



Original article

Hand assistance is an alternative to conversion to laparotomy during laparoscopic sigmoidectomy

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Introduction: Laparoscopic surgery in the treatment of diverticular disease offers multiple benefits compared with its open surgery counterpart. There are 2 distinct techniques, the laparoscopically assisted and the laparoscopic hand assisted approach. The purpose of this study is to demonstrate that the hand assisted approach can be used if, during a laparoscopically assisted approach, there is difficulty in dissection and/or exposure, and before performing a laparotomy.

Material and methods: This study is a retrospective cohort series that was performed in a private tertiary hospital in Mexico City. Patients with the diagnosis of diverticular disease who underwent a laparoscopically assisted sigmoidectomy were selected. These included patients who, during their procedure required conversion to a hand assisted approach.

Results: A total of 47 sigmoid colectomies began with assisted laparoscopy, of which 33 were completed, 4 required laparotomy, and 10 were completed using hand assistance (none required laparotomy). There were no statistically significant differences in return of bowel function ($P=.879$) and postoperative hospital stay ($P=.679$) between the group that was completed by assisted laparoscopy versus hand assisted.

Conclusions: If there is difficulty in exposure or dissection during a laparoscopically assisted sigmoid colectomy, the hand assisted approach is an alternative before the laparotomy

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La asistencia manual es una alternativa a la conversión a laparotomía durante la sigmoidectomía laparoscópica

R E S U M E N

Introducción: En el tratamiento de la enfermedad diverticular la cirugía laparoscópica tiene diversos beneficios en comparación con la cirugía abierta. Existen 2 tipos de abordajes, el asistido por laparoscopia (LA) y el laparoscópico asistido con la mano (MA). El objetivo de este estudio es demostrar que la cirugía MA puede ser un recurso previo a la conversión a una laparotomía en caso de encontrar dificultades con el abordaje LA.

Palabras clave:

Diverticulosis

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Material y métodos: Se realizó un estudio de cohorte retrospectivo en un hospital privado de tercer nivel en la ciudad de México. Se seleccionó a todo paciente con diagnóstico de enfermedad diverticular en el que se practicó una cirugía LA, incluidos aquellos pacientes en los que hubo dificultad técnica durante el procedimiento y se decidió continuar de manera MA.

Resultados: Se realizaron 47 sigmoidectomías LA, 33 de éstas se completaron de esta manera, 4 requirieron laparotomía y 10 se completaron de manera MA (de éstas ninguna requirió laparotomía). No hubo diferencia estadísticamente significativa entre los grupos laparoscópicos cuando se comparó el retorno de la función intestinal ($p=0,879$) y los días de estancia intrahospitalaria ($p=0,679$).

Conclusiones: La cirugía laparoscópica MA es una alternativa factible si durante una sigmoidectomía LA hay dificultad con la exposición o con la disección y evita la conversión a cirugía abierta

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Introduction

Laparoscopic surgery is an accepted alternative for the treatment of diverticular disease. It consists of 2 types of approach: standard laparoscopic surgery (SLS) and hand-assisted laparoscopic surgery (HALS). The choice of approach depends mainly on the surgeon's experience and his or her familiarity with both methods.

In SLS the entire dissection of the colon is carried out exclusively laparoscopically, and only at the moment of the part being free and ready to be removed is a small incision made in the abdominal wall so as to extract it. Subsequently, provided that there is a contraindication, the surgeon proceeds with re-establishing intestinal continuity.

The benefits offered by SLA compared with traditional surgery are as follows: 1) less postoperative pain; 2) earlier physical mobility; 3) less respiratory complications; 4) quicker recovery of intestinal function; 5) earlier oral intake of food or liquids; 6) more favourable cosmetic result; and 7) shorter postoperative hospital stay.¹⁻⁶ This is all largely attributed to the fact that laparoscopic surgery is less intensive and the systemic inflammatory response is lower.⁷

The difference between HALS and SLS lies in the use of a *hand port* that brings together the traditional ports of the job. This device allows the surgeon to introduce one of his or her hands to the abdominal cavity during the procedure, without a loss of pneumoperitoneum.

