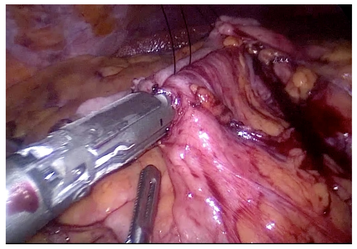


ELIMINATING THE PAINFUL 12 MM STAPLER PORT PARADOX IN MINIMALLY INVASIVE RIGHT HEMICOLECTOMY WITH INTRACORPOREAL ANASTOMOSIS

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Introduction

Despite advances in laparoscopy, historically most anastomoses for right hemicolectomy are performed via extracorporeal technique, with more recent popularity in the intracorporeal technique.

Minimally-invasive right hemicolectomy with intracorporeal anastomosis (ICA) has been associated with reduced post-operative ileus, narcotic use, and length of stay (LOS) when compared to extracorporeal anastomosis (ECA).

There are similar oncologic outcome between intracorporeal and extracorporeal anastomosis.

Objective

The objective of this study was to measure short-term outcomes following minimally-invasive right hemicolectomies comparing intracorporeal to extracorporeal anastomosis.

This study sought to demonstrate the utility of ICA with relocating the 12mm port site to the Pfannenstiel incision.

Materials and Methods

This was a retrospective review of laparoscopic and robotic right hemicolectomies between 2015-2023. Cases were compared with matched controls.

Several outcomes were measured including length of stay, postoperative ileus, reoperations, and operative time.

Intracorporeal anastomosis was performed with a stapled technique using 4-0 monofilament stay sutures and using the 12mm port at the Pfannenstiel extraction site. A side-to-side functional end-to-end ileocolic anastomosis was created.

Extracorporeal anastomoses were performed in either a stapled or hand-sewn technique using a periumbilical incision. In the hand sewn technique, the anastomosis sewn in a single layer with 2-0 vicryl suture.

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Results

A total of 112 patients underwent right hemicolectomy during the study period. 34 patients underwent ECA. 78 patients underwent ICA.

The average operative times were 150 minutes and 181 minutes for ECA and ICA, respectively.

LOS was shorter in the ICA group (3 days ECA vs 2 days ICA, p <0.01)

The rate of postoperative ileus was greater in the ECA group; however, this was not statistically significant (8.8% in ECA vs 2.6% in ICA, p=0.140).

There were more readmissions in the ECA group (8.8% vs 1.3%, p=0.048), and one surgical site infection in each of the two groups (p=0.507).

Table 1. Baseline Characteristics of Study Participants

	ECA	ICA	p-value
Total Cases (n)	34	78	
Male	13 (38.2%)	34 (43.6%)	0.598
Female	21 (61.8%)	44 (56.4%)	
Age, Average (Years)	74.4 (57-93)	65.3 (29-86)	<0.01
Body Mass Index	24.9 (18-35)	28.8 (18.8-48)	<0.01
Diabetes Mellitus	13 (38.2%)	33 (42.3%)	0.687
Hypertension	26 (76.5%)	40 (51.3%)	0.013
Hyperlipidemia	14 (41.2%)	41 (52.6%)	0.268
Obstructive Sleep Apnea	1 (2.9%)	6 (7.69%)	0.340
Chronic Kidney Disease	8 (23.5%)	9 (11.5%)	0.104
Congestive Heart Failure	2 (5.9%)	0 (0%)	0.031
Coronary Artery Disease	7 (20.6%)	5 (6.41%)	0.026
Albumin	3.6 (2.2-4.7)	4.0 (3.2-4.8)	<0.01

Table 1. Baseline characteristics of study participants. There were 34 patients in the ECA group and 78 patients in ICA group. All ICA were stapled anastomoses via a suprapubic 12mm port. Patients were well matched between groups, with similar rates in comorbidities.

Table 2. Operative Data, Outcomes, and Complications of Intracorporeal Anastomosis Compared to Extracorporeal Anastomosis.

