

# Post-Oncologic Surgery Care

## What to Look For



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**HOLLIS CANCER CENTER**

**LAKELAND, FL**



**HCA Florida**  
Healthcare

# Oncologic Surgery



## ▶ **Multidisciplinary management**

- ▶ Medical oncologist and Radiation oncologist
- ▶ Prospective vs Retrospective review at tumor board conference

## ▶ **Goals of surgery**

- ▶ Diagnostic procedure
- ▶ Curative intent
- ▶ Palliative surgery

## ▶ **Patient communication and education**

- ▶ Understanding disease process
- ▶ Prognosis
- ▶ Lifestyle changes
- ▶ Genetics/Familial inheritable syndromes

## ▶ **Patient's goals, experiences, and directives**

- ▶ Tolerance of surgery
- ▶ Nutritional state
- ▶ Postoperative experiences

## ▶ **Therapies that impact surgical outcomes**

- ▶ Early postoperative
- ▶ Late postoperative

## ▶ **Clinical trial participation/research**

- ▶ Novel therapies
- ▶ Biotherapy, hormonal therapy
- ▶ Access to clinical trials
- ▶ Participation bias/genetic testing

# Oncologic Surgery: Goals of Surgery



- ▶ **Diagnostic procedures**
  - ▶ **Punch biopsy on skin or visible tumor**
    - ▶ Inflammatory breast cancer, fungating tumor at the skin, melanoma
  - ▶ **US guided fine needle aspiration**
    - ▶ Small pain, occasional small hematoma
  - ▶ **Incisional biopsy**
    - ▶ Pain, infection
  - ▶ **Excisional biopsy**
    - ▶ Pain, infection, potentially leaving positive margins

# Oncologic Surgery: Goals of Surgery



## ▶ Curative intent

- ▶ Surgical resection with intent to remove all disease
  - ▶ Metastectomy ???
- ▶ Extent of local regional spread or invading another organ
- ▶ Lymph node status
- ▶ Perineural and Lymphovascular invasion status
- ▶ Resection margin status
- ▶ Functionality after extensive curative resection
- ▶ Medically fit to tolerate surgery?

# Oncologic Surgery: Goals of Surgery



## ▶ Palliative surgery

- ▶ Obstructing tumor in face of metastatic disease
  - ▶ Resection, bypass, ileostomy, colostomy, PEG tube
- ▶ Infection and perforation of gastrointestinal tumor
- ▶ Stents in GI tract (small bowel and large bowel)
- ▶ Infection and necrosis of solid organ tumor
- ▶ Malignant effusions
  - ▶ Pleural, pericardial, ascites

# Oncologic Surgery: Patient's Experiences



- ▶ Pain at the surgery site
- ▶ Venous thromboembolism
  - ▶ 5-7x increased risk in cancer patients
  - ▶ Deep vein thrombosis
  - ▶ Pulmonary embolism (fatal in cancer patients at 3x risk)
  - ▶ Age > 85 = 10-fold higher incidence rate vs 45-65 year old
- ▶ Bleeding
  - ▶ Disseminated intravascular coagulopathy (7%)
- ▶ Damage to nearby tissues and organs
- ▶ Infections
  - ▶ Immunosuppression
  - ▶ Gut flora

# Oncologic Surgery: Patient's Experiences



## ▶ Arterial embolism

- ▶ Cancer compression of arterioles
- ▶ Thrombin production
- ▶ VEGF production
- ▶ Inhibition of fibrinolysis
- ▶ Activation of Factor X to Xa

## ▶ Emotional distress

- ▶ Concerns regarding function
- ▶ Survivability
- ▶ Disfigurement
- ▶ Impact on relationships

# Oncologic Surgery: Patient Experiences



- ▶ **Patient communication and education**
  - ▶ Disease site and stage of disease, tumor biology (BIOLOGY IS KING)
  - ▶ Molecular/genetic studies
  - ▶ Neoadjuvant therapy (chemotherapy/radiation therapy/immunotherapy)
  - ▶ Surgical expectations
  - ▶ Adjuvant therapy (chemotherapy/radiation therapy/immunotherapy)
  - ▶ Oncology navigation
  - ▶ Impact of genetic testing (prophylactic surgery vs surveillance)
    - ▶ Familial inheritable cancer syndrome
    - ▶ Customized screening protocol
  - ▶ Clinical trial



