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Klinikinė praktika

Hand-assisted laparoscopic surgery for colon and rectal resection: a single-institution experience in 473 patients

Ranka asistuojamoji laparoskopinė gaubtinės ir tiesiosios žarnos chirurgija: vieno centro 473 ligonių patirtis

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Background / Objective

Hand-assisted laparoscopic surgery (HALS) has been introduced into clinical practice for almost three decades. It combines the advantages of both laparoscopic (minimally invasive) and conventional open surgery. Despite all the published data, there are still scepticism in surgical community regarding this hybrid form of laparoscopic surgery and the role of HALS is still being defined. Our study aimed to review 10 year experience in treating patients at single centre with colonic and rectal pathology using HALS.

Methods

This study was a retrospective analysis of prospectively collected data of 473 patients undergoing hand assisted laparoscopic colorectal surgery for colon and rectal disease, mainly cancer, in a single tertiary care institution, National Cancer Institute, from January, 2006, to July, 2016. All consented patient with colonic and rectal pathology were included in the analysis.

Results

The patients' mean age was 64.14 ± 9.75 years. Female and male ratio was similar 240 (50.73%) vs. 233 (49.27%). The mean length of postoperative hospital stay was 6.92, ranging from 2 to 34 days. Histological examination revealed mean lymph node harvest was 16.97 ± 12.10. Stage I, II, III cancer groups were similar accounting for 142 (30.02%), 139 (29.35%) and 153 (32.35%) cases respectively, stage IV – 36 (7.61%) and three cases of benign origin. Segmental colectomies were performed in 53.0% cases, 45.3% patients had rectal resections and "other" 1.7%. Surgical re-intervention was required for 10 patients (2.11%). Complication rate was 6.55%, and mortality documented in only 2 cases (0.42%).

Conclusion

HALS is safe and feasible technique, which maintains all the benefits of laparoscopic colectomy and can be performed for numerous indications, while affording the surgeon to carry out complex cases in a minimally invasive fashion.

Key words: laparoscopic colectomy, hand-assisted laparoscopy, colon cancer

Įvadas / tikslas

Ranka asistuojamoji laparoskopinė chirurgija (HALS) į klinikinę praktiką įdiegta jau beveik tris dešimtmečius. Ji jungia atviros chirurgijos ir laparoskopinės (minimaliai invazinės) chirurgijos būdus. Nepaisant paskelbtų duomenų, chirurgų bendruomenė vis dar skeptiškai žvelgia į šią hibridinę laparoskopijos formą. Straipsnio tikslas – apžvelgti vieno centro 10 metų patirtį taikant HALS metodiką.

Metodai

Tai retrospektyvioji duomenų analizė. Apžvelgti 473 pacientai, gydyti Nacionaliniame vėžio institute dėl kolorektalinės patologijos nuo 2006 m. sausio iki 2016 m. liepos mėn. Šie pacientai buvo operuoti HALS būdu.

Rezultatai

Pacientų amžiaus vidurkis buvo 64,14 ± 9,75 metai. Moterų – 240 (50,73 %), vyrų – 233 (49,27 %). Vidutinė hospitalizacijos trukmė buvo 6,92 dienos (nuo 2 iki 34 d.). Histologinio tyrimo duomenimis, vidutinis pašalintų limfmazgių skaičius 16,97 ± 12,10. I, II, III ir IV stadijų grupes sudarė atitinkamai 142 (30,02 %), 139 (29,35 %), 153 (32,35 %) ir 36 (7,61 %) pacientai. Trims pacientams patologija buvo gerybinė. Segmentinės kolektomijos atliktos 53 % pacientų, tiesiosios žarnos rezekcijos – 45,3 % pacientų, kitos operacijos sudarė 1,7 %. Pakartotinės intervencijos prireikė 10 pacientų (2,11 %). Komplikacijų dažnis buvo 6,55 %, 2 pacientai (0,42 %) mirė.

Išvada

HALS yra saugi ir efektyvi technika, kuri leidžia pasinaudoti visais laparoskopinės kolektomijos privalumais bei minimaliai invaziniu būdu gali būti pritaikyta sudėtingais klinikiniais atvejais.

