JOURNAL OF SURGICAL RESEARCH • JANUARY 2022 (269) 229–233

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/YJSRE

Association for Academic Surgery

Evaluation of an Expedited Trauma Transfer Protocol: Right Place, Right Time

Kalli L. Devecki, DO,[1] *Sergey Kozyr, MD,*[2] *Marie Crandall, MD, MPH,*[1] *and Brian K. Yorkgitis, DO*[1,*]

[1] *Division of Acute Care Surgery, University of Florida College of Medicine - Jacksonville, Jacksonville, Florida*
[2] *Lee Memorial Health, Fort Meyers, Florida*

ARTICLE INFO

Article history:
Received 1 March 2021
Revised 9 August 2021
Accepted 28 August 2021
Available online 2 October 2021

Keywords:
Trauma
Transfer
Non-trauma center

ABSTRACT

Background: Trauma patients may initially be evaluated at non-trauma centers. This may cause a delay in treatment, which could affect their outcome. Additionally, advanced imaging may be performed which may be suboptimal or unnecessary, increase time to transfer, or unable to be viewed when the patient reaches a trauma center increasing the delays to treatment or need for repeat imaging. Rapid identification and transfer to definitive trauma care, minimizing unnecessary delays should be the priority.

Methods: The trauma registry at a regional Level 1 Adult/Pediatric Trauma center was queried for transferred trauma patients over a 3-y period. A retrospective review was performed. Transferred trauma patients were compared prior to an expedited transfer protocol to after implementation. Demographics, mechanism of injury, injury severity score, computerized tomography scans performed prior to transfer, mortality, hospital and intensive care unit length of stay were compared using bivariate and multivariable regression statistics where appropriate.

Results: Transferred trauma patients were identified, 683 in the pre-protocol group and 821 in the post-protocol group, an increase of 16.8%. There were no differences in age, sex, injury severity score, mechanism of injury, mortality, hospital, or intensive care unit length of stay (LOS) throughout the study period. There was a significant decrease in time to transfer (263 min ± 222 *versus* 227 ± 189, $P < 0.001$) and computerized tomography scans performed prior to transfer (Head 47% *versus* 32%, C-spine 36% *versus* 23%, Thorax 22% *versus* 16%, Abdomen/Pelvis 24% *versus* 14%, all P values <0.001 except CT Thorax). Interestingly, the rate of underinsured patients did not increase (21% *versus* 25%, $P = 0.05$). Risk-adjusted mortality and hospital LOS also did not change during the study period.

Conclusions: After implementation of an expedited trauma transfer protocol to a regional Level 1 trauma center there was an associated reduced time of arrival to definitive care

Surgery 170 (2021) 446–453

Contents lists available at ScienceDirect

Surgery

journal homepage: www.elsevier.com/locate/surg

Instructional methods of attendings as exhibited during intraoperative takeovers: A pilot study

Martha Godfrey, MD, MS[a], Alexandra A. Rosser, BS[b], Sarah A. Jung, PhD[b], Marie Crandall, MD, MPH[a,*], Mitchel Nathan, PhD[c], Jacob A. Greenberg, MD, EdM[b]

[a] Department of Surgery, University of Florida School of Medicine–Jacksonville, FL
[b] Department of Surgery, School of Medicine and Public Health, University of Wisconsin–Madison, WI
[c] Wisconsin Center for Education Research, University of Wisconsin–Madison, WI

ARTICLE INFO

Article history:
Accepted 9 February 2021
Available online 26 March 2021

ABSTRACT

Background: This pilot study examined intraoperative instructional techniques during "takeovers," defined as the act of an attending taking control of a case from a resident. This work describes what happens during takeovers and identifies possible reasons for takeovers.

Methods: Intraoperative audio-video recordings during 25 laparoscopic inguinal hernia repair procedures were collected. Participants included 2 postgraduate year–5 residents and 5 attendings. Postoperative evaluation forms were completed by attendings. Coding schemes for takeovers during hernia reduction and mesh placement steps were developed using conventional and directed content analysis in an iterative process by study team members, including individuals with expertise in education, surgery, and surgical education.

