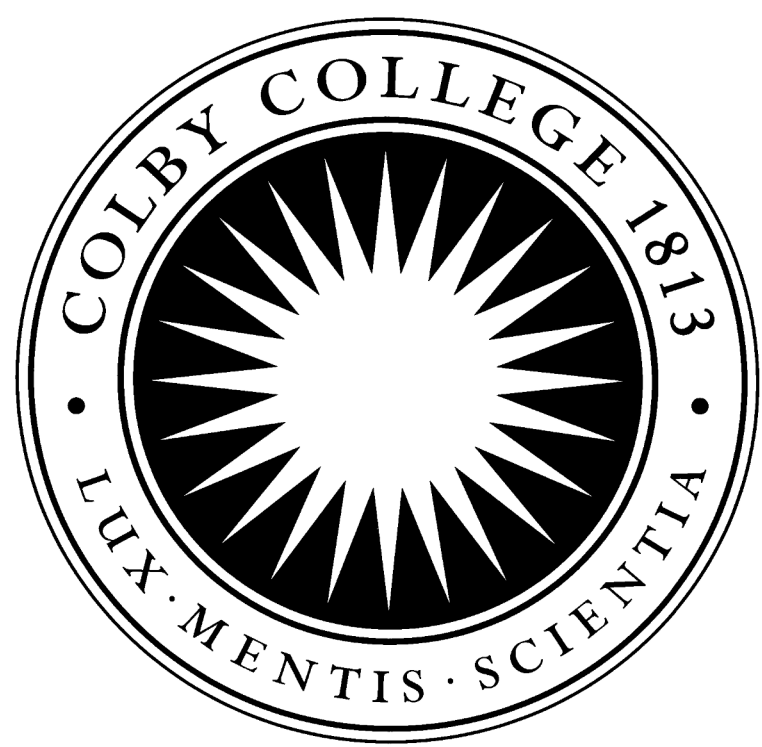




Standard Robotic Sigmoid Colectomy vs Robotic Sigmoid Colectomy with Natural Orifice IntraCorporeal Anastomosis with Extraction of Specimen (NICE): A Retrospective Cohort Study



Sravya Bahudodda¹, Ian Reight M.D.²

Colby College¹ & MaineGeneral Medical Center²

Background

- There is a growing body of evidence supporting the use of minimally invasive surgery in a wide variety of colorectal procedures.
- Standard robotic sigmoid colectomies are characterized by specimen extraction through an open incision after minimally invasive mobilization of the colon and mesentery, placement of an anvil into the descending colon through this open incision, followed by robotic colorectal anastomosis.
- A recently developed robotic approach with Natural orifice IntraCorporeal Anastomosis with Extraction of Specimen (NICE) procedure completely eliminates the need for an abdominal incision other than those required for robotic port placement.
- Although there is some literature pertaining to the robotic NICE procedure that reports favorable patient outcomes, there are currently no studies comparing the NICE procedure with the standard robotic approach.
- The objective of this study is to compare intraoperative and postoperative outcomes of the standard vs robotic NICE approach in a cohort of patients presenting for elective sigmoid colectomies.

Methods

This is a retrospective cohort study of elective robotic assisted sigmoid colectomies performed at MaineGeneral Medical Center in Augusta, ME. All 88 cases were performed using the Da Vinci Si robotic system (Intuitive Surgical Inc., Sunnyvale, CA) between January 2016 and June 2019. All patient data was collected from surgeon operative notes and operating room data sheets. Operative time represents the time from incision to skin closed. Console time represents time from console on to off.

Statistical analysis was performed using the Pearson’s Chi-Squared test (Fisher’s Exact test for cell counts less than 5) and the t-test in RStudio (Version 1.2). A p-value less than 0.05 was considered to be statistically significant.

Table 1
Demographic and Patient Characteristics.

Characteristics	Standard Robotic Colectomy	NICE Procedure	p
n	80	8	
Age, mean (range), years	56 (28 – 86)	55 (47 – 66)	0.88
Gender, No. (%)			0.64
Female	37 (46.3%)	3 (37.5%)	
Male	43 (53.7%)	5 (62.5%)	
BMI, mean (range), kg/m ²	30.7 (21.2 – 47.87)	31.9 (23.4 – 50.0)	0.55
Indication for operation, No. (%)			0.47
Diverticulitis	61 (76.3%)	7 (87.5%)	
Colorectal cancer	19 (23.8%)	1 (12.5%)	