# Oncologic Surgery: Side Effects of Surgery



## ▶ Pain

- ▶ Surgical wound pain
- ▶ Coordination with anesthesiologist to minimize pain
  - ▶ Epidural catheter, TAP block, PCA
- ▶ Location and duration of pain varies depending upon the extent of surgery
- ▶ Use of narcotics, muscle relaxants, anxiolytics
- ▶ Signs of infection
  - ▶ Abscess, necrotizing fasciitis, ischemia/necrosis

# Oncologic Surgery: Side Effects of Surgery



## ▶ Fatigue

- ▶ Very common after surgery
- ▶ Most commonly occurs when surgery takes place on the chest or abdomen
- ▶ Side effect of anesthesia
- ▶ Lack of energy ( low fitness level)
- ▶ Loss of appetite after surgery
- ▶ Stress of surgery

# Oncologic Surgery: Side Effects of Surgery



- ▶ **Appetite loss**
  - ▶ Early satiety
  - ▶ Poor appetite
  - ▶ Change in sense of smell and taste
  - ▶ Associated with some weight loss and occasionally dehydration
  - ▶ Modification of food intake
  - ▶ Vitamin and mineral deficiency
  - ▶ Occasional need for supplemental nutrition
  - ▶ Dobhoff tube, percutaneous endoscopic gastrostomy tube, jejunostomy tube

# Oncologic Surgery: Side Effects of Surgery



- ▶ **Problems with other body parts**
  - ▶ Potential for organ dysfunction
  - ▶ Prolonged ileus
  - ▶ Nausea and vomiting/stomach cramps
  - ▶ Constipation
  - ▶ Liver dysfunction
  - ▶ Renal dysfunction
  - ▶ Pneumonia
  - ▶ Cardiac strain or myocardial infarction
  - ▶ Stroke

# Oncologic Surgery: Side Effects of Surgery



- ▶ **Common side effects at the surgery site**
  - ▶ **Swelling:** surgical site swelling as result of inflammation
  - ▶ **Drainage:** fluid buildup at the surgical site in the form of a seroma, hematoma, or lymphocele; possible fat necrosis
  - ▶ **Infection:** May occur at the surgical site or at a distant location
    - ▶ Erythema, warmth, increased pain, purulent drainage
    - ▶ Fibrinous exudate vs purulent exudate
    - ▶ Necrotizing fasciitis
    - ▶ Abscess formation
    - ▶ Interventions include: IV or oral antibiotics, incision and drainage, pigtail catheter drainage, chest tube, wound vacs

# Oncologic Surgery:

## Issues specific to cancer patients after surgery



- ▶ Major surgery, patients have increased risk for:
  - ▶ DVT and pulmonary embolism
  - ▶ Anastomotic leaks (enteroenterostomy, enterocolostomy, biliary leak, pancreatic leak)
  - ▶ Fistulas (enterocutaneous, colocutaneous)
  - ▶ Abdominal wall fascial dehiscence
  - ▶ Lymphedema after lymphadenectomy (breast and melanoma)
  - ▶ Paresthesia (tingling sensation, numbness)
  - ▶ Chronic pain (neuroma)
  - ▶ Organ injury during extensive surgery: ureters, bladder, spleen, gallbladder
  - ▶ GI tract dysfunction (nausea/vomiting, diarrhea, constipation)

# Oncologic Surgery: A Trigger for Metastases



- ▶ Surgery:
  - ▶ Induces increased shedding of cancer cells into circulation
  - ▶ Suppression of anti-tumor immunity allowing circulating cells to survive
    - ▶ MDSC = myeloid-derived suppressor cells, immature myeloid cells with ability to suppress immune responses
  - ▶ Upregulation of adhesion molecules in target tissues and in cancer cells
    - ▶ Enhances migration and invasion at a target site
  - ▶ Induction of local and systemic inflammatory responses
    - ▶ Accelerated growth of residual and micro-metastatic disease
  - ▶ Perioperative factors:
    - ▶ Anesthesia, transfusions, hypothermia

Horowitz M, Neeman E, Sharon E, Ben-Eliyahu S. Exploiting the critical perioperative period to improve long-term cancer outcomes. *Nat Rev Clin Oncol.* 2015 Apr;12(4):213-26

# Oncologic Surgery:

## Risk Factors for Surgical Site Infections



### Patient related

- ▶ **P**eripheral vascular disease and smoking
- ▶ **A**nemia
- ▶ **T**rauma
- ▶ **I**mmunosuppression including diabetes
- ▶ **E**lderly (old age )
- ▶ **N**utritional: Malnutrition
- ▶ **T**oo much obesity
- ▶ **S**tress

