Adoption of Robotic Colorectal Surgery: Review of Experience and Outcomes in the First 100 Consecutive Robotic Cases at a High Volume Single Surgeon Center

Matthew Jacobsson[1] DO; Deepa Chandhrasekhar[1] DO; Jamie Whisler[1] DO, Kiefer Starks[1] DO, Vitas Wagner[1] MD PhD, Shalini Kanneganti[1], MD, FACS, FASCRS

[1]Virginia Mason Franciscan Health, Tacoma, WA, USA

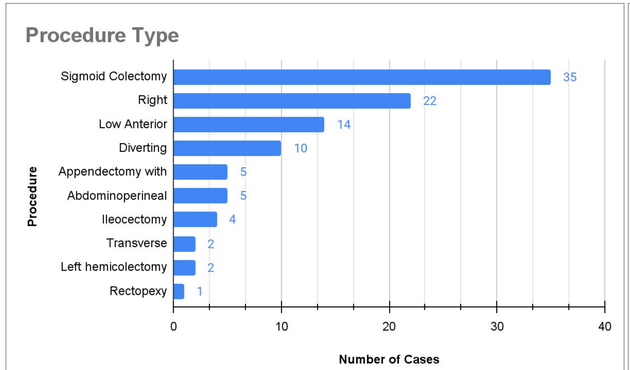
Background

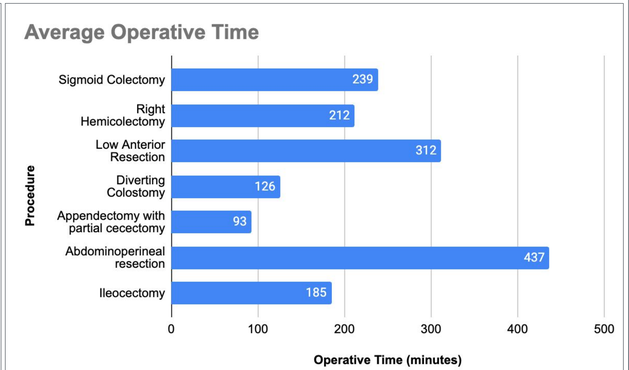
Robotic surgery is increasingly being utilized in colorectal surgery.[1] We seek to describe the experience and outcomes during the initial adoption period of robotic surgery at our single surgeon, high-volume colorectal surgery program. The da Vinci Robotic Surgical System was approved in the year 2001 and continues to gain popularity and adoption by surgeons. A 3D view, stable camera controlled by the operating surgeon, articulating wristed instruments, improved ergonomics, decreased workplace musculoskeletal disorders, and improved ability to work in small and deep spaces, are a few of many reasons surgeons are converting to a robotic approach.[2] As robotic surgical techniques are adopted, the benefits and downsides of robotic surgery for the surgeon, operating room personnel, the hospital, and most importantly the patient, are a constant conversation and outcomes and experience need to be scrutinized.[3,4]

Methods

A retrospective chart review was completed, identifying the first 100 robotic cases by the same colorectal surgeon at one community center following robotic platform adoption. Patient demographics, operative indications, and perioperative outcomes data were collected and described.

Results





Patient Demographics

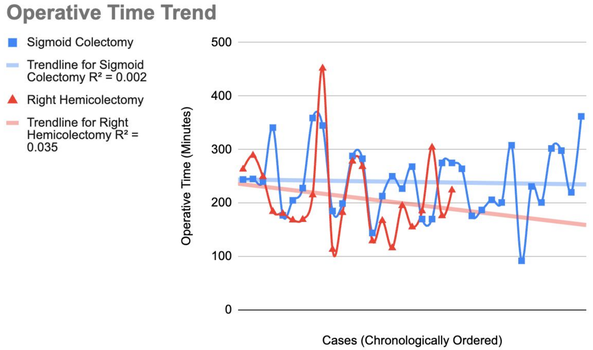
- 51 female / 49 male
- Median age 64 years (25-91)
- BMI 29.1 (14.7-57.1)

Operative Indications

- 64 - Oncologic indications
- 19 - Diverticular disease
- 11 - High risk polyps
- 9 - Other

Outcomes

- Average operative time of 217 minutes (64-575 minutes)
- No conversions to open; one conversion to laparoscopic hand assist
- No re-operations
- 5% 30-day readmission rate
- 0% 30 day mortality
- 3 days median length of stay
- 7% 30-day complication rate including 1 contained anastomotic leak (managed nonoperatively)
- 64% for oncologic indications
  - LN harvest >12 in 63/64
  - Negative margins in all cases



Discussion

- Adoption of robotic platform process: initial self-paced simulation modules, hands-on training at Intuitive (Sunnyvale, CA), 2 Site Observations (to observe workflow and team dynamics), and 5 proctored cases
- Less complex cases and good surgical candidates were initially preferentially selected.
- First 100 cases demonstrate favorable outcomes, minimal complications, and acceptable operative times despite robotic learning curve.
- Average operative time across all cases of 217 minutes
  - Slight, although non-significant, downtrend in operative time across the two most commonly performed procedures (sigmoid colectomy and right colectomy).
  - This reflects time required for robot docking and new technique learning curves.
  - It is anticipated that with increased surgeon and team familiarity with docking and robotic techniques operative time trends will continue to improve.
- Majority of initial anastomosis were performed extracorporeally.
- Future work to perform comparison to laparoscopic outcomes and cost analysis.

Conclusion

Our findings reflect a diverse casemix and acceptable oncologic and perioperative outcomes during the adoption period of robotic surgery at a high-volume community colorectal surgery program.

References

1 Damle et al. 2017. Diffusion of technology: Trends in robotic-assisted colorectal surgery. The American Journal of Surgery. Volume 214, Issue 5, Pages 820-824. https://doi.org/10.1016/j.amjsurg.2017.03.020
2 Zelhart, M., Kaiser, A.M. Robotic versus laparoscopic versus open colorectal surgery: towards defining criteria to the right choice. Surg Endosc 32, 24–38 (2018). https://doi.org/10.1007/s00464-017-5796-2
3 Deutsch, G.B., Sathyanarayana, S.A., Gunabushanam, V. *et al.* Robotic vs. laparoscopic colorectal surgery: an institutional experience. *Surg Endosc* 26, 956–963 (2012).
4 Green, C., Levy, J., Martino, M., Porterfield Jr, J. 2020. The current state of surgeon credentialing in the robotic era. Annals of Laparoscopic and Endoscopic Surgery. Volume 5. https://ales.amegroups.org/article/view/5624