Results: Takeovers occurred in 72% of cases. Frequency of takeovers was not related to case difficulty or differences in resident technical skill levels, nor did they decrease over the duration of the 2-month rotation. Takeovers most commonly occurred when a resident struggled to progress the case. They also occurred when anatomy was unclear or when the attending wanted to teach a specific skill. Differences were identified among attendings regarding frequency of takeovers. The majority of takeover behaviors were directed at instructing residents; however, attendings' teaching techniques did not vary by resident.

Conclusion: Attending teaching habits appear to be independent of resident skills and depend on the attending's teaching style rather than residents' learning needs. Findings highlight the need for faculty development to help surgical educators learn how to tailor instruction to individual trainees. Additionally, future research is needed to establish the effectiveness of instruction through takeovers in the operating room.

ORIGINAL ARTICLE

Reoperative Surgery After Minimally Invasive Ivor Lewis Esophagectomy

Keouna Pather, MD, Alexander D. Ghannam, MD,* Shoshana Hacker, MD,* Christina Guerrier, MBA,† Erin M. Mobley, PhD, MPH,* Rhemar Esma, MD,‡ and Ziad T. Awad, MD, FACS**

Objective: The aim of this study is to identify factors influencing reoperations following minimally invasive Ivor Lewis esophagectomy and associated mortality and hospital costs.

Materials and Methods: Between 2013 and 2018, 125 patients were retrospectively analyzed. Outcomes included reoperations, mortality, and hospital costs. Multivariable logistic regression analyses determined factors associated with reoperations.

Results: In-hospital reoperations (n = 10) were associated with in-hospital mortality (n = 3, $P<0.01$), higher hospital costs ($P<0.01$), and longer hospital stay ($P<0.01$). Conversely, reoperations after discharge were not associated with mortality. By multivariable analysis, baseline cardiovascular ($P=0.02$) and chronic kidney disease ($P=0.01$) were associated with reoperations. However, anastomotic leaks were not associated with reoperations nor mortality.

Conclusion: The majority of reoperations occur within 30 days often during index hospitalization. Reoperations were associated with increased in-hospital mortality and hospital costs. Notably, anastomotic leaks did not influence reoperations nor mortality. Efforts to optimize patient baseline comorbidities should be emphasized to minimize reoperations following minimally invasive Ivor Lewis esophagectomy.

Key Words: minimally invasive esophagectomy, Ivor Lewis esophagectomy, reoperation, esophageal cancer

(*Surg Laparosc Endosc Percutan Tech* 2022;32:60–65)

Minimally invasive Ivor Lewis esophagectomy (MILE) is a complex procedure with substantial morbidity reported up to 60%.[1–7] In particular, the reoperation rate after esophagectomy has been reported at 15% with an associated postoperative mortality of 10%.[8] In addition to the burden of reoperations on short-term mortality, there is also evidence to suggest that reoperations may impact long-term survival after MILE.[8,9] Therefore, evaluation of factors contributing to reoperations is important to prevent both short-term and long-term patient morbidity after MILE. Previous studies have identified low surgeon volume, nonuniversity hospital status, previous antireflux surgery, and postoperative anastomotic leak as risk factors for reoperation following MILE; however, none have adequately described patient-related comorbid risk factors that may increase the risk of reoperation.[4,7,8,10–12]

The aim of this study is to determine factors associated with surgical reoperations in a series of patients undergoing totally MILE and the associated in-hospital, 30-day, and 90-day mortality as well as hospital costs.

MATERIALS AND METHODS

Study Design

A retrospective review of patients undergoing MILE was approved by our Institutional Review Board. There were 125 consecutive patients that underwent MILE between September 2013 and September 2018 at a single safety-net hospital. Baseline patient characteristics and demographics including age, sex, race, medical comorbidities, and American Society of Anesthesiologist (ASA) class were collected. Primary and secondary insurance payer information at the time of operation was also collected. Low socioeconomic status was defined based on primary and secondary insurance payer type and included Medicaid payers (primary), and Medicare payers (primary) and Medicaid payers (secondary) or charity payers (secondary). Esophageal disease characteristics including histologic type of cancer and use of neoadjuvant chemoradiation were also examined. Procedural details including operative time, estimated blood loss, fluid resuscitation, intraoperative transfusions, urine output, and postoperative pathology reports were recorded. There were 7 patients that required conversion to a thoracotomy and were included in the analysis. Postoperative details including length of hospital stay (LOS) and major adverse events occurring during index hospital admission were extracted from the medical record. Adverse events were considered major if they were classified as grade IIIb, IV, or V in the Clavien-Dindo classification system.[13] Our operative technique and postoperative standardized clinical pathway have previously been detailed.[14]

