



Open Versus Laparoscopic Perforated Peptic Ulcer Repair: Trends in Management and Outcomes within a Regional Healthcare Network

Mary M. Jordan, MD¹, Yancey E. Warren, Jr, MD, MAT¹, Caroline E. Reinke, MD¹, Lynnette M. Schiffern, MD¹, Pooja P. Palmer, MS², Timothy C. Hetherington, MS²,
Marc Kowalkowski, PhD², Brent D. Matthews, MD¹, Addison K. May, MD, MBA¹, Samuel W. Ross, MD, MPH¹

¹Carolinas Medical Center, Department of Surgery, Charlotte, North Carolina
²Carolinas Medical Center, Center for Outcomes Research and Evaluation, Charlotte, North Carolina

Introduction

Despite the advent of proton pump inhibitors and identification of *H. pylori*, perforated peptic ulcer disease (PPUD) remains a common diagnosis with risk factors including tobacco abuse, NSAID use, steroid use, physiologic stress, *H. pylori* infection, and smoking. Increasingly, laparoscopic repair has been used to surgically manage PPUD patients, but there is limited data on outcomes associated with this approach compared to traditional open procedures. We hypothesized that employing a laparoscopic approach would be associated with decreased length of stay (LOS), hernia formation, and surgical site infection (SSI).

Methods

We conducted a retrospective analysis of adults with PPUD, defined using AAST emergency general surgery (EGS) ICD-9 diagnosis codes, managed at 8 hospitals within our regional health system between January 2013 and October 2015. We abstracted additional patient data by chart review including operative details, upper GI results and outcomes. We used t-tests and Fisher’s exact tests to compare the incidence of postoperative leak, incisional hernia formation, surgical site infection, need for reoperation, hospital length of stay, and mortality between PPUD patients managed laparoscopically versus open.

Results

Table 1. Demographics

		Open	Laparoscopic
Gender	Male	52	3
	Female	39	3
Age	18-44	19	0
	45-54	22	2
	55-64	22	2
	65+	28	2
BMI	Unknown	2	0
	< 18	9	0
	≥ 18, < 25	47	4
	≥ 25, < 30	20	1
	≥ 30, < 40	11	1
	≥ 40	2	0

Table 2. Surgical Approach by Trauma Center Level

	Level 1	Level 3 & 4	p = 0.003
Total Open	21	70	
Total Laparoscopic	4	2	
Fraction Laparoscopic	16%	2.7%	

Table 3. Complications and Length of Stay by Approach

		Open	Laparoscopic	
Incisional Hernia	Present	13	1	
	Absent	78	5	p = 0.081
Surgical Site Infection	Present	12	0	p = 0.5
	Absent	79	6	
Mean Length of Stay (d)		8.68	6.33	p = 0.10

Results

We identified 116 total patients and excluded 19 based on chart review determination that primary pathology was either a bleeding ulcer or a perforated marginal ulcer. Among 97 remaining eligible patients, PPUD was more frequently managed with an open approach (n=91, 93.8%). Receiving care at a Level 1 trauma center was associated with a higher proportion of laparoscopic management than in other settings (16% vs 2.7%, p=0.003). Mean LOS was shorter (6.33d vs 8.68d) and SSI rates were lower (0% vs 13.1%) in the laparoscopic group, but due to the small sample size, this did not meet statistical significance. Only 32.9% of patients underwent a postoperative upper GI study. None of the patients managed laparoscopically had a leak postoperatively nor required a return to the operating room. The 30-day mortality rate in the laparoscopic cohort was 0%.

Discussion

In this small cohort, PPUD patients managed laparoscopically had a trend toward decreased LOS and SSI rates without significant, adverse events. Our findings support the need for more comprehensive assessment of the potential advantages of laparoscopic management in this patient population. Future directions include evaluation of outcomes of the laparoscopic approach in non-Level 1 trauma centers and of the benefits of a regionalized acute care surgery network to transfer patients in need of complex, emergent laparoscopic surgery.