Reikšminiai žodžiai: laparoskopinė kolektomija, ranka asistuojamoji laparoskopija, gaubtinės žarnos vėžys

Introduction

Laparoscopic colectomy (LC) has demonstrated many short-term clinical benefits comparing to conventional approach for both benign and malignant conditions [1]. Despite its increasing use by practitioners, laparoscopic colorectal surgery remains technically challenging, has steep learning curve, increased operative time and lack of tactile feedback [2–4].

Hand-assisted laparoscopic colectomy addresses these problems while preserving the short-term benefits of laparoscopic colectomy: postoperative pain, morbidity, postoperative length of hospital stay [5–7]. Some surgeons accept HALS as alternative to laparoscopic surgery, others view it as a stepping-stone to mastering laparoscopy [8-9], while others use this technique for more complex cases. Many expert laparoscopists still argue that HALS stagnated the colorectal laparoscopic field, but with advancement of sleeveless hand-assisted devices, that were introduced in 2001, this view can no longer be promoted [10]. There are no differences of short-term outcomes (return of bowel function, tolerance of diet, length of stay, postoperative pain scores) between hand-assisted and laparoscopic colectomy [5]. HALS showed no difference in oncological outcomes comparing to conventional open surgical approach in colonic or rectal cancer [11–13].

This paper aims to update our previously published data and review short-term results of all HALS cases performed in our centre [14].

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 colonic and rectal disease at the National Cancer Institute, Lithuania, from January, 2006 to July, 2016. All consented patients aged 18 years or older with histologically-confirmed invasive cancers or benign lesions of the colon, as well as the upper and the middle rectum, were included in this study. 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. 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 [14]. Complications were classified according to Clavien-Dindo (C-D) classification of surgical complications [15].

Statistics

Data were entered, calculated and analysed in Microsoft Office Excel 2007. We report most analyses as simple descriptive statistics with standard deviation unless otherwise specified.

Results

Patient characteristics

Between January 2006 and July 2016, a total of 473 HALS colorectal resections were performed.

Table 1. Demographics of 473 who underwent hand assisted laparoscopic surgery for benign and malignant colorectal diseases

Variable	Value
Male : Female	240 (50.73%) : 233(49.27%)
Patients age	64.14±9.75 (from 23 to 91) years
Comorbidities (total)	217 (45.87%)
Cardiac	189 (87.09%)
Pulmonary	16 (7.37%)
Diabetes	26 (11.98%)
Renal dysfunction	9 (4.15%)
Other	31 (14.28%)
Postoperative hospital stay	6.92 (from 2 to 34) days

Table 2. Distribution of 473 hand-assisted laparoscopic surgery (HALS) procedures

HALS procedure	n (%)
Anterior rectal resection with partial mesorectal excision	170 (35.94%)
Sigmoid colectomy	164 (34.57%)
Left hemicolectomy	81 (17.02%)
Anterior rectal resections with total mesorectal excision	45 (9.51%)
Right hemicolectomy	6 (1.27%)
Other	8 (1.69)
Total	473

Demographics are summarized in Table 1. Overall, patients were middle-aged (absolute range, 26–91 y). Each sex was equally represented. Almost half of all patients 217 (45.87%) had comorbidities, while cardiac system abnormalities were dominating (87.09%).

Operative and postoperative details

The procedures performed were as follows: absolute majority 465 (98.31%) were segmental resections, abdominoperineal resections four (0.84%), proctocolectomy with ileal pouch – anal anastomosis two (0.42%), one Hartmann's procedure. Five conversions needed because

of technical difficulties. Segmental resections included: 215 (45.45%) low anterior resections, 164 (34.57%) sigmoid colectomies, 81 (17.02%) left colectomies and six (1.27%) right colectomies (Table 2).

Average length of operative time was 104 min ± 44.1 min (30–320 min). The mean length of postoperative hospital stay was 6.92±3.40 days, postoperative hospital length of stay ranged from minimum of 2 days to a maximum of 34 days. Histopathological analysis revealed the average lymph node harvest 16.9±12.1, ranging from 0 to 177.

Stage I, II and III cancer was similar in distribution accounting for 142 (30.03%), 139 (29.38%), 153 (32.35%) respectively and stage IV for 36 (7.61%). There were two patients with benign adenomas of upper rectum and 1 young woman with familial adenomatous polyposis (Table 3).

