

# **Acute Care Surgery for the Cancer Patient**

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# Introduction

Collection of protocols for the acute care surgical treatment of patients with cancer.

This book is no substitute for clinical judgement and should not be considered a statement of standard of care

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**Part I**

**Esophageal Cancer**

# 1 Esophageal Cancer Overview

Triage questions:

- Has EGD been done? Pathology results?
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Upper GI bleeding requiring transfusion? Is bleeding persistent?
- Can patient maintain hydration orally?

## 1.1 Triage

- Bleeding
- Obstruction (unable to maintain hydration)
- Perforation

Patients who can maintain their hydration orally can be managed as an outpatient and generally do not need transfer to CMC. These patients can usually be seen within one week.

- CMC Inpatient
  - Consult GI Surgical Oncology
  - LCI InBasket message to Jonathan Salo
- Mercy/Pineville/Outside
  - Triage: Red LCI SO
  - InBasket message to Jonathan Salo
  - AMB CONSULT SURGICAL ONCOLOGY (Salo)

## 1.2 Background

### 1.2.1 Patients with dysphagia who can maintain oral hydration

Patients with esophageal cancer with dysphagia are clinically staged as T3 and fit into one of two categories:

- Patients with metastatic disease (liver, lung, or extra-regional lymphadenopathy with cervical or para-aortic nodes). Treatment is chemotherapy with radiation for palliation of dysphagia or treatment of symptomatic bone metastasis
- Patients without metastatic disease are staged Locally Advanced and treated with pre-operative chemotherapy  $\pm$  radiation followed by surgery. Surgery as primary therapy is not indicated except for cancer perforation.

### **1.2.2 Patients with minimal dysphagia**

These patients typically present acutely with bleeding, often while under anticoagulation.

Some of these patients are AJCC T2 and would be candidates for primary surgery. Most are AJCC T3 and should get preoperative chemo  $\pm$  radiation. Endoscopic Ultrasound (EUS) is necessary to distinguish T2 from T3 and is available only at CMC Main.

## **1.3 Endoscopy**

Endoscopy with biopsy is foundational in the evaluation of patients with esophageal obstruction.

The majority will have evidence of malignancy on EGD. Negative endoscopic biopsies in the patient with an obstructing esophageal stricture are unusual but not rare.

Options for re-biopsy include use of a neonatal (5mm) endoscope, dilation followed by biopsy, and endoscopic ultrasound with FNA. These options are available at CMC Main and may not be available at regional facilities. (Faigel et al., 1998)

## **1.4 CT Scan**

Patients with esophageal cancer need CT chest/abdomen/pelvis with IV contrast for initial staging.

## **1.5 PET**

PET scan is needed for complete staging but ordinarily is not always required in the acute setting. PET is required for accurate planning for radiation therapy. Patients who need inpatient PET need to be NPO with water only (no sugar-containing oral intake) and be without intravenous dextrose for 4 hours and have blood sugars controlled.



## 1.6 Endoscopic ultrasound

EUS is helpful in distinguishing patients with localized tumors (AJCC T2) who may be candidates for primary surgery from patients with locally-advanced cancers (AJCC T3) who need preoperative chemotherapy  $\pm$  radiation. Patients with T2 tumors generally have minimal dysphagia and frequently present with bleeding during anticoagulation or surveillance for Barrett's esophagus.

EUS has limited utility in the staging of patients with esophageal cancer who present with dysphagia (Mansfield et al., 2017) (Findlay et al., 2015) (Radlinski et al., 2020) (Ripley et al., 2016) and is not necessary in these patients. In general, patients with esophageal cancer who need EUS can have it performed as an outpatient.

## 2 EsoCA + Bleeding

Triage questions:

- Has EGD been done? Pathology results?
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Upper GI bleeding requiring transfusion? Is bleeding persistent?
- Can patient maintain hydration orally?

