Management of Esophageal Perforations
Self Assessment CME

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Case Scenario:

• Mr. K is a 57 year old man who is a poor historian. He underwent recent abdominal surgery for perforated diverticulum that included a rectal sigmoidectomy, right hemicolecctomy, with colostomy. He was discharged to a skilled nursing facility after a complicated postoperative course including prolonged mechanical ventilation and malnutrition d/t dysphagia. He had continued dysphagia to solids and liquids and was seen by GI yesterday for an EGD that noted a distal esophageal stricture which was dilated to 12mm. He was discharged and is presenting today with SOB, neck pain, tachycardia, and chest pain.

• He denies fevers, chills, nausea, or vomiting.
Past Medical/Surgical History

- Depression, anxiety, GERD, diverticular disease of intestine with perforation and abscess.
- Rectal sigmoidectomy, right hemicolecetomy with colostomy
Social/Family Histories

- No pertinent family history
Allergies/Meds/ROS

- NKDA
- Omeprazole 20mg PO daily
- ROS is negative except for that in the HPI
VS/PE

• His weight is 108lb. Temp 36.9C, BP 105/71, HR 115, RR 16, SpO2 97% RA.
• GA: Alert, appears older than stated age, cachectic, cooperative, no acute distress
• HEENT: Normocephalic, extensive caries, poor dentition.
• Chest: LCTAB, with diminished bases bilat. Tachycardic
• Abdomen: Soft, NT, ND. +colostomy bag in place. Midline abdominal incision with packing noted.
• Extremities: Warm, no cyanosis, no edema
• Neurologic: A&Ox3, poor historian
Labs

BMP WNL

WBC mildly elevated at 14.3. Hgb 10.5, Hct 33.1, Platelets 432.
Question #1

- What imaging study would you request first?
  a) CT chest with oral contrast
  b) Upper GI series with gastrograffin
  c) Upper GI series with barium
  d) Chest x-ray
Answer

D – chest x-ray
Discussion: Plain film radiographs are quicker to obtain and can reveal things such as pneumothorax, hydropneumothorax, pneumomediastinum, subcutaneous emphysema, widening of mediastinum, subdiaphragmatic air, pleural effusions.
Impression: moderate right and small left pleural effusion. No definite pneumomediastinum
Question #2

- What study would you request next?
  a) CT chest with oral contrast
  b) Upper GI series with gastrograffin
  c) Upper GI series with barium
  d) EGD
Answer

B or C – Upper GI series with gastrograffin or Barium

Discussion: Both answers are correct and the preferred modality depends in large part upon radiologist discretion and thoracic surgery preference. Benefits to gastrograffin include water solubility and low likelihood of mediastinal irritation if there is extravasation. However, barium is far more sensitive for smaller perforations and is inert in the chest. It is reasonable to start with gastrograffin and if the study is negative but clinical suspicion for esophageal perforation remains high, to follow-up with a barium esophagram.
Barium Esophagram

Large leak visualized going into mediastinum at level of T8, 7 cm proximal to GE junction
Question #3

• What is the preferred initial management of this perforation?
  a) Primary surgical repair alone
  b) Primary surgical repair with reinforcement (i.e. pleura, intercostal muscle, diaphragm, pericardial fat
  c) Esophageal stent placement
  d) NPO with IVF and broad spectrum antibiotics
  e) Esophagectomy
D - Esophagectomy

Discussion: In a patient with no known esophageal abnormalities, the first approach would be primary repair. For this patient, he has an esophageal stricture so primary repair is unlikely to be effective. B) esophageal stents are usually reserved as a temporizing measure for those too unstable to proceed directly to surgery. C) Due to known mediastinal contamination conservative measures are not appropriate in this case.
Question #4

The patient said, “No more surgery for me Doc”. So you placed an esophageal stent and chest tubes for mediastinal drainage. How long do we keep the stent?

a) 1 week  
b) 1 month  
c) 3 weeks  
d) 3 months
Answer

C – 3 weeks

Discussion: Esophageal stent placement for perforation should not be left for longer than a few weeks. One week is likely not long enough for adequate healing.
Esophagram with stent

Status post esophageal stent placement without obstruction or leak
After 3 weeks patient presented for EGD and removal of his stent. He had a postoperative esophagogram that showed continued extravasation of contrast. What is the next appropriate step?

