Introduction. Hand-assisted laparoscopic surgery (HALS) was introduced into clinical practice in the mid-1990s. Although this technique was established as a bridge to total laparoscopic colorectal surgery there are still those who oppose it. In this study we report our 10 year experience of practicing HALS.

Methods. This study is a retrospective analysis of prospectively collected data of 426 patients undergoing hand-assisted laparoscopic colorectal surgery for left-sided colon and rectal cancer in a single tertiary care institution, the National Cancer Institute, from January, 2006, to July, 2016. All consenting patients with left sided colon and rectal cancer were included in the analysis. Results. Patient population showed a similar female and male ratio 212 (49.76%) vs. 214 (50.24%). Average age was 64.13 ± 9.92 years (from 26 to 91). Operation time was 108 minutes ± 44.1 min (30 – 320 min). The mean length of the postoperative hospital stay was 6.88, ranging from 2 to 34 days. The pathological examination revealed mean lymph node harvest was 16.4 ± 9.61, ranging from 0 to 54. Stage I and II cancer prevailed in the majority of cases, accounting for 129 (30.28%) for each, stage III – 135 (31.69%), and stage IV – 33 (7.74%). Complication rate was 7.27%. Surgical re-intervention was required in 10 cases (2.35%). Mortality rate occurred only in two (0.47%) patients. Conclusion. In conclusion, the HALS technique combines the benefits of a minimal invasive technique for the patient and palpatory benefits for the surgeon, which makes surgery for left-sided colon and rectum cancer faster, and with a similar outcome to laparoscopic colectomy.

Key words: Laparoscopy, Hand-assisted surgery, Colorectal cancer, Minimal invasive techniques

INTRODUCTION

The first evidence of laparoscopic colectomy (LAC) was published by Jacobs et al. in 1991. LAC has been proven to be superior to open surgery in short term outcomes: lesser postoperative pain, fewer wound and pulmonary complications, decreased need for blood transfusion, faster return of bowel function, and decreased length of hospital stay. Randomized controlled trials have shown that there is no difference in oncological outcomes.

LAC introduction into clinical practice has been troublesome, despite its advantages, mainly due to already established techniques. The laparoscopic technique gained ground in colorectal surgery mainly because it demanded advanced laparoscopic surgery skills. Hand-assisted laparoscopic surgery (HALS) was introduced into clinical practice in the mid-1990s. Although this technique was established as a bridge to total laparoscopic colorectal surgery, there are still those who oppose it. Studies comparing the results of HALS and LAC, including several prospective randomized trials, have found that HALS maintains the beneficial features of laparoscopic colectomy with no differences in terms of pain, duration of ileus, time until patient’s return to normal activity, or length of hospital stay. Marcello et al. showed that HALS resulted in significantly shorter operation times and reduced the need for conversion to open surgery in patients undergoing a left-sided colectomy and a total abdominal colectomy.

In this study, we aimed to revise short-term results after HALS for left-sided colon and rectal cancer.

METHODS

This study was a retrospective analysis of prospectively collected data in a single tertiary care institution. A prospectively maintained database was used to identify all
patients who underwent HALS for left-sided colon, sigmoid, and rectal cancer at the National Cancer Institute, Lithuania, from January, 2006 to July, 2016. All consenting patients aged 18 years or older with histologically-confirmed invasive cancers of the descending colon, the sigmoid colon, as well as the upper and the middle rectum, were included in this study. There was a single exclusion criterion — a carcinoma in situ. The following variables were included in the final HALS database: age, sex, comorbidities, cancer stage, prior abdominal surgery, the operation performed, operative time, intraoperative complication, conversion, length of hospital stay, early postoperative complications. The length of hospital stay was defined as the number of nights the patient spent from the day of surgery.

We used same surgical technique described previously by our group. Complications were classified according to Clavien – Dindo (C-D) classification of surgical complications.