There are doubts about whether the benefits observed in SLS also apply to HALS. However, more and more evidence is gathered suggesting that HALS offers patients the same short-term benefits like those observed in SLS,⁸ combined with the fact that HALS entails a decrease in the operative time and the conversion rate to open surgery.⁸

The decrease in the conversion rate obtained with HALS is important, since the surgical procedure of patients being converted to laparotomy entails greater operative times, longer hospital stays and higher postoperative morbidity

and mortality compared with those undergoing laparoscopic surgery.⁹⁻¹¹

HALS serves as a bridge between traditional and complete laparoscopic surgery, and allows surgeons with less experience to carry out a complex procedure with quicker training times. Furthermore, it offers benefits to both novice and experienced laparoscopic surgeons so as to maintain tactile proprioception and feedback.¹²

The purpose of this study is to evaluate whether HALS can function as the next step, prior to laparotomy, in the event of difficulty during exposure or dissection in SLS sigmoidectomy. Moreover, it researches whether the benefits related with minimally invasive surgery are preserved when changing approaches.

Material and methods

A cohort and retrospective study was conducted at a private third-level hospital in Mexico City, which included all patients with a diagnosis of diverticular disease, and who underwent laparoscopic sigmoidectomy (SLS and HALS) in the period from January 2002 to January 2009. Concerning the procedures carried out using HALS, it was established whether initially they were SLS procedures and the reason for the conversion. The following parameters were recorded: age, gender, surgical technique, previous abdominal surgery, conversion to HALS, conversion to laparotomy, operative time, recovery of intestinal function (measured by first flatulence or postoperative bowel movement), days of postoperative hospital stay, and complications.

The surgery that was started as SLS and which, once the procedure had begun, required a small laparotomy to place the hand port was considered to be HALS-converted SLS.

The requirement of blood transfusion or surgical reintervention was considered as major complication.

Table – Comparison of variables between the assisted laparoscopic group and the group that began with assisted laparoscopic surgery and concluded with hand-assisted surgery

	SLS procedure (n=37)	Procedure that was started as SLS and was completed as HALS (n=10)	P
Gender (male:female)	1.64:1	4:1	
Average age, y	55	52	
Average BMI, kg/m ²	26.0	27.5	
Urgent, n (%)	2 (5)	0	
Deferred, n (%)	35 (95)	10 (100)	
Uncomplicated diverticulitis, n (%)	30 (81)	3 (30)	
Hinchey I diverticulitis, n (%)	7 (19)	7 (70)	
Previous abdominal surgery, n (%)	8 (22)	6 (60)	
Conversion to laparotomy n (%)	4 (11)	0	
Operative time, min	180 (86) ^a	123 (35)	0.0496
Recovery of intestinal function, d	1.8 (0.9) ^a	2 (0.8)	0.879
Days of postoperative hospital stay, d	4.5 (1.1) ^a	5.0 (3.6)	0.689

BMI indicates body mass index; HALS, hand-assisted laparoscopic surgery; SLS, standard laparoscopic surgery.

^aPatients requiring conversion to laparotomy were excluded.

Analysis

A descriptive statistical analysis was carried out for both groups and, subsequently, the Student t test was used to compare the quantitative variables of operative time, recovery time for intestinal function and days of postoperative hospital stay. The value of $P < .05$ (95% confidence interval) was considered as statistically significant.

Results

Within the established time period, 47 sigmoidectomies were started as SLS, from which only 33 were completed as SLS. Four required conversion to laparotomy, and in 10 cases the support of a hand port was chosen so as to complete the procedure as HALS. It should be noted that no mention was made in the operative notes of the motive behind the selection of laparotomy over HALS, or vice versa.

The assessment of the group's demographic variables can be found in Table. Furthermore, there is a comparison of the values of operative time, recovery time for intestinal function and days of postoperative hospital stay between the patients who underwent complete SLS and those whose procedure was started as SLS and was completed as HALS.

From the cases that were started as SLS and were converted to laparotomy (n=4), 2 were converted for failure to obtain adequate exposure during the procedure (both with Hinchey I diverticulitis), while 2 were converted due to the presence of adhesions that rendered dissection impossible (both with uncomplicated diverticular disease). The average hospital stay of these patients was 7.2 days.

None of the cases that was started as SLS and were converted to HALS required conversion to laparotomy. In 6 cases, the reason for deciding to change the approach to HALS

during the SLS was due to the discovery of an inflammatory phlegmon, rendering the dissection and identification of structures difficult; while in 3 cases it was due to adhesions that made dissection difficult, and in 1 case the motive for the change in approach was not adequately recorded.