### Local features

- ▶ **L**ong ( prolonged ) surgical procedure
- ▶ **O**xygenation is poor (hypoxia)
- ▶ **C**ontamination of instruments and poor skin preparation
- ▶ **A**ntibiotic prophylaxis is inadequate
- ▶ **L**ocal tissue necrosis and low temperature (hypothermia)





# Oncologic Surgery: Therapies that Impact Surgical Outcomes

- ▶ Neoadjuvant chemotherapy effect on tumors:
  - ▶ **Complete** pathologic response
    - ▶ Breast cancer                      Pancreas cancer                      Esophageal and Gastric cancer
    - ▶ Colorectal cancer                      Sarcoma/GIST                      Ovarian cancer
    - ▶ Lung cancer                      Melanoma
  - ▶ **Partial** pathologic response (reduced size by >30%)
  - ▶ **Stable** disease
  - ▶ **Progressive** disease (tumor size increase by 20% or new metastases)
- ▶ Role of Immunocheckpoint inhibitors
  - ▶ Challenges with resistance to ICIs



# Oncologic Surgery:

## Therapies that Impact Surgical Outcomes

### ▶ Alkylating agents:

- ▶ Non-specific cell cycle inhibitor of DNA replication
- ▶ Miscoding
- ▶ Crosslinking

### ▶ Side effects:

- ▶ Mucositis, stomatitis, esophagitis
- ▶ Diarrhea, fatigue, nausea, vomiting
- ▶ Loss of appetite, joint/muscle back pain

### ▶ Antimetabolites:

- ▶ Cell specific S-cycle
- ▶ Structurally similar to structures in the cell
- ▶ Interfere with availability of normal purine or pyrimidine nucleotide precursors

### ▶ Side effects:

- ▶ Nausea, vomiting, or loss of appetite, fatigue, sore muscles, headache and dizziness, diarrhea or constipation
- ▶ Inflammation of the mouth and lips.
- ▶ Higher levels of liver enzymes, which can be a sign of inflamed or injured liver cells.
- ▶ Hair loss, rash or dry and cracked skin.



# Oncologic Surgery:

## Therapies that Impact Surgical Outcomes

### ▶ Anti-tumor antibiotics:

- ▶ They function as cell-cycle-nonspecific DNA intercalating agents, interfering with DNA and RNA synthesis
- ▶ Interfere with cancer cell copying their genome

### ▶ Side effects:

- ▶ Tingling, nausea, vomiting, nerve pain, abdominal pain, diarrhea, fever, hair loss, and skin rashes.

### ▶ Topoisomerase inhibitors:

- ▶ Type I enzymes cleave one DNA strand and pass either one or two DNA strands through the break before resealing it
- ▶ Type II molecules cleave both DNA strands in concert and pass another double strand through the break followed by re-ligation of the double strand break

### ▶ Side effects:

- ▶ Fatigue, gastrointestinal problems like diarrhea, hair loss, anemia, and increased risk of infection
- ▶ Cardiotoxicity
- ▶ Secondary malignancies



# Oncologic Surgery:

## Therapies that Impact Surgical Outcomes

### ▶ Mitotic inhibitors:

- ▶ Interfere with the assembly and disassembly of tubulin into microtubule polymers
- ▶ Interrupts cell division, usually during the mitosis (M) phase of the cell cycle

### ▶ Side effects:

- ▶ Bone marrow depression, nausea and vomiting, mucositis, and diarrhea
- ▶ Cardiotoxicity

# Case 1: 45M with progressive growth of a pimple on left arm for 8 months

- ▶ No history of trauma
- ▶ No history of skin cancer
- ▶ No exposure to toxic chemicals or radiation
- ▶ Landscape and tree cutter
- ▶ Tobacco smoker