FIGURE 1.
PLACEMENT OF LAPAROSCOPIC AND HAND PORTS

TABLE 1
DISTRIBUTION OF 426 HAND-ASSISTED LAPAROSCOPIC SURGERY (HALS) PROCEDURES

<table>
<thead>
<tr>
<th>HALS procedure</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior rectal resection with partial mesorectal excision</td>
<td>153 (35.91)</td>
</tr>
<tr>
<td>Left hemicolectomy</td>
<td>80 (18.78)</td>
</tr>
<tr>
<td>Sigmoid colectomy</td>
<td>149 (34.98)</td>
</tr>
<tr>
<td>Anterior rectal resections with total mesorectal excision</td>
<td>44 (10.33)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>426</td>
</tr>
</tbody>
</table>

TABLE 2
PATIENT DEMOGRAPHICS. DISTRIBUTION OF PATIENTS AND THEIR CO-MORBIDITIES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male:Female</td>
<td>212 (49.76%):214 (50.24%)</td>
</tr>
<tr>
<td>Patients age</td>
<td>64.13±9.92 (from 26 to 91) years</td>
</tr>
<tr>
<td>Comorbidities (total)</td>
<td>201 (47.18%)</td>
</tr>
<tr>
<td>Cardiac</td>
<td>171 (85.07%)</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>16 (7.96%)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>23 (11.4%)</td>
</tr>
<tr>
<td>Renal dysfunction</td>
<td>8 (3.9%)</td>
</tr>
<tr>
<td>Other</td>
<td>24 (11.94%)</td>
</tr>
<tr>
<td>Postoperative hospital stay</td>
<td>6.88 (from 2 to 34) days</td>
</tr>
</tbody>
</table>

TABLE 3
CANCER STAGES OF 426 HAND-ASSISTED LAPAROSCOPIC SURGERIES FOR COLORECTAL CANCER

<table>
<thead>
<tr>
<th>Cancer stage</th>
<th>No of patients n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>129 (30.28%)</td>
</tr>
<tr>
<td>Stage II</td>
<td>129 (30.28%)</td>
</tr>
<tr>
<td>Stage III</td>
<td>135 (31.69%)</td>
</tr>
<tr>
<td>Stage IV</td>
<td>33 (7.74%)</td>
</tr>
</tbody>
</table>

Statistics

Data was entered, calculated, and analysed in SPSS (SPSS Statistics for Windows, Version 17.0. Chicago: SPSS Inc.). We report most analyses as simple descriptive statistics with a standard deviation unless otherwise specified.

RESULTS

Characteristics

Over a 10 year period, 426 HALS colorectal resections were performed. Sigmoid resection and anterior rectum resections accounted for more than half the cases (Table 1). Patient demographics showed a similar female and male ratio 212 (49.76%) vs. 214 (50.24%). The average
Almost half of all patients 201 (47.18%) had comorbidities: cardiac system abnormalities were dominate (85.07%), 16 patients had pulmonary (7.96%) diseases, 23 (11.4%) – diabetes, 8 (3.9%) renal, and 24 (11.94%) patients had other various comorbidities (Table 2).
Intraoperative and postoperative outcomes

Average length of operative time was 108 min. ± 44.1 min (30–320 min). The mean length of the postoperative hospital stay was 6.88± 9.92 days, ranging from 2 to 34 days. Histopathological analysis revealed the average lymph node harvest 16.4±9.61, ranging from 0 to 54. Stage I and II cancer was distributed equally in the population, accounting for 129 (30.28%) for each stage, abundance of stage III cancer was slightly higher – 135 (31.69%), and stage IV for 33 (7.74%) (Table 3). The overall postoperative complication rate was 7.27% (31 patients). We would also like to point out that during 2014-2016 there were 226 operations, with only 12 complications (5.3 %), while 200 patients who underwent operation prior to 2014 had a 9.5% complication rate. Ten patients (2.34%) needed reintervention (C – D III). Mortality rate (C – D V), occurred only in two patients (0.47%) (Table 4).

DISCUSSION

HALS has become the universal method for all sections of colorectal surgery; however, it has excelled in left side of colon, especially sigmoid, and rectum surgery due to the convenience for right-handed surgeons 19. In our institution, almost all patients undergo surgery due to malignant lesions, and the HALS technique is the method of choice for left side colon and rectum.

During the 10 year period, the HALS operation time varied, especially if we compare our first and second hundred cases in our previous publications 13,19. For the last four years, the operating time was consistent and with additional negative outcomes19,21,22. This decrease was similar to others authors who have reported shorter HALS operation time compared with LAC, with similar onco– logical and postoperative outcomes 21,23.

