

Conduit Vascular Evaluation is Associated with Reduction in Anastomotic Leak After Esophagectomy

AUTHORS

C. Campbell
M. K. Reames
M. Robinson
J. Symanowski
J. C. Salo

JOURNAL

Journal of
Gastrointestinal Surgery

PUBLISHED

Online 2015

ABSTRACT:

Background: Anastomotic leak following esophagectomy is associated with significant morbidity and mortality. A major factor determining anastomotic success is an adequate blood supply to the conduit. The aim of this study was to determine the impact of intraoperative evaluation of the conduit's vascular supply on anastomotic failure after esophagectomy.

Methods: We retrospectively analyzed data from 90 consecutive patients undergoing esophagectomy with gastric conduit reconstruction. A change in surgical practice occurred after 60 cases were completed, when we introduced the use of intraoperative indocyanine green fluorescence angiography and Doppler examination to evaluate blood supply and assist in construction of the conduit. The leak rates before and after implementation of conduit vascular evaluation were compared.

Results: After the introduction of intraoperative vascular evaluation of the gastric conduit, we noted a dramatic decrease in the rate of anastomotic leak from 20 % in the first 60 patients to 0 % in the succeeding 30 patients.

Conclusions: Intraoperative vascular evaluation with indocyanine green fluorescence imaging and Doppler examination of the gastric conduit used to assist reconstruction after esophagectomy allows for enhanced construction of the conduit that maximizes blood supply to the anastomosis. This change in practice was associated with a significant reduction in anastomotic leak rate.

KEY POINTS:

1. This retrospective study consisted of 90 patients undergoing esophagectomy with gastric conduit reconstruction.
 - a) The first 60 patients were completed using visual inspection of the gastric serosa.
 - b) The last 30 patients were completed using intraoperative Doppler and SPY imaging.
2. For the abdominal portion one case was converted from laparoscopy to laparotomy due to dense intestinal adhesions, and the remainder of cases were completed laparoscopically. For the thoracic portion, 82 cases were performed thoracoscopically, 4 were converted from thoracoscopy to thoracotomy, and 4 were treated with initial thoracotomy.
 - a) The gastric conduit was imaged with SPY Elite and/or Doppler prior to transposition into the right chest.
3. The overall leak rate in the series was 13.3% (12 of the 90).
 - a) All 12 of these leaks occurred in the first 60 patients (20%).
4. After the practice change, there were no leaks in the succeeding 30 cases ($p=0.007$).
5. Anastomotic leak following esophagectomy is one of the most serious complications and occurs in up to 30% of cases in some published series.
6. Median OR time:
 - a) Group 1 without SPY Technology was 548 minutes
 - b) Group 2 with SPY Technology was 501 minutes

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7. Evaluation of conduit perfusion allows for enhanced discretion in choosing the optimal site of anastomosis based on vascular pattern.

Complications	Before ICG Fluorescence Angiography (n = 60) n (%)	After ICG Fluorescence Angiography (n = 30) n (%)	Total (n = 90) n (%)
Anastomotic Failure			
Anastomotic Leak	12 (20 %)	0 (0 %)	12 (13 %)
Anastomotic Stent	7 (12 %)	0 (0 %)	7 (7.7 %)
Graft Necrosis	0 (0 %)	0 (0 %)	0 (0 %)
Chylothorax	1 (1.8 %)	0 (0 %)	1 (1.1 %)
Pulmonary Embolism	0 (0 %)	2 (6.7 %)	(2.2 %)

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