Treatment of bleeding from esophageal cancer usually occurs in anticoagulated patients. Persistent brisk bleeding should raise the possibility of an aorto-esophageal fistula.

### 2.1 CMC Inpatient

Consult **GI Surgical Oncology LCI** InBasket message to Jonathan Salo

### 2.2 Mercy/Pineville/Outside

Triage:

- Red LCI SO
- InBasket message to Jonathan Salo

Patients with self-limited bleeding can be discharged after a period of observation and followed as an outpatient. Brisk bleeding requires transfer to CMC Main

### 2.3 Acute Management

- Transfusion
- Correction of clotting abnormalities
- IV hydration
- Correction of electrolyte abnormalities
- Persistent bleeding:
  - Advanced GI consultation for EGD and possible endoscopic therapy

## 2.4 Inpatient Management

- Radiation Oncology consultation: Possible need for inpatient radiation
- CT C/A/P with IV contrast
- If small tumor → Advanced GI Consult for EUS

## 2.5 Background

Bleeding from esophageal cancer usually occurs in the context of anticoagulation or anti-platelet therapy. Once these are stopped, bleeding usually stops. Because bleeding can lead to an earlier diagnosis, some patients with bleeding may be a candidate for early surgery if they are shown to be T2 N0 M0 on staging. Patient with small bleeding tumors should undergo EUS once stabilized. EUS can be helpful in distinguishing T2 N0 (which are candidates for primary surgery) vs T3 or N1 (which should receive neoadjuvant chemotherapy  $\pm$  radiation prior to surgery).

### 2.5.1 Endoscopic Therapy

A series of 45 patients with bleeding esophageal cancer from Cologne included 24 patients with active bleeding of whom 20 were treated with endoscopic therapy including argon beam coagulation with control of bleeding in 18 (Allo et al., 2023)

### 2.5.2 Radiation Therapy

For patients who have not had prior radiation therapy, urgent radiation therapy can be helpful for bleeding gastric cancer (Kondoh et al., 2015) (Kawabata et al., 2017) (Sugita et al., 2022) (and likely for esophageal cancer as well)

### 2.5.3 Aortoesophageal fistula

Aortoesophageal fistula is fatal in the majority of cases. The classic description of Chiari's triad consists of mid-sternal chest pain, herald bleed, and exanguination after a period without symptoms (Carter et al., 1978). A series from Taiwan (where most cases of esophageal cancer are squamous cell) of 249 patients with bleeding esophageal cancer, found aortoesophageal fistula to be the cause in 12%. Aortoesophageal fistula can also occur after endoluminal stent placement

Successful treatment has been described using Thoracic Endovascular Aortic Repair (TEVAR) and endoluminal stenting (Chen et al., 2021) (Canaud et al., 2014) (Sakai et al., 2024)

## 3 EsoCA + Obstruction

Triage questions:

- Has EGD been done? Pathology results?
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Upper GI bleeding requiring transfusion? Is bleeding persistent?
- Can patient maintain hydration orally?

Patients who can't maintain their hydration orally will need inpatient management.

### 3.1 CMC Inpatient

- Consult **GI Surgical Oncology LCI**
- InBasket message to Jonathan Salo

### 3.2 Mercy/Pineville/Outside

- Triage: Red LCI SO
- InBasket message to Jonathan Salo

### 3.3 Acute Management

- IV hydration
- Correction of electrolyte abnormalities

## 3.4 Inpatient Management

- CT C/A/P with IV contrast
- No need for inpatient PET
- Medical Oncology consult: “Is patient a candidate for palliative chemotherapy?”
- Central venous port for candidates for chemotherapy
- Feeding tube
  - PEG if metastatic disease
  - Laparoscopic feeding tube if no metastatic disease
    - \* Lap gastrostomy preferred
    - \* Lap jejunostomy acceptable

## 3.5 Background

Patients with esophageal obstruction from cancer need treatment of electrolyte and fluid abnormalities, nutritional support, and venous access for administration of chemotherapy.

