



Minimally Invasive Esophagectomy in Esophageal Cancer—Predictors of Success

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Results

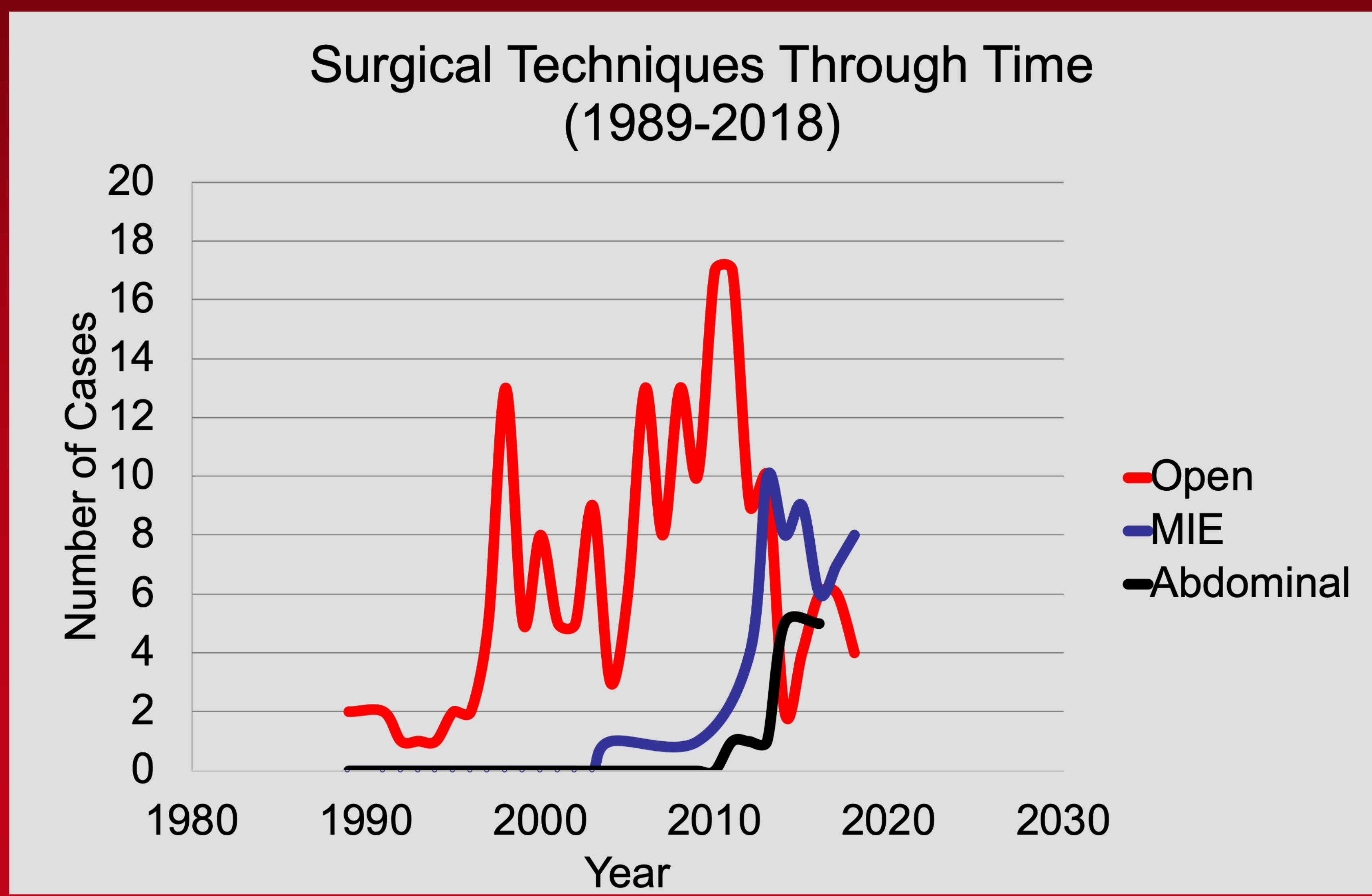


Figure (above). A total of 260 patients were reviewed, with OR in 190 patients, MIE in 57 patients, and AA in 13 patients. The groups were comparable with respect to preoperative variables. From 2004 to 2012, MIE accounted for only 5.76% of esophagectomies, while OR was 92.31% during that same timespan; from 2013-2019, MIE accounted for 53.68% of esophagectomies, with OR making up 34.74%.