A. Primary surgical repair
B. Another esophageal stent
C. Esophagectomy
Answer

B. Another esophageal stent

Discussion: The patient has a history of an esophageal stricture primary repair is unlikely to be helpful. The stent trail was unsuccessful, however the patient was noted to be malnourished at the time of presentation. A stent can be replaced. Esophagectomy is still an option should the stent revision fail.
The patient was subsequently taken to the OR for a stent revision. The patient was also complaining of difficulty tolerating the Dobhoff tube. Which of the following options would be most appropriate in order to maximize the patient’s nutritional status?

A. Laparoscopic jejunostomy feeding tube placement
B. Percutaneous gastrostomy feeding tube placement
C. Laparoscopic GJ feeding tube
D. Continue with Dobhoff feeding tube
A: Laparoscopic jejunostomy tube placement. 
Discussion: The patient could continue with the Dobhoff however there is risk of the tube placement being compromised. Patient quality of life is also compromised due to the transnasal placement. A gastrostomy tube could be used however, if the patient ultimately requires esophagectomy the stomach will be used as conduit, as such a laparoscopic jejunostomy is the best choice.
Question #7

Which of the following elements of the patient’s history represents the greatest risk factor for post operative complication?

A. Prior abdominal surgery
B. Cigarette smoking
C. Alcohol use
D. Residing in a skilled nursing facility
Answer

B. Cigarette smoking

Discussion: The greatest risk for post-operative complication is the development of a post-operative pneumonia. Patients who smoke up until the time of surgery have a significantly greater chance of death secondary to a post-operative pneumonia as compared to non-smokers who develop a post-operative pneumonia. Smoking cessation for 21 days prior to elective surgery is associated with an increase in ciliary function and a 10% increase in FEV1.
Esophagram s/p stent removal

Status post removal of distal esophageal stent. No evidence of large volume esophageal leak. Some contrast material in the lower mediastinum is noted on scout imaging, probably from prior extravasation.
Ultimate hospital course

Admitted 07/01/2014

Date: 07/01/2014
Procedure: Flexible esophagoscropy with biopsies, alimaxx 22 x 100 mm esophageal stent placement, endoscopic OverStitch of proximal stent x1, right VATS mediastinal debridement and decortication with 32 Fr 90 degree chest tube placement x1

Multiple interval right and left chest tube placements for empyema

Discharged to ECF 7/18/14 on IV antibiotics with right pigtail in place

Stent removed in OR on 8/1/14. Postoperative barium esophagram showed persistent esophageal leak so stent revision was performed. Due to difficulty with Dobhoff, a laparoscopic jejunostomy tube was placed 8/7/14.

Stent was eventually removed 8/21/14. Postoperative esophagram showed no continued esophageal leak and he was discharged on a soft diet.
1 year later he presents with dysphagia...

Severe complicated and obstructive stricture extending from the mid to distal esophagus, with various degrees of stricture and sacculation within this area, which appears worse compared to prior examination.
The patient ultimately agreed to esophagectomy. Which of the following is the preferred approach?

A. Transabdominal esophagectomy
B. Ivor Lewis Esophagectomy
C. Mckeown Esophagectomy
D. Transhiatal Esophagectomy
**Answer**

**B. Ivor Lewis Esophagectomy**

**Discussion:** A transabdominal approach will have exposure limited to the distal esophagus only. If the patient had esophageal cancer, a McKeown esophagogastrectomy would be the ideal choice as it would allow for three field lymphadenectomy for proper oncologic staging and a cervical anastomosis would provide the greatest margin. A transhiatal esophagogastrectomy would be a good choice were it not for the periesophageal inflammation due to stent placement and perforation making the transhiatal blunt esophageal mobilization treacherous. In this instance an Ivor Lewis is the most appropriate choice.
On POD 4 the patient was noted to have return of bowel sounds. At this point in the post-operative course the patient’s nutritional status should be addressed by which of the following?

A. Start trickle j-tube feeds and advance to goal as tolerated while keeping pt NPO

B. Start j-tube feeds at 30mL per hour continuously advancing to goal by an additional 10mL per hour while keeping pt NPO

C. Start patient at 50% of goal tube feed rate for 24 hours, then advance to goal within the next 24 hours.
Answer

A. Start trickle j-tube feeds and advance to goal as tolerated while keeping pt NPO

Discussion: Tube feedings would be started slowly and advanced as tolerated to goal rate over several hours.
References