### 3.5.1 Laparoscopic Gastrostomy

Laparoscopic gastrostomy is the preferred method for enteral access in patients with esophageal cancer for surgeons familiar with esophageal reconstruction. The stomach is the preferred method of reconstruction during esophagectomy and it is critical that gastrostomy placement not complicate future surgery. Gastrostomy tubes are more convenient for the patient as feedings can be done by bolus feedings, while jejunostomy feeding requires a pump over extended periods (12-16 hours).

The laparoscopic approach allows placement of the tube away from the right gastroepiploic artery. Finding the ideal location for the tube involves laparoscopy with low insufflation pressure (4mm Hg), which allows adequate distention of the stomach with an endoscope. A neonatal (5mm) endoscope can be helpful. A site is selected at the midpoint of the stomach on a sagittal plane to allow minimal tension on the tube. The tube is placed as far proximally on the stomach as possible yet still at least 3cm from the left costal margin (for patient comfort and to allow minimal tension on the gastrostomy tube). [Operative Description of Laparoscopic Gastrostomy](#)

### 3.5.2 Laparoscopic Jejunostomy

Jejunostomy is the traditional method of nutritional support for patients with esophageal obstruction. This avoids the risk of injury to the future gastric conduit at the time of esophagectomy.

Description of operative setup for [laparoscopic jejunostomy](#)

[Postoperative Care for Jejunostomy](#)

### **3.5.3 Endoscopic stents**

Endoscopic stents to treat esophageal obstruction are appropriate in patients with documented metastatic disease (Stage IV) and those who will never be candidates for surgery.

In patients who are potentially candidates for esophagectomy, stents are generally avoided to prevent complications of surgery through fibrosis of the esophagus proximal to the tumor.

A retrospective study of patients with esophageal cancer and dysphagia (Min et al., 2017) found that treatment with gastrostomy was associated with longer survival than those treated with an endoscopic stent and had higher albumin levels and less need for re-intervention.

### **3.5.4 Percutaneous Endoscopic Gastrostomy**

For patients with Stage IV disease, percutaneous endoscopic gastrostomy (PEG) is indicated for nutritional support. A gastrostomy allows for bolus feeding and is more convenient for patients than a jejunostomy, which requires an infusion pump.

For patients with potentially resectable disease, PEG is avoided to prevent injury to the right gastroepiploic artery and the risk of tumor seeding of the gastrostomy tract.

### **3.5.5 Central Venous Port**

Central venous port can facilitate the administration of chemotherapy but is not essential in the acute management of patients with esophageal cancer, particularly patients with poor performance status who may not receive chemotherapy once they meet with their treating medical oncologist. Inpatient medical oncology consultation can help sort out which patients are not candidates for chemotherapy.

## 4 EsoCA + Perforation

Triage questions:

- Has EGD been done? Pathology results?
- Spontaneous or s/p procedure?
- Has patient had prior radiation therapy?
- CT Chest/abdomen/pelvis
- Pleural effusion or pneumothorax?
- Pneumoperitoneum or peritoneal fluid?

Patients with perforated esophageal cancer need multidisciplinary emergency management. These patients should be transferred emergently to CMC Main.

Patients with pleural effusion need emergent thoracic surgery consultation. Patients with pneumoperitoneum or intra-abdominal fluid in the upper abdomen need emergent laparoscopic placement of drains.

### 4.1 Triage Team

- CMC Thoracic Surg Attending SHVI (for thoracic perforations)
- Red LCI SO (for abdominal perforations)
- CMC LCI Head and Neck Surg Onc Attending (for cervical perforations)

### 4.2 Acute Management

- IV hydration
- Correction of electrolyte abnormalities
- IV antibiotics
- CT Esophagram with water soluble contrast
- CT abdomen/pelvis
- CT neck (if suspicion of cervical perforation)

## 4.3 Inpatient Management

- Emergent drainage of pleural effusions
- Emergent laparoscopic placement of drains for evidence of intra-abdominal perforation