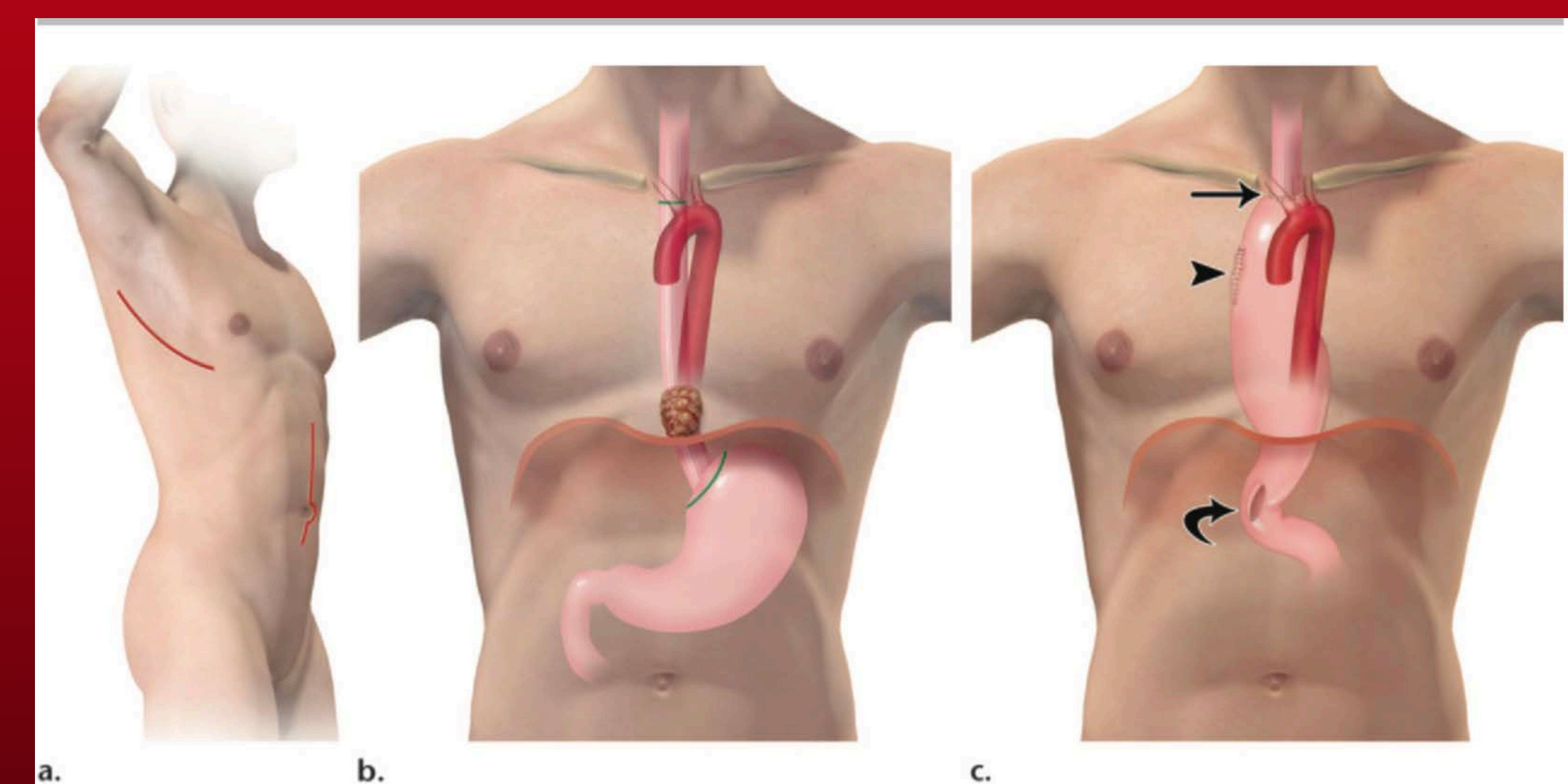


Figure2 (left). Open Ivor-Lewis. Red lines show skin incisions for laparotomy and open right thoracotomy (a). Green lines show resection lines (b). Postoperative anatomy is shown in (c).³