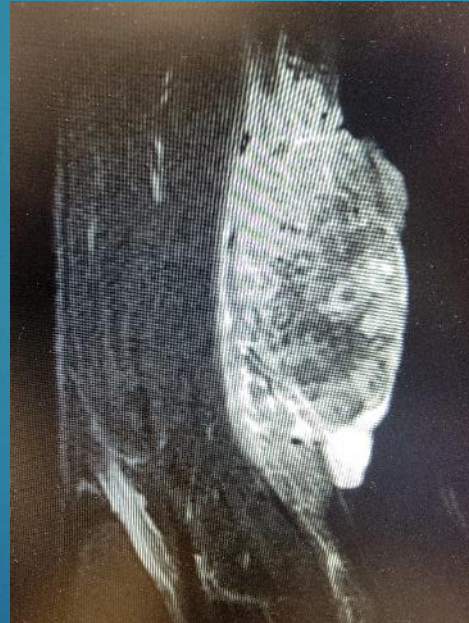
# Case 1: 45M with progressive growth of a pimple on left arm for 6 months



CT scan of left arm



MRI of left arm



CT scan of chest:

No evidence of pulmonary nodules

# Case 1: 45M with progressive growth of a pimple on left arm for 8 months



Surgical resection with SLNBx at left axilla



STSG to left arm wound  
After confirming neg margins

**PATHOLOGY: Malignant pilomatrixoma (16 cm x 14 cm x 8 cm)**



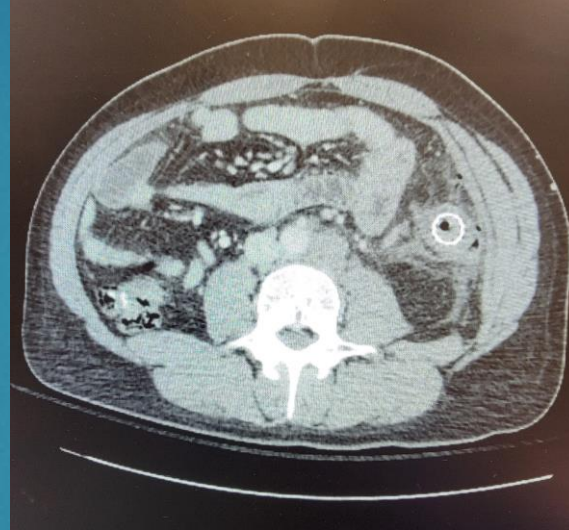
## Case 2: 35M with history of left-sided abdominal pain, hematochezia

- ▶ Seen at another hospital, identified with long, high-grade partially obstructing **descending colon signet-ring cell adenocarcinoma**
- ▶ Consulting gastroenterologist placed colonic stent
- ▶ Details on primary surgeon's input was not available
- ▶ Staging workup reveals **bone metastasis**
- ▶ Family history of colon cancer (father)
- ▶ **Started on chemotherapy:**
  - ▶ **mFOLFOX6 + MVASI** (bevacizumab- awwb) 5mg/kg IV
  - ▶ Oxaliplatin 85mg/m<sup>2</sup> IV
  - ▶ Leucovorin 400mg/m<sup>2</sup> IV
  - ▶ Fluorouracil IVP 400mg/m<sup>2</sup> & 2400mg/m<sup>2</sup> (1200mg/m<sup>2</sup> x2d) CI q 14d x 12 Cycles



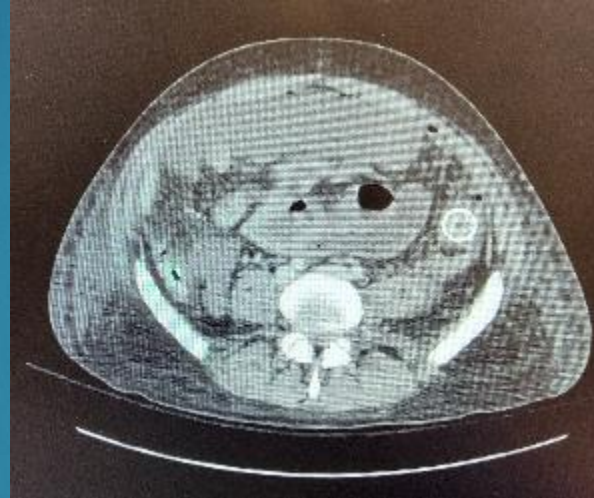
## Case 2: 35M with history of left-sided abdominal pain, hematochezia

- ▶ Presents to OHH ER with sudden onset of increased abdominal pain
- ▶ On-call surgical consultant requested on day of admission
- ▶ Suboptimal discussion and multidisciplinary communication breakdown (chemotherapy???)



