg Oncol, 2019. 120(1): p. 35-44

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Procedure-related Considerations

- Will the procedure relieve the symptoms?
- Durability of symptom relief?
- What are the risks? (Both morbidity/mortality and QoL)
- Are there other treatment options available?

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Traditional tools may be less helpful for determining risk

- In a retrospective review of their institutional ACS NSQIP data, Vidri et al found very small numbers of patients with disseminated cancer who had palliative surgery
  - 1.8% of patients had disseminated cancer
  - ¼ of those had a palliative intent
- Rodriguez et al found that the calculator overestimate complications and underestimate other risks (LOS)
  - 31% actual vs 59% predicted complications
  - 5.4 days actual vs 2.9 days predicted LOS
  - Also had small numbers

1. Vidri, R et al. *American College of Surgeons National Surgical Quality Improvement Program as a quality-measurement tool for advanced cancer patients*. Ann Palliat Med. 2015 Oct;4(4):200-6
2. Rodriguez R et al. *Estimation of risk in cancer patients undergoing palliative procedures by the American College of Surgeons Risk Calculator.* J Palliat Med. 2016;19(10):1039-1042

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For appropriately selected patients, palliative surgery can have good results

- Miner et al found 80% of patients reported symptom relief, with median duration of control 135 days[1]
  - Symptom relief decreased to 17% if major surgical complication
  - High morbidity (29%) and mortality (10%)

- Improved to 90% symptom relief, with decreased M&M (20% and 4%) with improved patient selection via Palliative Triangle framework[2]
  - Shared decision-making process includes patient, family and surgeon
  - Evaluates treatment options through lens of the patient's symptoms/values, likelihood of the intervention to resolve these symptoms, and risks of the procedure

1. Miner, T.J., M.F. Brennan, and D.P. Jaques, *A prospective, symptom related, outcomes analysis of 1022 palliative procedures for advanced cancer.* Ann Surg, 2004. 240(4): p. 719-26; discussion 726-7.
2. Miner, T.J., et al., *The palliative triangle: improved patient selection and outcomes associated with palliative operations.* Arch Surg, 2011. 146(5): p. 517-22

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Tumor-related Considerations

- What is the biology of the underlying disease?
- Expected duration of tumor-related symptoms?
- Life expectancy/Disease-related OS
- What is the risk of recurrence/progression?
- Are there post-surgery treatment options for underlying cancer?

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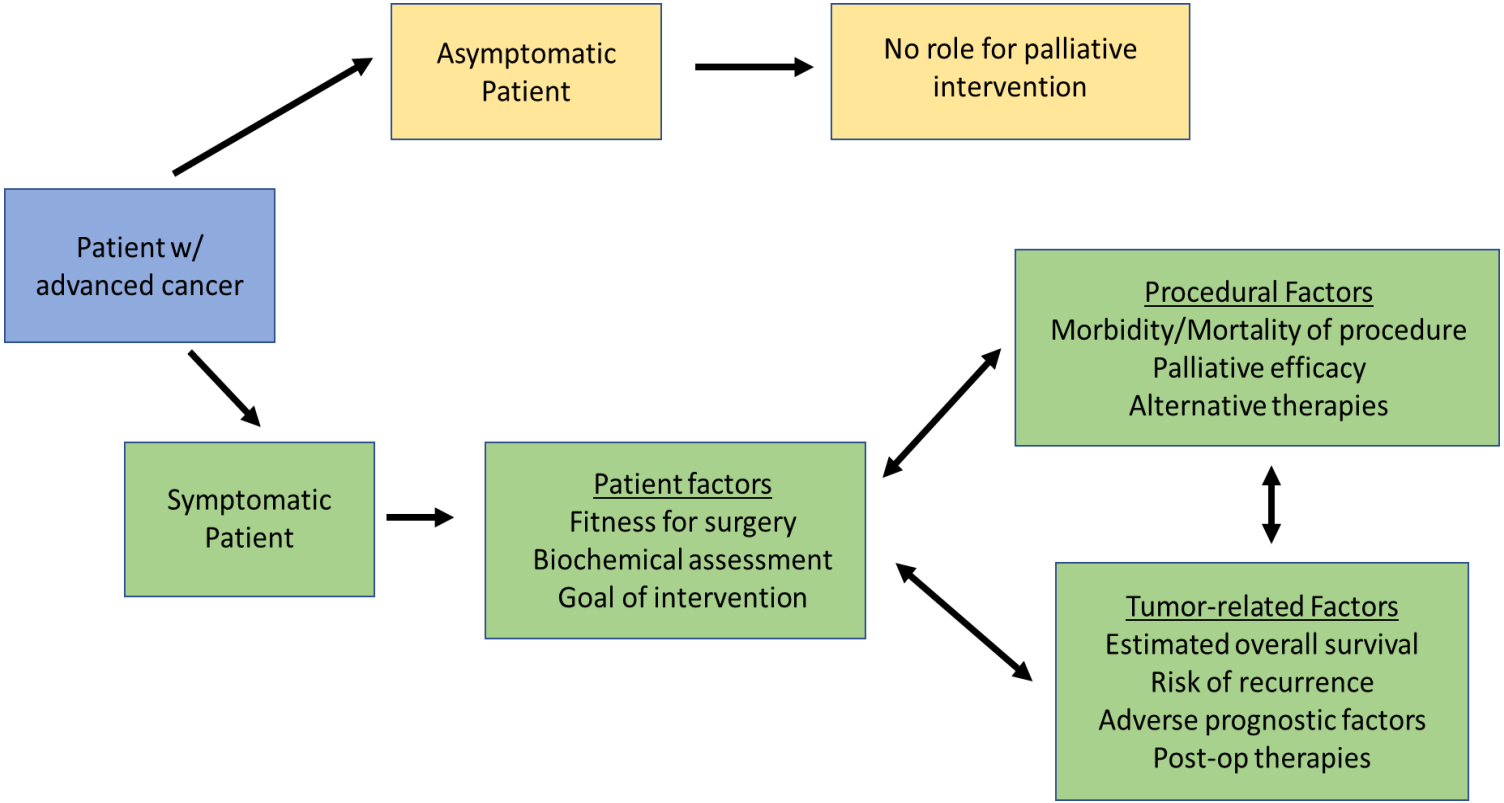