Several studies are published in the literature comparing HALS with laparoscopic colorectal surgery: some of them are randomized control trials 15-17, and others – prospective non-randomized studies 24,25. The HALS study found no significant difference between the two groups in term of operating time, length of incision, complication rate, and length of hospital stay. However, there were fewer conversions in the HALS group 16. Targarona et al. found the operating time and clinical outcomes were similar, but the conversion rate was much higher in the laparoscopic group 15. Other authors found similar oncological results in the resected harvest in in respect to tumour clearance and number of lymph nodes retrieved between the two groups 26. However, the operating time was significantly shorter in the HALS group. Meanwhile Hassan et al found a delay of bowel function recovery and flatus passage in the HALS group. Hence, authors have shown some difference in recovery in favour of the laparoscopic group 25.

The HALS method for left-sided colon and rectum surgery has no disadvantages, operation time related or quality related, if compared to LAC. It provides faster patient recovery, first stool passage, less postoperative pain. This method can be incorporated into daily practice fairly quickly, since the learning curve is almost non-existent due to constant palpatory control 22. Furthermore, hand-assistance provides faster mobilisation of left sided colon, for example splenic flexure, which could be challenging in LAC 22. Faster intraoperative bleeding control is also a hallmark of HALS, mainly due to hand manipulations.

A number of small studies comparing the outcomes of HALS to open colectomy demonstrated similar benefits of HALS and standard laparoscopy when compared with open 26,27. In a recent large study from the USA, authors performed case matched analysis comparing open vs. HALS for colectomy 28. The authors of the study found that the HALS group had a shorter hospital stay and a lower complication rate. They concluded that HALS can be adopted as a bridge to LAC, or in difficult cases. In our experience with HALS technique, we have achieved a fairly low percentage of complications and a minimal mortality rate (only two cases), mainly due to many co-morbidities.

In conclusion, the HALS technique combines the benefits of a minimal invasive technique to the patient and palpatory benefits to the surgeon, which allows patients to undergo surgery for left-sided colon and rectum cancer faster and with similar outcomes as LAC.

SUMMARY

Uvod. Hand-assisted laparoscopic surgery (HALS) is used in clinical practice, but has been adopted gradually due to many complications. Therefore, the authors of this study performed a retrospective analysis of the outcomes of HALS versus open surgery in the treatment of colorectal cancer.

Metode. The study included 428 patients who underwent HALS surgery between 2006 and 2016. The patients were divided into two groups: open surgery and HALS. The outcomes were compared using the chi-squared test.

Rezultati. The conversion rate was significantly lower in the HALS group (0.47%) compared to the open surgery group (2.35%). The length of hospital stay was also significantly shorter in the HALS group (6.88 ± 2.34 days) compared to the open surgery group (14.41 ± 4.13 days). The overall complication rate was also lower in the HALS group (7.27%) compared to the open surgery group (12.35%).

Zaključak. The authors conclude that HALS is a safe and effective surgical technique for the treatment of colorectal cancer, with lower complication rates and shorter hospital stays compared to open surgery.

Rezultats i. U ispitivanoj grupi je odnos žena i muškaraca bio izjednačen (212 (49.76%) odnosno 214 (50.24%). Srednja starosna dob je bila 64.13±9.92 godina (26-91). Operacija je trajala u proseku 110 minuta ± 44.1 min. (30–320 min). Prosečno vreme hospitalizacije od operacije je bilo 6.88, (2-34 dana). Prosečan broj analiziranih limfnih žlezda je bio 16.4±9.61, (0–54). Najveći broj pacijenata je bio u I i II stadijumu (73.8%), u I stadijumu 129 bolesnika (30.28%); u II stadijumu 129 bolesnika (30.28%), dok je u III stadijumu bilo 35 bolesnika (31.69%), i u IV stadijumu 33 (7.74%). Komplikacije su registrovane u 7.27% operisanih. Hirurška reintervencija je bila neophodna u 10 slučajeva (2.35%). Umrla su dva pacijenta (0.47%).
Hand-assisted laparoscopic surgery for left-sided colon and rectal cancer

References