Postoperative Outcomes

Study outcomes were surgical reoperations following index MILE, which included surgical procedures for any reason. For each patient requiring a reoperation, a chart review was performed to identify both the timing of reoperation, indication of reoperations, and patient mortality. Reoperations and mortality were then classified as either occurring during the index hospitalization, within 30 days,

Surgical Endoscopy (2022) 36:896–903
https://doi.org/10.1007/s00464-021-08346-9

Indocyanine green perfusion assessment of the gastric conduit in minimally invasive Ivor Lewis esophagectomy

Keouna Pather[1] · Adeline M. Deladisma[1] · Christina Guerrier[2] · Isaac R. Kriley[1] · Ziad T. Awad[1,2]

Received: 24 October 2020 / Accepted: 27 January 2021 / Published online: 12 February 2021

Abstract

Background Anastomotic leak is a serious complication following esophagectomy. The aim of the study was to report our experience with indocyanine green fluorescence angiography (ICG-FA)—PINPOINT® assisted minimally invasive Ivor Lewis esophagectomy (MILE) and assess factors associated with anastomotic leak.

Methods We reviewed consecutive patients undergoing MILE from 2013 to 2018. Intraoperative real-time assessment of gastric conduit was performed using ICG-FA with PINPOINT®. Perfusion was categorized as good perfusion (brisk ICG visualization to conduit tip) or non-perfusion (any demarcation along the conduit).

Results 100 patients (81 males, median age 68 [60–72]) underwent MILE for malignancy in 96 patients and benign disease in 4 patients. There were six anastomotic leaks all managed with endoscopic stent placement. There was no intraoperative mortality and no 30-day mortality in leak patients. Patients with a leak were more likely to be overweight with BMI > 25 (100% versus 53%, $p = 0.03$), have pre-existing diabetes (50% versus 13%, $p = 0.04$), and have higher intraoperative estimated blood loss (260 mL [95–463] versus 75 mL [48–150], $p = 0.03$). Anastomotic leaks occurred more frequently in the non-perfusion (67%) versus the good perfusion category (33%, $p = 0.03$). By multivariable analysis, diabetes (odds ratio [OR] 6.42; $p = 0.04$) and non-perfusion (OR 6.60; $p = 0.04$) were independently associated with leak.

Conclusion Intraoperative use of ICG-FA may be a useful adjunct to assess perfusion of the gastric conduit with non-perfusion being independently associated with a leak. While perfusion plays an important role in anastomotic integrity, development of a leak is multifactorial, and ICG-FA should be used in conjunction with the optimization of patient and procedural components to minimize leak rates. Prospective, randomized studies are required to validate the interpretation, efficacy, and application of this novel technology in minimally invasive esophagectomies.

Keywords Anastomotic leak · Indocyanine green angiography · Near-infrared imaging · Minimally invasive esophagectomy · Ivor Lewis esophagectomy

Esophagectomy is a major procedure with a high rate of reported complications and morbidity reported up 59.8% [1, 2]. Particularly, anastomotic leak is a serious complication that has been associated with increased morbidity after esophagectomy [1–3]. Anastomotic integrity is thought to be dependent on vascular perfusion of the conduit [3]. Most commonly, the gastric conduit is perfused by the right gastroepiploic vascular arcade. However, perfusion along the conduit varies, with the most proximal segment often supplied by smaller vessels and intramural capillaries.

Evaluation of adequate perfusion has predominantly relied on gross inspection of the gastric serosa color; however, this is a subjective assessment. Consequently, indocyanine green fluorescence angiography (ICG-FA) and Doppler examination emerged as a modality to more definitively assess blood supply of the anastomosis intending to reduce anastomotic leaks [4, 5]. The Near-Infrared (NIR) laparoscopic PINPOINT® endoscopic fluorescence imaging