Table 3. Cancer stages of 467 hand-assisted laparoscopic surgeries for colorectal cancer

Cancer Stage	Number of the patients n (%)
Stage I	142 (30.03%)
Stage II	139 (29.38%)
Stage III	153 (32.35%)
Stage IV	36 (7.61%)
Benign cases	3 (0.63%)

Postoperative complications occurred in 6.55% of patients. Ten patients (2.11%) needed reintervention (C-D > IIIb), mainly because of anastomotic complications and intraabdominal abscesses. Two patients died (C-D V) during 30-day postoperative period: one because of septic pneumonia and other because of pulmonary embolism. Complications are detailed in Table 4.

Discussion

Laparoscopic colectomy has become a standard surgical treatment for colon cancer; short-term benefits, such as decreased postoperative pain, more rapid postoperative recovery, short hospital stay, improved quality of life, and similar oncological results compared with open colectomy have been demonstrated [12, 13, 16]. HALS colectomy has been established alternative to LC for more than 15 years. Many surgical operations, from the simplest to the very complicated, are greatly facilitated by the introduction of the hand into the laparoscopic arena. The addition of tactile feedback to standard laparoscopy has the potential to enhance manipulation of tissues, promote safe blunt dissection and enable atraumatic retraction. HALS has more advantages for more complex procedures, particularly those requiring multiquadrant dissection and removal of larger segment of the bowel [3].

The impact of the number of lymph nodes retrieved after colon cancer surgery on oncological outcomes

Table 4. Postoperative complications.

Postoperative complications	Number	Percent (%)	Clavien-Dindo	Management	Outcome
Intraabdominal abscess	4	0.84	IVa	Laparotomy, washout and loop ileostomy	Recovered
Anastomotic leakage	3	0.63	IVa	Laparotomy and Hartman's procedure	Recovered
Bowel obstruction	3	0.63	II	Conservative	Recovered
Wound dehiscence	1	0.21	IIIb	Suture	Recovered
Postoperative bleeding	2	0.42	IVa	Laparotomy, hemostasis	Recovered
Wound sepsis	4	0.84	I	Conservative	Recovered
Urinary retention	4	0.84	II	Conservative	Recovered
Pulmonary	3	0,63	V	Conservative	2 died
Cardiac	1	0.21	II	Conservative	Recovered
Infection (fever)	1	0.21	I	Conservative	Recovered
Urinary infection	5	1.05	II	Conservative	Recovered

has recently been emphasized. In our group of patients oncological principles have been maintained: number of harvested lymph nodes was similar to the results published by Ringley et al. [17].

The newest reports states, that operating time is of no difference between HALS and LC groups [19]. Our operative time achieved is significantly shorter than previous studies reports [1, 3, 20]. Therefore we strongly comply with the opinion that technical proficiency occurs after approximately 100 cases for HALS [21], which is hardly achievable in rural hospitals and more challenging with LC approach.

HALS should be considered not only as bridge procedure, but as best alternative to LC for complicated cases, when difficult rectal dissection (lower middle part) or colonic mobilization experienced, especially in morbid obese patients with body mass index of 40 or more [6, 22, 23].

We documented four cases of conversion (we defined conversion as lengthening of the incision of that planned at the beginning of procedure) due massive adhesions and one because of bleeding from mesenteric vessels due to non functioning suturing device. With experience gained, general complication rate in our centre is also decreasing [1, 4, 14]. While our length of stay data compare favourably with other reports [1, 6, 24].

There is still arguments against HALS, mainly because of incision length [5, 17] or uncertainty about long-term results such as development of adhesive small bowel obstruction or ventral hernias [25]. However, Taragorna et al. evaluated risk of tumour dissemination by doing a cytological analysis of peritoneal fluid lavage obtained at the beginning and the end of procedure and by evaluating the quality of the resected specimen. They found no differences between the two groups [6].

In conclusion, HALS simplifies difficult intraoperative situation, reduces need of conversion and maintains features of oncological and laparoscopic surgery [26–28]. This technique may provide an effective bridge between purely laparoscopic and traditionally open surgery for patient undergoing colorectal resections.

Conflict of interest. *No potential conflict of interest relevant to this article was reported.*

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