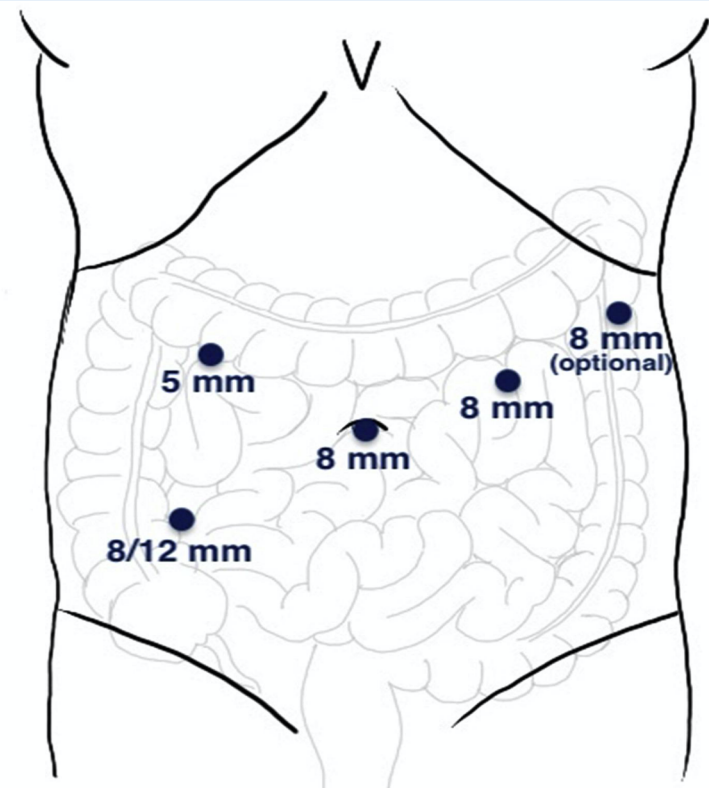


Figure 1: Robotic port placement (Granillo 2018).

Table 2
Intraoperative Outcomes.

Variable	Standard Robotic Colectomy	NICE Procedure	p
Mean operative time (min) n = 72,7	171.0	219.7	0.02
Mean console time (min) n = 72, 7	54.7	136. 1	<0.01
Percentage of operative time spent on console	32.0%	61.9%	—
Complications, No. (%) *	12 (15%)	0 (0%)	0.24

Table 3
Postoperative Outcomes.

Variable	Standard Robotic Procedure	NICE Procedure	p
Length of hospital stay, mean (range), days (n = 76, 8)	6.1 (0-19)	3.9 (2-8)	0.11
Return of bowel function, mean (range), days (n = 41, 4)	2.9 (0-13)	2.8 (1-5)	0.92
Complications, No. (%) **	37 (53.8%)	5 (62.5%)	0.38

*The only noted intraoperative complication was conversion to open.

** The most common postoperative complications included nausea, vomiting, abdominal distension, blood per rectum, acute postoperative pain, and ileus. For the robotic NICE procedure, there was one case with postoperative anastomotic leakage resulting in readmission to the operating room.

- The two groups are similar with respect to age, gender, BMI, and indication for operation (Table 1).
- There is *a significant difference* in operative time and console time between the two groups (Table 2).
- There is *no significant difference* in intraoperative complication rate and postoperative complication rate between the two groups (Table 2).
- There is no significant difference in mean number to days to return of bowel function between the two groups (Table 3).
- There is *no significant difference* in mean postoperative length of hospital stay between the two groups (Table 3,).
- There appears to be a *decreasing trend* in the mean length of hospital stay between patients who underwent sigmoid colectomy with NICE procedure when compared to the standard procedure (Table 3).

Discussion

- There appears to be a trend towards shorter length of stay in patients who underwent the robotic NICE procedure, however, the difference is not statistically significant.
- The robotic NICE procedure can be performed safely with complication rates and return of bowel function similar to the standard robotic colectomy.
- The longer operative time associated with the robotic NICE procedure could potentially be attributed to the learning curve associated with the NICE steps. Future studies should distinguish the proportion of total operative time involved in NICE steps.
- The major limitation of this study is the sample size, which is likely due to the relatively recent introduction and adoption of the robotic NICE technique.
- Future studies should include a larger cohort across multiple institutions. Additional confounding variables should be considered such as ASA score, number of previous abdominal surgeries and number of lymph nodes harvested to ensure groups with similar characteristics.
- Additional intraoperative and postoperative indicators for patient outcomes should be considered including estimated blood loss, narcotic usage during hospital stay, narcotic usage at discharge, time to first flatus and time to regular diet.

Conclusions

- The robotic NICE procedure is a safe and feasible alternative to the standard robotic procedure for elective sigmoid colectomies.
- There is potential for shorter length of postoperative hospital stay with the robotic NICE procedure, but further studies with a larger cohort are necessary.

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