

Laparoscopic Versus Robotic Right Colectomy: BMI Effect on Conversion Rate

Caroline A Couch, MD, Kristen L Coleman, DO, Angela N Fellner, PhD, CCRC, Hamza Guend, MD | Cincinnati, OH

Introduction

Meta-analyses looking on robotic vs laparoscopic right colectomies:

- Data is mixed on reduction of complications such as bleeding, leaks and overall complication rates ^{4, 5}
- Recent studies showed decreased rates of conversion ^{4, 5}
 - 2.4% for robotic compared to 18.1% for laparoscopic ⁵

Obesity’s Effect

- Rate of obesity increased to 42.4% ³
- Increased BMIs increase the conversion rate in laparoscopic surgery¹
- Comparing the conversion rates in each group at varying BMIs showed a trend towards increasing benefit of robotics with increasing BMI but without statistical significance ²

Our null hypothesis was that there would be no difference in the rate of conversion in the laparoscopic or robotic groups when separated out by BMI class.

Methods

This was a retrospective review of data using the electronic medical record of a single hospital system with multiple surgeons.

A total of 95 right colectomies were collected.

- 66 laparoscopic
- 29 robotic

All BMI classes were represented.

Exclusion criteria:

- en block resections
- emergent operations

The primary endpoint was conversion from laparoscopic or robotic surgery to open. Secondary endpoints were short-term (30 day) outcomes including readmissions, ED visits, major and minor complications.

Results

Table 1: There were more intra-corporeal anastomoses in robotic cases

Table 2: Demographics were similar

Table 3: Distribution of diagnoses was similar

Table 1. Anastomotic Type			
	Robotic	Laparoscopic	P-value
Anastomotic Type			0.00
Intracorporeal	86.21%	18.18%	
Extracorporeal	13.79%	81.82%	

Table 2. Demographics			
	Robotic	Laparoscopic	P-value
Average Age (yrs)	66.7	64.7	
Gender			0.541
M	51.7%	53.0%	
F	48.3%	47.0%	
ASA Category			0.398
1	0%	0%	
2	41.4%	31.8%	
3	51.7%	65.2%	
4	6.9%	3.0%	
Comorbidities			
COPD	20.7%	10.6%	0.160
DM	37.9%	34.8%	0.474
Poorly controlled	10.3%	16.7%	0.323
CAD/CHF	37.9%	22.7%	0.101
Malnutrition	21.4%	30.8%	0.255
Smoking	6.9%	22.7%	0.053
Anemia	31.0%	36.9%	0.378
OSA	27.6%	12.1%	0.063

Table 3. Diagnoses			
	Robotic	Laparoscopic	P-value
Diagnosis			0.706
Cancer	51.7%	59.1%	
Benign Tumor or Polyp	44.8%	39.4%	
IBD	0%	1.5%	
Other	3.4%	0%	

Table 4: There were no conversions to open in robotic cases but even when subdivided by BMI there was no statistically significant difference between groups.

Table 5: There were lower rates of multiple complications in the robotic group but none were statistically significant. 30-day readmissions approached significance at p = 0.070.

Table 4. Conversions			
	Robotic	Laparoscopic	P-value
Conversions	0.0%	9.1%	0.105
BMI <25	0.0%	9.10%	0.579
BMI 25-30	0.0%	10.00%	0.569
BMI 30-35	0.0%	7.70%	0.722
BMI 35-40	0.0%	0.00%	na
BMI 40+	0.0%	20.00%	0.417

Table 5. Outcomes			
	Robotic	Laparoscopic	P-value
Major Complications			
Abscess	3.4%	3.0%	0.669
Leak	0.0%	4.5%	0.331
Return to OR	0.0%	6.1%	0.226
Transfusion	0.0%	3.0%	0.480
MI	0.0%	1.5%	0.695
Stroke	0.0%	0.0%	na
PNA	0.0%	1.5%	0.695
30 day Death	0.0%	1.5%	0.695
Minor Complications			
New A-fib	3.4%	1.5%	0.520
Ileus	10.3%	13.6%	0.470
UTI	0.0%	3.0%	0.480
Superficial Infection	0.0%	3.0%	0.480
Re-visits			
30 day ED Visit	3.4%	13.6%	0.127
30 day Re-Admit	0.0%	10.6%	0.070

Conclusions

The groups were very similar in terms of indication for surgery, demographics and co-morbidities. However the robotic group had significantly more intra-corporeal anastomoses than the laparoscopic group. It is possible the benefit of robotic surgery may be conferred in part by this type of anastomosis. Further research into this effect is ongoing.

There were no conversions to open in the robotic right colectomy group. They also had lower rates of leak, return to the OR, transfusion, superficial wound infection, ileus, 30-day ED visits & 30-day readmissions. While none of these were statistically significant we believe it to be clinically significant.

Works Cited

1. **Bell**, S., Kong, J., Wale, R., Staples, M., Oliva, K., Wilkins, S., Mc Murrick, P. and Warriar, S. (2018). The effect of increasing body mass index on laparoscopic surgery for colon and rectal cancer. *Colorectal Disease*, 20(9), pp.778-788.
2. **Cardinali**, Luca & Belfiori, Giulio & Ghiselli, Roberto & Ortenzi, Monica & Guerrieri, Mario. (2016). Robotic versus laparoscopic right colectomy for cancer: Short-term outcomes and influence of Body Mass Index on conversion rate. *Minerva chirurgica*. 71.
3. **Hales**, C., Carroll, M., Fryar, C. and Ogden, C. (2020). Prevalence of Obesity and Severe Obesity Among Adults: United States, 2017–2018. *National Center for Health Statistics*. February 2020. Brief 360. Available from <https://www.cdc.gov/nchs/products/databriefs/db360.htm>.
4. **Scotton**, G., Contardo, T., Zerbinati, A., Tosato, S., Orsini, C. and Morpurgo, E. (2018). From Laparoscopic Right Colectomy with Extracorporeal Anastomosis to Robot-Assisted Intracorporeal Anastomosis to Totally Robotic Right Colectomy for Cancer: The Evolution of Robotic Multiquadrant Abdominal Surgery. *Journal of Laparoendoscopic & Advanced Surgical Techniques*, 28(10), pp.1216-1222.
5. **Solaini**, L., Bazzocchi, F., Cavaliere, D., Avanzolini, A., Cucchetti, A. and Ercolani, G. (2018). Robotic versus laparoscopic right colectomy: an updated systematic review and meta-analysis. *Surgical Endoscopy*, 32(3), pp.1104-1110.