

Clinical Science

Improved perioperative and short-term outcomes of robotic versus conventional laparoscopic colorectal operations



Mark A. Casillas, Jr., M.D.^a, Stefan W. Leichter, M.D.^a, Wendy L. Wahl, M.D.^a,
Richard M. Lampman, Ph.D.^a, Kathleen B. Welch, M.P.H.^b, Trisha Wellock, B.S.^a,
Erin B. Madden, B.S.^a, Robert K. Cleary, M.D.^{a,*}

^aDepartment of Surgery, Division of Colon and Rectal Surgery, Saint Joseph Mercy Health System, 5325 Elliott Drive, Suite 104, Ann Arbor, MI, USA; ^bCenter for Statistical Consultation & Research, University of Michigan, Ann Arbor, MI, USA

KEYWORDS:

Robotic surgery;
Laparoscopic
colorectal surgery;
Colectomy;
30-day outcomes

Abstract

BACKGROUND: Robotic assistance may offer unique advantages over conventional laparoscopy in colorectal operations.

METHODS: This prospective observational study compared operative measures and postoperative outcomes between laparoscopic and robotic abdominal and pelvic resections for benign and malignant disease.

RESULTS: From 2005 through 2012, 200 (58%) laparoscopic and 144 (42%) robotic operations were performed by a single surgeon. After adjustment for differences in demographics and disease processes using propensity score matching, all laparoscopic operations had a significantly shorter operative time ($P < .01$), laparoscopic left colectomies had a longer length of hospital stay (2009 and 2010: 6.5 vs 3.6 days, $P = .01$); and laparoscopic right colectomies had a higher risk for overall complications ($P = .03$) and postoperative ileus ($P = .04$). There were no significant differences in the outcomes of pelvic operations ($P = .15$).

CONCLUSIONS: Compared with conventional laparoscopy, some types of robotic-assisted colorectal operations may offer advantages regarding postoperative length of stay and perioperative complications.

© 2014 Elsevier Inc. All rights reserved.

The first successful robotic-assisted colorectal procedure involving colonic mobilization of the right and sigmoid colon

Dr. Cleary is a consultant to and has received honoraria from Intuitive Surgical, Inc.

* Corresponding author. Tel.: +1-734-712-8160; fax: +1-734-712-8151.

E-mail address: clearyrk@trinity-health.org

Manuscript received February 24, 2013; revised manuscript July 20, 2013

was published in 2002.¹ Since this report, several studies have documented the feasibility and safety of robotic colon and rectal surgery.²⁻¹² The advantages of robotic surgical systems transcend multiple surgical disciplines and include 3-dimensional imaging, a third arm for fixed retraction, fine motion scaling, articulated instruments providing superior dexterity, and a stable surgeon-controlled camera platform resulting in less lens soiling. These robotic advantages may be particularly important for rectal neoplasms and other

diseases in the pelvis in which laparoscopic retraction and visualization are very challenging and robotic-assisted surgery affords better visualization and improved precision.^{8,9,13} Although the advantages of conventional laparoscopic surgery over standard open techniques have been studied extensively,^{3,7,14–26} studies comparing robotic with laparoscopic colon and rectal surgery are currently in evolution.^{7,8,27} Our institution has prospectively collected data on operative measures and outcomes of robotic colon and rectal surgery for more than 2.5 years. We hypothesized that the advantages of robotic assistance may allow surgeons to perform colorectal operations with improved perioperative and short-term outcomes.

Materials and Methods

From January 1, 2005, through April 25, 2012, 1 of the authors (R.K.C.) performed 344 consecutive laparoscopic ($n = 200$) and robotic ($n = 144$) colon and rectal operations at a single institution. The first robotic operation was performed on October 30, 2009. Patients were offered open, laparoscopic, and robotic options. The indications for robotic surgery were the same as for open and laparoscopic surgery without regard to the stage of neoplasia or diverticulitis. Most patients chose the robotic option except when robotic time was not available. A few did not want to pursue a new technology. Therefore, most patients in the laparoscopic group were prior to 2010. Patient characteristics, operative data, and 30-day outcomes of these operations were prospectively recorded in a database. Included in the database were all patients older than 18 years and with an operative diagnosis of diverticulitis or benign and malignant colorectal neoplasms. Patients with gastrointestinal hemorrhage, inflammatory bowel disease, and rectal prolapse were excluded because they were not well represented in both groups. All patients were placed on the same postoperative diet progression and had the same discharge criteria including passing flatus, tolerating a general diet, and adequate pain control on oral pain medication. The Institutional Review Board at Saint Joseph Mercy Health System, Ann Arbor, MI, approved this study.

Baseline demographic characteristics including age, sex, body mass index, and American Society of Anesthesiologists class were compared between the 2 groups. Outcomes of interest were operative time, estimated blood loss, lymph node harvest, conversion rate to open surgery (defined as any deviation from the laparoscopic procedure that required lengthening the abdominal incision to proceed), length of hospital stay, and 30-day complications. The latter included surgical site infections, wound dehiscence, ileus, anastomotic leakage, septic complications, cardiopulmonary complications, and other complications. The definition for surgical site infections was based on Centers for Disease Control and Prevention and American College of Surgeons' National Surgical Quality Improvement Program terminology. Ileus was defined as a delay in the return of bowel

function requiring the placement of a nasogastric tube. Anastomotic leakage was defined as contrast extravasation on radiographic imaging or clinical leakage requiring radiographic-guided or operative intervention.

Statistical analysis

Baseline comparisons of normally distributed demographic variables were made using the independent samples t test; categorical variables were compared using the Fisher exact test. The natural log transformation was calculated for skewed distributions, which were then compared using the independent samples t test. Propensity score analysis²⁸ was used to compare robotic with laparoscopic cases separately for each outcome. The propensity scores were calculated matching patients on diagnosis (ie, neoplasia or nonneoplasia), stage of disease, and age for left colectomies. For right colectomies and pelvic surgeries, the propensity scores were used to match patients according to stage of disease and age because there were only neoplasia cases for these surgery types. To adjust for differences between the 2 surgical modalities (laparoscopic vs robot), the analysis was adjusted for propensity score quintile using a linear regression model for the normally distributed outcome (surgical time), a negative binomial regression for the estimated blood loss and number of lymph nodes harvested, and a Poisson regression for the length of hospital stay (all of which were skewed distributions and therefore not appropriate for linear regression analysis), and a conditional logistic regression for the binary variable "conversion to open surgery" stratified on propensity score quintile.

Separate analyses were performed for each procedure type including left colectomy (to include sigmoid colectomy), right colectomy, and pelvic operations (low anterior resection and abdominoperineal resection). The length of hospital stay was compared for the surgeries in the years 2009 and 2010 when laparoscopic and robotic operations were performed concurrently (total $N = 117$, 59 laparoscopic and 58 robotic), and comparisons were adjusted for the year of surgery to avoid possible bias related to institutional changes in patient care and discharge policies. Postoperative complications were compared using the Fisher exact test, and no adjustment for differences in baseline characteristics were made because of the small number of complications that occurred. For all statistical analyses, a P value less than or equal to .05 was considered significant. Data analyses were generated using SAS software release 9.3 for Windows (SAS System for Windows; SAS Institute Inc, Cary, NC).

Operative technique

Laparoscopy was performed at the beginning of every robotic procedure as described in more detail elsewhere.²⁹ All the robotic right colectomies were performed with the robot docked over the patient's right side. Medial to lateral

Download English Version:

<https://daneshyari.com/en/article/4278662>

Download Persian Version:

<https://daneshyari.com/article/4278662>

[Daneshyari.com](https://daneshyari.com)