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ORIGINAL ARTICLE

Results of laparoscopic colorectal surgery from a national training center

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Summary *Background/purpose:* Trials have shown laparoscopic colorectal surgery to be safe. We aim to analyze the long-term results from a single national training center for laparoscopic surgery, especially in patients with high predicted mortality scores as well as in octogenarians. We also aim to explore the trend in the length of the learning curve among consultants and colorectal trainees, and determine whether or not laparoscopic colorectal surgery is amenable to surgical training.
Methods: All patients between July 2003 and July 2011 having laparoscopic colorectal surgery were included in a prospectively maintained database and analyzed retrospectively. We collected operative data (operation time, conversion), postoperative 30-day morbidity/mortality, cancer survival (including local/distant recurrences), postoperative incisional/port site hernia rates, and rates of reoperation.
Results: A total of 508 patients (258 males and 250 females) were enrolled in the study. The mean age of patients was 65.5 years and median body mass index (BMI) 27 kg/m^2; 70% of cases were malignant. Conversion rate was 15%, mean operation time was 175 minutes, and mean blood loss was 220 mL. The mean postoperative length of stay was 5.8 days, 30-day morbidity 23% (leak rate 1.38%), and 30-day mortality 1.57%. Operating time and conversion rates were significantly lower in right-sided resections compared to left-sided and rectal resections, and lymph node retrieval was significantly higher. Readmission and reoperation rates were 4.9%

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and 2.8%, respectively. The overall mean follow-up period was 1.8 years, rate of incisional/port site/parastomal hernia was 5.7% ($n = 30$), and readmission secondary to adhesions was <1% ($n = 4$). Readmission rates and 30-day surgical morbidity were significantly higher in patients with non-neoplastic disease compared to those with benign or malignant lesions. The mean follow-up period for cancer patients was 2.3 years. Local and distant recurrence rates were 4.2% and 13.2%, respectively. Overall death from cancer was 10.4%. Among the study participants, 74 were octogenarians and 23 had a predicted mortality of >5% (P-Possum tool). No statistically significant increases were observed in conversion, morbidity, or mortality rates in these groups ($p > 0.05$), but length of stay was statistically longer—7 days for octogenarians and 8 days for patients with >5% predicted mortality ($p < 0.05$). In 2003, two consultants operated on all cases; currently, twice as many procedures are performed by supervised trainees instead of consultants, with no change in outcome. Operating time was significantly higher in the consultant-led cases, but no other differences were noted in short- or long-term outcomes between consultant- and junior/senior trainee-led cases.

Conclusion: We conclude that laparoscopic colorectal surgery should be the standard treatment option offered to all patients regardless of age and comorbidities and it is amenable to training.

1. Introduction

Since its initial description in 1991, laparoscopic colorectal surgery has become the preferred method for colorectal resection.[1–7] Repeated studies have illustrated that laparoscopic surgery is associated with lower morbidity compared to open surgery.[1,2,8–10] The Conventional versus Laparoscopic-Assisted Surgery In patients with Colorectal Cancer (CLASICC) trial group, which investigated long-term outcomes of patients randomized to laparoscopic or open surgery, found no difference in long-term outcomes in the laparoscopic group.[11] However, laparoscopic surgery has a relatively lengthy learning curve.[12] In 2008, the Department of Health funded national training centers [Programme for Laparoscopic Colorectal Cancer Surgery (LAPCO)] to aid training in laparoscopic procedures. Our unit started laparoscopic colorectal surgery in 2003, and we published our preliminary results in 2007; the unit became a national training center in 2008.

This current study analyzed the long-term results from a single national training center for laparoscopic surgery, especially for patients with high predicted mortality scores as well as for octogenarians.

We also investigated the trend in the length of the learning curve among consultants and colorectal trainees.

2. Patients and methods

All patients undergoing elective laparoscopic colorectal surgery between July 2003 and July 2011 were included prospectively in a database.

All benign and malignant cases were assessed adequately and staged prior to surgery, according to the National Institute for Health and Care Excellence (NICE) guidelines.[13]

Procedures were performed as described previously.[14]

Patients were followed up in colorectal clinics postoperatively. Morbidity was defined as any illness within a 30-day postoperative period, whether surgical or otherwise. Thirty-day postoperative mortality and return to theatre were also recorded prospectively.

Follow-up data, including local or distant recurrence and death from cancer, were recorded. The rate of incisional/port site/parastomal hernia was also recorded.

The data was subdivided further according to disease location (right-sided lesions, left-sided lesions, and rectal lesions) and underlying pathology (non-neoplastic lesions, benign lesions, and malignant lesions). Non-neoplastic lesions consisted of pathologies such as diverticular complications, rectal prolapses, etc. Benign lesions consisted primarily of adenomas.

To address the trend in training, the data was subanalyzed depending on the grade of the operating surgeon. Cases where the primary operator was the consultant or where the consultant had to take over part-way through the procedure were all classified as consultant-led procedures. Senior trainees consisted of those in their last 2 years of training in colorectal surgery or specific laparoscopic colorectal fellows, whereas junior trainees were those in their first 3 years of specialist registrar training.

2.1. Statistical tests

All parameters were tested for normality prior to selecting the appropriate statistical tests. Continuous variables were analyzed using the analysis of variance (ANOVA) or Kruskall–Wallis test, and categorical variables were analyzed using the Chi-square test. Differences were considered significant for $p < 0.05$.

3. Results

3.1. Demographics and operative procedure

Laparoscopic colorectal procedures were performed on 508 patients, 258 males and 250 females, with a mean age of