Conclusions

Minimally invasive techniques for esophageal resection in patients with cancer were confirmed to be safe with a number of advantages in morbidity and 90-day mortality when compared to an open approach with respect to postoperative recovery.

Introduction

While the overall rate of squamous cell esophageal cancer is on the decline, there has been 1,600% increase in incidence of esophageal adenocarcinoma in the United States during the second half of the 20th century.¹ This has led to an estimated 15,200 esophageal cancer related deaths in 2013. Historically, esophagectomy alone led to a 23% mortality rate and a 5% 5-year survival; however, recent advances and a multimodal approach involving surgery, chemotherapy and radiation therapy have shown 5-year survivals approaching 20%.^{1,2} We report outcomes for esophageal resection with respect to morbidity, mortality and oncologic value comparing Open Ivor-Lewis (OR) with minimally invasive esophago-gastrectomy (MIE) and abdominal only esophago-gastrectomy (AA). The aim of our study was to review the perioperative and postoperative outcomes for three different surgical approaches and understand the predictors of success for each.

Methods

We performed a review of our prospective esophageal cancer database from 1989-2019. Patients who underwent OR, MIE or AA were analyzed. The indication for surgery and primary operation were recorded. Comorbidities were also recorded, including diabetes, cardiopulmonary disease, hypertension and presence of vasculopathy. Any and all adverse events and outcomes related to the primary operation were noted. Univariate analysis was performed using ANOVA for continuous variables and Chi-square test for categorical variables.

Table 1. Comparison of Surgical Techniques: Intra-operative and Post-operative Outcomes

	Open (190)	MIE (57)	Abdominal (13)	p-value
Estimated Blood Loss	300, 30.0-3500.0	150, 20.0-600.0	200, 0.0-250.0	0.0001
PC Blood Transfusion	71 (37.37%)	12 (21.43%)	4 (30.77%)	0.0724
PC Blood Unit	2.0, 1.0-7.0	2.0, 1.0-4.0	1.5, 1.0-2.0	0.0277
Intra-Operative Blood Units	2.0, 2.0-2.0	1.0, 1.0-2.0	1.0, 1.0-1.0	0.0300
Post-Op Blood Units	2.0, 1.0-2.0	3.0, 1.0-4.0	2.0, 2.0-2.0	0.0003
Positive Margin	18 (9.47%)	2 (3.51%)	0	0.0996
Number of Nodes	17.0, 0-54	21.0, 0-48	16.0, 8-36	0.8330
Complication Present	121 (63.68%)	31 (54.39%)	6 (46.15%)	0.2498
Anastomotic Leak	40 (21.05%)	10 (17.54%)	0	0.0484
Respiratory Complication	64 (33.68%)	13 (22.81%)	1 (7.69%)	0.0369
Cardiac Complication	34 (17.89%)	3 (5.26%)	0	0.0047
90-Day Mortality	11 (5.79%)	0	0	0.0290

The significant differences in the postoperative variables were:
- less median blood loss in MIE and AA versus OR (P<0.0001)-
- reduction in 90-day mortality for MIE (0%) and AA (0%) versus OR (5.79%) (P=0.029)
- reduction in pulmonary complications for MIE (22.81%) and AA (7.69%) versus OR (33.68%) (P=0.0369)
- reduction in cardiac complication rate for MIE (5.26%) and AA (0%) versus OR (17.89%) (P=0.0047)
- reduction in anastomotic leak rate for MIE (17.54%) and AA (0%) versus OR (21.05%) (0.0484).
- There were no differences in lymph node retrieval for each of the approaches (17 OR, 21 MIE, 16 AA, P=0.833).

References

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Acknowledgements

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