Adapted from: Hodge C and B Fahy. (2021). Palliative Interventions for Metastatic Neuroendocrine Tumors in Cloyd, J and T Pawlik (Eds.). *Neuroendocrine Tumors: Surgical Evaluation and Management.* (1st ed., pp. 293-309). Springer.

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Tools for Shared Decision Making

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Best Case/Worst Case

- Shared decision-making tool designed for frail older adults facing acute surgery
- Uses narrative and graphics
- Outlines best, worst and most likely case for each treatment option
- Serves as a basis for further discussion

- https://www.hipxchange.org/BCWC

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REMAP

- **Reframe**
  - Provide mew information, discuss what has changed
- **Expect emotion (& Empathize)**
  - Acknowledge and respond to patient/family emotions
- **Map out patient values**
  - Step back and discuss patient's values before presenting plan
  - Determine what is most important to the patient
  - Start open-ended, but may need to guide
- **Align with goals**
  - Reflect back and summarize
  - Patient may ask for plan or physician may ask if ok to recommend plan
- **Propose a plan**
  - Propose plan that is most consistent with patient's values and goals in light of physician's knowledge about likely outcomes

- https://www.vitaltalk.org/resources/quick-guides/
- https://courses.vitaltalk.org/courses/

Childers J, et al. *REMAP: A framework for goals of care conversations.* J Onc Pract. 2017 Oct;13(10):e844-e850

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When to consult Palliative Care Specialist

- American Society of Clinical Oncology (ASCO)[1]
  - All patients with advanced cancer should get PC consult
  - Early in disease, concurrent with active tx
- National Comprehensive Cancer Network (NCCN)[2]
  - All patients with advanced cancer
  - Poor performance status, MBO, malignant effusion, need for stent or venting G tube

- Palliative care underutilized
  - Review of general surgery pts who died during admission found that only 37% had PC consult[3]

1. Ferrell B. *Integration of palliative care into standard oncology care.* ASCO Guidelines. 2016 Oct. ascopubs.org/doi/pdf/10.1200/JCO.2016.70.1474
2. NCCN. *Palliative Care*. 2020. nccn.org/professionals/physician_gls/pdf/palliative.pdf
3. Evans B, et al. *Palliative Care consultation is underutilized in critically ill general surgery patients.* AJHPM. 2020;37(2):149-153.

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When to consult Palliative Care Specialist

- Patients evaluated for the conditions discussed today should get PC consult, *whether or not a procedure is done*
  - Will likely have complex symptoms to managed
  - Will face ongoing complex decision-making
  - PC can help with:
    - Difficult conversations
    - Managing patient and family distress, including bereavement

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References

1. Starnes HF Jr, Moore FD Jr, Mentzer S, et al. Abdominal pain in neutropenic cancer patients. Cancer. 1986;57:616–621.
2. Wade DS, Douglass H Jr, Nava HR, et al. Abdominal pain in neutropenic patients. Arch Surg. 1990;125:1119 –1127.
3. Wade DS, Nava HR, Douglass HO Jr. Neutropenic enterocolitis. Clinical diagnosis and treatment. Cancer. 1992;69:17–23.
4. Badgwell BD, Cormier JN, Wray CJ, et al. Challenges in the Management of Abdominal Pain in the Neutropenic Cancer Patient. Ann Surg. 2008;248: 104-109

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Thursday, February 11

How to Utilize Social Media to Create a Meaningful Impact in Your Practice
Thursday, February 25

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Thursday, March 11

https://www.facs.org/quality-programs/cancer/events/crp-webinars

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