## 4.4 Background

Perforated esophageal cancer most commonly occurs after endoscopy, endoscopic ultrasound, or dilation of an esophageal cancer (or benign stricture). Endoscopic stenting is frequently not feasible due to the underlying stricture. Treatment options are conservative management with drainage and IV antibiotics, endoluminal stenting, or emergency surgery. (Abu-Daff et al., 2016)

### 4.4.1 Diagnosis

CT esophagram with water soluble contrast is the diagnostic study of choice (Suarez-Poveda et al., 2014). This should include CT neck and/or CT abdomen/pelvis depending upon the suspected level of perforation.

A study from Colorado (Madsen et al., 2023) of 65 patients transferred with suspected esophageal perforation found that 24 patients were ultimately found not to have a perforation. Among patients for whom pneumomediastinum was their sole criteria for transfer, only 57% were ultimately found to have a perforation. Among patients with a pleural effusion prior to transfer, 83% were ultimately found to have a perforation. Patients with a lactate greater than 1.6 were 11 times more likely to have a perforation.

### 4.4.2 Cervical esophageal perforation

Contained perforations of the cervical esophagus can be treated with NPO and IV antibiotics. Uncontained perforations need surgical exploration. In this case, nutritional support with gastrostomy is indicated.

### 4.4.3 Thoracic esophageal perforations

Pittsburgh esophageal perforation scoring system: (Abbas et al., 2009) Validation of Pittsburgh scoring system (Schweigert et al., 2016)

A series from Birmingham UK of 74 esophageal perforations over 15 years include 13 patients with perforated cancers, of whom 7 were treated with endoscopic stenting (Charalampakis et al., 2023). These 13 patients had a 1-year mortality of 77%



#### **4.4.4 Conservative management**

There is little experience in the literature for the conservative management of perforated esophageal cancer. Most clinical reports exclude patients with perforated cancers. A report from Kenya of 10 perforations among 492 dilations of esophageal cancer, of whom 9 were successfully treated with endoluminal stents (White et al., 2003). Stenting of perforated esophageal cancer is limited to case reports (Kobayashi et al., 2019)

#### **4.4.5 Emergent surgery**

Emergency esophagectomy is the traditional approach to perforated esophageal cancer given the difficulty in stenting an area of tumor (or stricture). Short-term goals are fluid resuscitation, IV antibiotics, and drainage of the pleurae (and abdomen).

Emergent esophagogastrectomy via an abdominal and thoracic approach is the conventional approach in a fit patient. For frail patients, an transabdominal approach with esophagogastrostomy is less morbid (Gillen et al., 2009) although placing the patient at higher risk of postoperative reflux.

**Part II**

**Gastric Tumors**

## 5 Gastric Cancer Overview

Triage questions:

- Has EGD been done? Pathology results?
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Upper GI bleeding requiring transfusion? Is bleeding persistent?
- Can patient maintain hydration orally?

Patients with a globular mass on CT or submucosal tumor are likely at [GI Stromal Tumor](#)

### 5.1 Triage

- [Bleeding](#)
- [Obstruction \(unable to maintain hydration\)](#)
- [Perforation](#)

Patients who can maintain their hydration orally can be managed as an outpatient and generally do not need transfer to CMC. These patients can usually be seen within one week.

- CMC Inpatient
  - Consult GI Surgical Oncology
- Mercy/Pineville/Outside
  - Triage: Red LCI SO
  - AMB CONSULT SURGICAL ONCOLOGY

### 5.2 Workup

#### 5.2.1 Endoscopy

#### 5.2.2 CT Scan

Patients with gastric cancer need CT chest/abdomen/pelvis with IV contrast for initial staging.

### **5.2.3 PET**

PET scan is needed for complete staging but ordinarily is not always required in the acute setting. Patients who need inpatient PET need to be NPO with water only (no sugar-containing oral intake) and be without intravenous dextrose for 4 hours and have blood sugars controlled.