## Case 2: 35M with history of left-sided abdominal pain, hematochezia

- ▶ HD 7, surgical oncology consultation requested for second opinion on a Friday, late afternoon
- ▶ Peritonitis, septic shock
- ▶ Access to information!!
- ▶ Rumored that efforts were being made to transfer to Tampa General Hosp



# Case 2: 35M with history of left-sided abdominal pain, hematochezia



- ▶ IVFs, IV antibiotics, IV antifungal therapy, NG tube, central line, A-line
- ▶ Exp lap with subtotal left colectomy after drainage of fecal peritonitis, colostomy and partial small bowel resection
- ▶ **PATHOLOGY:**
- ▶ **ypT4a, pN2b, M1** poorly differentiated adenocarcinoma, signet ring cell type with abundant mucin with perforation at mid-descending colon
- ▶ Extensive Lymphovascular invasion and perineural invasion
- ▶ Negative margins, 9/12 LNs with metastatic disease
- ▶ Tumor bud: HIGH (> 10)
- ▶ MMR status: MLH1 and PMS2 intact; **MSH2 and MSH6 absent**
- ▶ **Complication: anastomotic leak at the small bowel anastomosis POD 8, sepsis, hospice**



## Case 3: 53F with left-sided abdominal pain associated with intermittent nausea, vomiting and hematochezia

- ▶ Cuban native, sponsored by her family
- ▶ Intermittent constipation and abdominal bloating since Autumn 2022
- ▶ 20 lb. weight loss
- ▶ Sought medical attention, presented to ER at another hospital
- ▶ Work-up: CT scan of abdomen and pelvis reveals descending colon mass and colonoscopy with biopsy reveals **poorly differentiated adenocarcinoma with high-grade stricture**
- ▶ Surgical attempt to remove colon cancer “frozen abdomen and cannot remove it”... “diverting loop colostomy” sent to medical oncologist
- ▶ Developed DVT and IVC filter placed

**Case 3:** 53F with left-sided abdominal pain associated with intermittent nausea, vomiting and hematochezia



# Case 3: 53F with left-sided abdominal pain associated with intermittent nausea, vomiting and hematochezia



- ▶ Referred for second opinion after admission to Oak Hill Hospital for persistent left sided abdominal pain, radiating to her back
- ▶ Family history of cancer:
  - ▶ prostate cancer (father, paternal grandfather)
  - ▶ uterine cancer (maternal grandmother, cousin)
  - ▶ breast cancer (maternal aunt, paternal aunt)

# Case 3: 53F with left-sided abdominal pain associated with intermittent nausea, vomiting and hematochezia

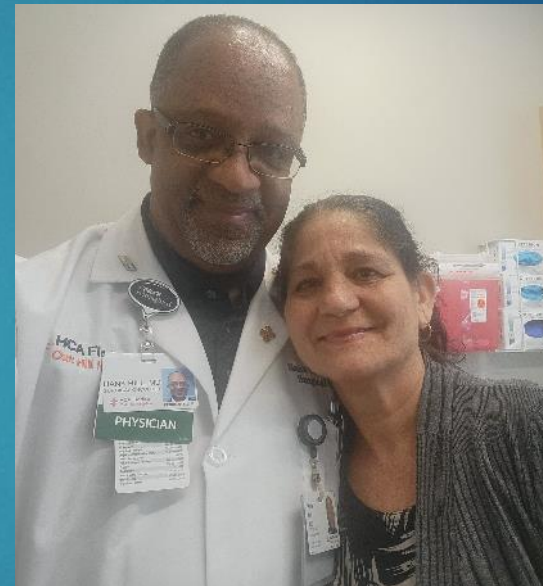
- ▶ Exploratory laparotomy with takedown of loop colostomy, left hemicolectomy with en-bloc resection of proximal jejunum, duodenojejunostomy and colocolostomy
- ▶ PATHOLOGY:
  - ▶ Poorly differentiated adenocarcinoma of descending colon
  - ▶ Tumor size: 10 cm, circumferential, no LVI or PNI
  - ▶ pT4b, pNo, Mo with 0/29 LNs, negative margins
  - ▶ Direct involvement of the small intestine
  - ▶ Tumor bud score: HIGH (> 10)
- ▶ MMR status:
  - ▶ MLH1 and PMS2 intact
  - ▶ **MSH2 and MSH6 absent**



# Case 3: 53F with left-sided abdominal pain associated with intermittent nausea, vomiting and hematochezia



UGI swallow study with small bowel series on POD 20



Tolerating adjuvant chemotherapy  
ICI is on hold





Thank you

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