Three major complications (9%) were observed in the patients who completed the surgical procedure as SLS. One patient (3%) presented with anastomosis leak and internal hernia, and 2 patients (6%) presented with secondary intestinal occlusion, resulting in internal hernia. The 3 patients required surgical reintervention.

A major complication occurred in only 1 of the cases (10%) completed with HALS, which was haemorrhage of the upper gastrointestinal tract that required blood transfusion of 2 units of packed red cells.

Discussion

The progress made in laparoscopic surgery has allowed for complex procedures to be increasingly carried out for the patient's benefit. One of the important advances allowing surgeons with less experience to carry out complex procedures is HALS, since it acts as an intermediate point between SLS and laparotomy.

HALS has the same short-term benefits as SLS, although it entails more handling of the abdominal organs and a wider incision.⁸

Our study tried to determine whether HALS can be used as an intermediate step between SLS and laparotomy, without losing the benefits obtained from the minimally invasive approach.

In our group of patients, we observed that 4 of the cases that were started as SLS had to be converted to laparotomy for reasons of difficulty in visualisation, exposure or dissection. In the group where the procedure was started as SLS and it was decided to complete it as HALS, there was no need to convert

to open surgery, despite having difficulties in completing the surgery as SLS. The 2 main reasons for changing the approach from SLS to HALS were adhesions and complicated diverticulitis. It is in these situations where digital perception and manual dissection are of paramount importance—special features conferred by HALS over SLS—that HALS is opted for.

Since this was a retrospective study, it should be noted that the reason conversion to HALS was not attempted in the patients on whom laparotomy was ultimately performed was perhaps because the surgeon decided that the situation would not be resolved in this way, given the difficulty of the operation. We believe it is important to carry out a prospective study in which all patients that start their surgical operation with SLS are offered HALS before carrying out laparotomy, despite the difficulty of the dissection or exposure.

An interesting fact is that the group of patients in whom a hand port was placed had a significantly shorter operative time (an average of 57 min) compared with the patients who completed the procedure as SLS. Moreover, our finding agrees to some extent (given that our HALS procedures were mixed, unlike what is reported) with what is observed in the medical literature worldwide to be one of the benefits of HALS.^{12,13} The decrease in operative time could support a favourable patient progress, particularly for patients with acute inflammatory attack. This is due to the association observed between the prolongation of operative times and hypothermia (with longer periods of pneumoperitoneum),¹⁴ as well as prolonged intubation and the highest rate of pulmonary complications.¹⁵

When comparing the postoperative variables of the start of intestinal function and the days of postoperative hospital stay, we found that there was no significant difference between the group that completed the procedure as SLS and those who began it as SLS but completed it as HALS. This is extremely important since one of the perceived benefits about carrying out the conversion from SLS to HALS, instead of laparotomy, is that patients have a quick recovery. We observed that hospital stay was shorter in these 2 groups compared with the patients who began their procedure as SLS and finished up with laparotomy, and whose average postoperative hospital stay was 7.2 days.

Concerning complications (group SLS and HALS), the rate observed was similar to what is reported in the medical literature.^{12,16,17} Two of the main indicators to evaluate the result of colorectal surgery are the anastomosis leak and the surgical reintervention. In the SLS cases, there was 3% anastomosis leak and 9% reintervention, percentages that are within the limits of the medical literature worldwide (the anastomosis leak ranges between 1.5% and 5.7% and the surgical reintervention between 2.4% and 11%)^{9,12,16-20} In the HALS group there was no anastomosis leak or reintervention; however, it should be noted that our sample is small and the occurrence of these complications is expected as there are more cases with this approach.

There is little information available concerning a small number of patients for whom there are documented results on the use of HALS in difficult SLS procedures. However, similar to our findings, others have observed that this strategy brings good results.²¹

To conclude, from the data obtained it is evident that HALS can serve as an intermediate step between SLS sigmoidectomy and laparotomy. This gives the surgeon the opportunity to complete more complex cases that were started as SLS, without having to carry out laparotomy, thus retaining the benefits associated with minimally invasive techniques.

Conflicts of interest

The authors affirm that they have no conflicts of interest.

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