### **5.2.4 Endoscopic ultrasound**

EUS is helpful in distinguishing patients with localized tumors (AJCC T2) who may be candidates for primary surgery from patients with locally-advanced cancers (AJCC T3) who need preoperative chemotherapy (MAGIC). Patients with T2 tumors generally smaller tumors.

### **5.2.5 Diagnostic Laparoscopy**

Diagnostic laparoscopy in patients with gastric cancer yields a finding of carcinomatosis in 10-30%. Laparoscopic is recommended in any patient who will undergo neoadjuvant chemotherapy

## 6 Gastric CA + Bleeding

Triage questions:

- Has EGD been done? Pathology results?
- Presence of exophytic mass on CT scan
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Evidence of intra-abdominal fluid on CT?

Patients with a bleeding gastric mass are generally due to adenocarcinoma or GI Stromal Tumors (GIST). In most cases, a provisional diagnosis of GIST can be made on CT scan, as these present with a localized mass and frequently have a large exophytic component. See [Bleeding GIST](#)

### 6.1 Triage Team

Red LCI SO

### 6.2 Acute Management

- IV hydration
- Correction of electrolyte abnormalities
- IV antibiotics
- CT abdomen/pelvis with water-soluble contrast
- Emergent surgery

### 6.3 Inpatient Management

- Emergent drainage of pleural effusions
- Emergent laparoscopic placement of drains for evidence of intra-abdominal perforation

### 6.4 Background

## 7 Gastric CA + Obstruction

Triage questions:

- Has EGD been done? Pathology results?
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Upper GI bleeding requiring transfusion? Is bleeding persistent?
- Can patient maintain hydration orally?

Patients who can't maintain their hydration orally will need inpatient management.

### 7.1 CMC Inpatient

Consult **GI Surgical Oncology LCI** InBasket message to Jonathan Salo

### 7.2 Mercy/Pineville/Outside

Triage: Red LCI SO InBasket message to Jonathan Salo

### 7.3 Acute Management

- IV hydration
- Correction of electrolyte abnormalities

### 7.4 Inpatient Management

- CT C/A/P with IV contrast
- No need for inpatient PET
- Medical Oncology consult: "Is patient a candidate for palliative chemotherapy?"
- Central venous port for candidates for chemotherapy
- Feeding tube

- PEG if metastatic disease
- Laparoscopic feeding tube if no metastatic disease
  - \* Lap gastrostomy preferred
  - \* Lap jejunostomy acceptable

## 8 Background

Patients with esophageal obstruction from cancer need treatment of electrolyte and fluid abnormalities, nutritional support, and venous access for administration of chemotherapy.

### 8.1 Laparoscopic Gastrostomy

Laparoscopic gastrostomy is the preferred method for enteral access in patients with esophageal cancer for surgeons familiar with esophageal reconstruction. The stomach is the preferred method of reconstruction during esophagectomy and it is critical that gastrostomy placement not complicate future surgery. Gastrostomy tubes are more convenient for the patient as feedings can be done by bolus feedings, while jejunostomy feeding requires a pump over extended periods (12-16 hours).

The laparoscopic approach allows placement of the tube away from the right gastroepiploic artery. Finding the ideal location for the tube involves laparoscopy with low insufflation pressure (4mm Hg), which allows adequate distention of the stomach with an endoscope. A neonatal (5mm) endoscope can be helpful. A site is selected at the midpoint of the stomach on a sagittal plane to allow minimal tension on the tube. The tube is placed as far proximally on the stomach as possible yet still at least 3cm from the left costal margin (for patient comfort and to allow minimal tension on the gastrostomy tube). [Operative Description of Laparoscopic Gastrostomy](#)

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[Postoperative Care for Jejunostomy](#)



### **8.3 Endoscopic stents**

Endoscopic stents to treat esophageal obstruction are appropriate in patients with documented metastatic disease (Stage IV) and those who will never be candidates for surgery.

