Dispelling Dogma: Ethicon vs. Covidien EEA Staplers

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Introduction

Surgeon dogma and hospital procurement contracts have long guided the selection of circular cutting (EEA) staplers in colorectal surgery. These anecdotally driven decisions behind the utilization of Ethicon or Covidien/Medtronic EEA staplers have not been evaluated by direct comparison of clinical outcomes. Our study seeks to determine whether there is a significant difference in postoperative leak rates associated with use of the Ethicon circular stapler versus the Covidien/Medtronic EEA™ circular stapler.

Methods

A retrospective review was performed of all patients undergoing creation of an end-to-end left-sided colonic anastomosis using an EEA stapling device by a single surgeon from July 2012 to May 2020. Patient demographics, indication for surgery, anastomotic characteristics, and anastomotic leak were abstracted from chart review. Primary outcome of post-operative leak was defined as any clinical documentation specifying air or fluid collection surrounding the anastomosis requiring radiologic or surgical drainage. Univariate analysis was conducted using t-tests and chi-squared tests to compare the two stapler cohorts. A multivariate logistic regression analysis was used to compare patients with and without post-operative leaks to identify predictors of leak.



Figure 1. Ethicon (Top) and Covidien/Medtronic EEA (Bottom) Staplers

EEA Type	N	BMI	Poor Nutrition	Pre-op CXRT	Intra-op Air Leak	Anastomotic Leak
Covidien/ Medtronic	82	29.6 ± 7.2	19 (23.2%)	10 (12.2%)	9 (11.4%)	5 (6.1%)
Ethicon	175	28.3 ± 6.4	39 (22.2%)	27 (15.4%)	19 (11.2%)	4 (2.3%)
p-value		0.165	0.874	0.491	0.972	0.121

Table 1. Univariate analysis of BMI, nutrition status, neoadjuvant chemoradiation, intra-op air leak, and anastomotic leak between the cohorts

EEA Type	N	Colorectal	Coloanal	IPAA	Ileorectal
Covidien/ Medtronic	82	70 (85.4%)	4 (4.9%)	6 (7.3%)	2 (2.4%)
Ethicon	175	135 (77.1%)	14 (8.0%)	22 (12.6%)	4 (2.3%)
p-value		0.445			

EEA Type	N	Diverticulitis	IBD	Neoplasm	Other
Covidien/ Medtronic	82	38 (46.3%)	7 (8.5%)	33 (40.2%)	4 (4.9%)
Ethicon	175	83 (47.4%)	19 (10.9%)	69 (39.4%)	4 (2.3%)
p-value		0.676			

Table 2. Multivariate analysis of anastomosis type and indication for surgery between the cohorts

Results

In our single surgeon's experience, 257 patients underwent creation of an end-to-end left-sided colonic anastomosis using an EEA stapling device. The Covidien/Medtronic EEA™ circular stapling device was used in 82 cases and the Ethicon circular stapling device was used in 175 cases. Overall leak rate was 3.5% (n=9). Univariate analysis revealed a greater percentage of patients with an ASA less than or equal to 2 in the Ethicon stapler cohort (60% vs. 35%, p≤0.001), and a greater percentage of men in the Covidien cohort compared to the Ethicon cohort (71%vs. 55%, p = 0.02). There was no difference between the stapler cohorts in terms of malnutrition, diabetes, BMI, indication for surgery, anastomosis type, rates of neoadjuvant chemoradiation, or presence of a positive intraoperative air leak test (all p>0.05). On multivariate logistic regression, none of the variables (including stapler brand) were associated with anastomotic leak (p>0.05).

Conclusion

In this study, selection of circular stapling device did not impact anastomotic leak rate. However, as leak rate is typically low, a large, randomized controlled trial comparing stapler types may be the only way to confidently determine whether a true difference in stapler type exists. In the meantime, we recommend that stapler choice focus on availability, surgeon experience, ease of use, and cost efficiency.