Operative Date	ECA	ICA	p-value
Stapled Anastomosis	31 (91%)	78 (100%)	
Hand sewn Anastomosis	3 (9%)	0 (0%)	
Operative Time	149.8 (59-320)	183.1 (83-351)	<0.01
Outcomes			
Length of stay	3 (1-14)	2 (0-5)	<0.01
Readmission within 30 days	3 (8.8%)	1 (1.3%)	0.048
Mortality within 30 days	0 (0%)	1 (1.28%)	0.507
Postoperative Chemotherapy	8 (23.5)	20 (25.6%)	0.812
Malignancy Recurrence	2 (5.9%)	3 (3.9%)	0.631
Complications			
Ileus	3 (8.8%)	2 (2.6%)	0.140
Bacteremia	1 (2.9%)	0 (0%)	0.128
Thromboembolic Event	1 (2.9%)	1 (1.3%)	0.542
Urinary retention	1 (2.9%)	1 (1.3%)	0.453
Surgical site infection	1 (2.9%)	1 (1.3%)	0.507

Table 2. Operative Data, Outcomes, and Complications of Intracorporeal Anastomosis Compared to Extracorporeal Anastomosis. LOS was shorter in the ICA group and this was statistically significant. There was no statistically significant difference in complications between the two groups.

Table 3. Diagnostic and Oncologic Data

	ECA	ICA
Location		
Cecum	8 (23.5%)	24 (30.8%)
Ascending Colon	16 (47.1%)	42 (53.9%)
Hepatic Flexure	4 (11.8%)	5 (6.4%)
Transverse Colon	6 (17.6%)	3 (3.9%)
Appendix	0 (0.0%)	4 (0.5%)
Pathology		
Adenocarcinoma	31 (91.2%)	66 (84.6%)
Adenoma	3 (8.8%)	10 (12.8%)
Lipoma	0 (0%)	1 (1.3%)
Chronic Inflammation	0 (0%)	1 (1.3%)
Adenocarcinoma TNM Data	31 (91.2%)	66 (84.6%)
T1	2 (6.5%)	8 (12.1%)
T2	4 (12.9%)	11 (16.7%)
T3	25 (80.1%)	32 (48.5%)
T4	0 (0%)	2 (3.0%)
N0	21 (67.7%)	36 (54.5%)
N1	7 (22.6%)	13 (19.7%)
N2	3 (9.7%)	7 (10.6%)
N3	0 (0%)	0 (0%)
M0	31 (100%)	77 (98.7%)
M1	0 (0%)	1 (1.3%)

Table 3. Diagnostic and Oncologic Data between ECA and ICA groups. The majority of patients had adenocarcinoma on final pathology with a T3 lesion. The majority of patients had either N0 or N1 disease.

Table 4. Number of Cases with Intracorporeal Anastomosis vs Extracorporeal Anastomosis by Year

Cases by Year	ECA	ICA
2015	11	2
2016	3	6
2017	3	5
2018	0	4
2019	2	3
2020	6	4
2021	5	23
2022	3	17
2023	1	14

Table 4. Number of cases of ECA and ICA per year

Conclusion

This study demonstrates the efficacy and good short-term outcomes of ICA compared to ECA, including shorter LOS in ICA, which was found to be statistically significant. The efficacy of ICAs has led our division of colorectal surgery to continue consideration of ICA during laparoscopic right hemicolectomies. During the study period, we did incorporate ICA in a significant portion of our operative cases, and we did see a change in practice. We believe that ICA does have positive outcomes in these patients.

Summary

ICA when compared to ECA has excellent efficacy with comparable outcomes and notable reduced postoperative ileus and length of stay.

There was a change in practice during the study period with more ICA being performed in later years, suggesting increased proficiency and preference for ICA over ECA.

Further studies with trials, blinding, and large sample sizes are needed to further elucidate outcomes and benefits of ICA.

Acknowledgements

I would like to thank SAGES for allowing us the opportunity to present our research.
I would also like to acknowledge the mentors and co-authors who contributed to this project.

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