In patients who are potentially candidates for esophagectomy, stents are generally avoided to prevent complications of surgery through fibrosis of the esophagus proximal to the tumor.

A retrospective study of patients with esophageal cancer and dysphagia (Min et al., 2017) found that treatment with gastrostomy was associated with longer survival than those treated with an endoscopic stent and had higher albumin levels and less need for re-intervention.

### **8.4 Percutaneous Endoscopic Gastrostomy**

For patients with Stage IV disease, percutaneous endoscopic gastrostomy (PEG) is indicated for nutritional support. A gastrostomy allows for bolus feeding and is more convenient for patients than a jejunostomy, which requires an infusion pump.

For patients with potentially resectable disease, PEG is avoided to prevent injury to the right gastroepiploic artery and the risk of tumor seeding of the gastrostomy tract.

### **8.5 Central Venous Port**

Central venous port can facilitate the administration of chemotherapy but is not essential in the acute management of patients with esophageal cancer, particularly patients with poor performance status who may not receive chemotherapy once they meet with their treating medical oncologist. Inpatient medical oncology consultation can help sort out which patients are not candidates for chemotherapy.

## 9 Gastric CA + Perforation

Triage questions:

- Has EGD been done? Pathology results?
- Spontaneous or s/p procedure?
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Evidence of intra-abdominal fluid on CT?

Patients with perforated gastric cancer need multidisciplinary emergency management.

### 9.1 Triage Team

Red LCI SO

### 9.2 Acute Management

- IV hydration
- Correction of electrolyte abnormalities
- IV antibiotics
- CT abdomen/pelvis with water-soluble contrast
- Emergent surgery

### 9.3 Inpatient Management

- Emergent laparoscopic Graham Patch and placement of drains for evidence of intra-abdominal perforation
- May need emergent gastric resection

### 9.4 Background

# 10 GIST Overview

Triage questions:

- Has EGD been done? Pathology results?
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Upper GI bleeding requiring transfusion? Is bleeding persistent?
- Can patient maintain hydration orally?

Bleeding GIST Perforated GIST

## 10.1 Workup

## 10.2 CT Scan

CT abdomen/pelvis with IV contrast will look for metastatic disease (most likely in liver) and assist surgical planning.

## 10.3 Endoscopic ultrasound

EUS may be required for the diagnosis as patients frequently present with a submucosal mass and endoscopic biopsies can be benign.

# 11 GIST + Bleeding

Triage questions:

- Has EGD been done? Pathology results?
- Presence of exophytic mass on CT scan
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Evidence of intra-abdominal fluid on CT?

Bleeding from GI Stromal Tumors can occur either intraluminal or intr-abdominal. Patients with intra-abdominal bleeding may have tumor rupture.

These patients frequently need emergency surgery

## 11.1 Triage Team

Red LCI SO

## 11.2 Acute Management

- CT abdomen/pelvis with IV contrast
- Transfusion
- Advanced GI Consultation (for endoscopic management of bleeding)

## 11.3 Inpatient Management

- Most patients will need surgical exploration.

## 11.4 Background

GIST tumors have a characteristic appearance on CT scan. Frequently, the endoscopic appearance is that of a submucosal mass. Endoscopic biopsies are frequently negative. Histologic diagnosis may require EUS with FNA.

# 12 GIST + Perforation

Triage questions:

- Has EGD been done? Pathology results?
- Presence of exophytic mass on CT scan
- Presence of metastatic disease on CT chest/abdomen/pelvis?
- Evidence of intra-abdominal fluid on CT?

Perforation from GI Stromal Tumors is unusual and likely is accompanied by tumor rupture. These patients should be transferred emergently to CMC Main for consideration of surgery.

## 12.1 Triage Team

Red LCI SO

## 12.2 Acute Management

- CT abdomen/pelvis with IV contrast
- Transfusion

## 12.3 Inpatient Management

- Most patients will need surgical exploration.

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