

Learning curve in laparoscopic hernioplasty in a University Center in Uruguay

Abstract

The implementation of laparoscopic inguinal hernioplasty requires the application of a safe and feasible teaching program within the framework of an experienced staff. Training, anatomical knowledge and systematization are fundamental pillars in the learning curve. Laparoscopic resolution of hernial pathology is considered one of the most complex procedures to teach. The standardization of the surgical technique allows to achieve shorter learning curves, bearing in mind that it is longer in the laparoscopic approach than in the classic open approach.

Objectives: To evaluate through surgical time, the evolution in the learning curve for laparoscopic hernioplasty in a university center.

Methodology: An observational, retrospective, descriptive, retrospective study was carried out, based on the analysis of medical records of patients who underwent laparoscopic hernias at the Hospital de Clínicas, between March 2021 and March 2024.

Results: Of the total number of patients collected, 87 met the established criteria. The N for group A was 40, while the N for group B was 47. The average surgical procedure time for group A was 130 minutes, while for group B it was 85 minutes, showing a P-value of 0.0002. An average time reduction of 34.5% (45 min) was observed.

Conclusion: Although there is no consensus on the surgical times and the number of procedures necessary to complete a learning curve in laparoscopic inguinal hernia surgery, we have been able to evaluate it in our hospital. The creation of the wall unit had a positive impact, generating a decrease in surgical times.

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Ramirez L,¹ Guarneri C,¹ Parada U,¹ Girardi F,² Viera J,² Cazabán L³¹Surgical Clinic Assistant to Prof. Dr. L. Cazabán, Hospital de Clínicas, School of Medicine, University of the Republic, Montevideo, Uruguay²Clinical Surgical Resident A Prof. Dr. L. Cazaban, Hospital de Clínicas, School of Medicine, Universidad de la República, Uruguay³Prof. Director of Surgical Clinics A Prof. Dr. L. Cazabán, Hospital de Clínicas, School of Medicine, University of the Republic, Uruguay**Correspondence:** Luciano Ramirez, Surgical Clinic Assistant A, Hospital de Clínicas, Montevideo Uruguay, Abdominal Wall Unit, Hospital de Clínicas, Uruguay, Email luciano2000@hotmail.com**Received:** May 12, 2024 | **Published:** June 03, 2024

Introduction

The implementation of laparoscopic inguinal hernioplasty requires the application of a safe and feasible teaching program within the framework of an experienced staff. Training, anatomical knowledge and systematization are fundamental pillars in the learning curve.

Laparoscopic resolution of hernial pathology is considered one of the most complex procedures to teach. The standardization of the surgical technique allows to achieve shorter learning curves, bearing in mind that the same is longer in the laparoscopic approach than in the classic open approach. We refer to the learning curve as the time or procedures necessary for a surgeon to master a technique. The number of procedures necessary to perfect laparoscopic inguinal hernia is not defined, or there is controversy on the number of procedures necessary to perfect laparoscopic inguinal hernia.

The International Endohernia Association (IEHS) guidelines do not clearly state how many TAPP procedures should be performed. According to the Guide for Laparoscopic Treatment of Ventral and Incisional Hernia of the Hispanic American Hernia Society, the learning curve in terms of time for laparoscopic HV operation is 50 cases (level 1B).¹

Objectives

To evaluate through surgical time, the evolution in the learning curve for laparoscopic hernioplasty in a university center.

Methodology

An observational, retrospective, descriptive, retrospective study was carried out based on the analysis of medical records of patients

who underwent laparoscopic hernias at the Hospital de Clínicas between March 2021 and March 2024. The data were obtained from the single electronic registry of patients operated at the Hospital de Clínicas during that period.

Inclusion and exclusion criteria were established. Inclusion criteria:

- Uni or bilateral inguinal hernias
 - Emergency surgery (patient consulting in the emergency room for symptomatic hernia) or coordination surgery.
 - Over 18 years old
 - Patients with no major comorbidities (ASA 1 and 2)
 - TAPP or TEP technique
- Exclusion criteria:
- Patients with hernias complicated with ischemia, perforation or abscessation.
 - Procedures requiring conversion
 - Those that were not the only procedure performed

All procedures were performed in the context of a University Hospital, which implies that at least one of the members of the surgical team is part of the teaching staff with experience in abdominal wall surgery.

In all cases the same materials were used for the repair: polypropylene mesh should ideally be 15 by 12 cm, they can contract up to 30% once the integration process is completed, any smaller size may be insufficient and cause recurrence, resorbable thread suture in 2-0 gauge, mesh fixation with tackers, laparoscopic material (Figure 1).

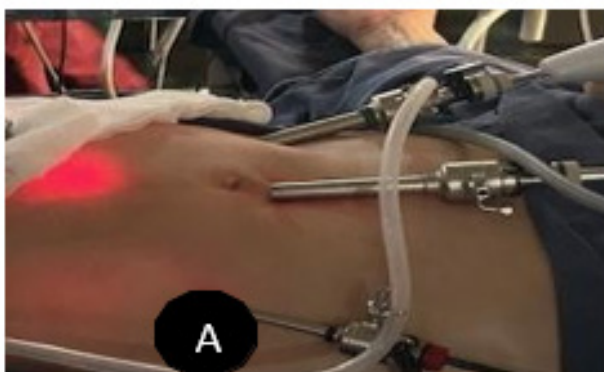


Figure 1 Placement of trocars in right inguinal hernia 10mm supraumbilical trocar, 2 trocars of 5mm in flanks.

Standard TAPP technique is performed, supraumbilical incision is made, closed pneumoperitoneum is performed with Veress needle at a pressure of 14 or 15 mmHg, placement of 10 mm trocar with optical fiber, the rest of the trocars are placed on each side, on the mid-clavicular line, depending on the patient's biotype.

Initially we perform exploration of the abdominal cavity, peritoneal incision should pass at least 3 cm above the upper edge of the deep inguinal orifice and following a somewhat curved line, which runs from the anterior superior iliac spine, to the umbilical ligament in the medial sector.

Zone 1: lateral dissection, extending superiorly to a plane slightly above the anterior superior iliac spine, inferiorly the limit is the exposure of the psoas muscle.

Zone 2: medial dissection, seeking to expose the pubic tubercle and Cooper's ligament.

Zone 3: the most technically demanding zone in which the dissection of the hernial sac is performed. During this step the peritoneum must be mobilized medially and laterally to facilitate the identification and separation of the peritoneum from the noble elements of the cord.

Mesh placement is microporous (heavy) polypropylene mesh (ideally size 15 by 12 cm). The mesh is fixed, we use tackers of resorbable material, placing two on the cooper ligament, one on the posterior face of the rectus abdominis muscle and another lateral to the epigastric vessels. The closure of the peritoneal flap must be continuous 2-0 caliber resorbable thread (Figure 2).

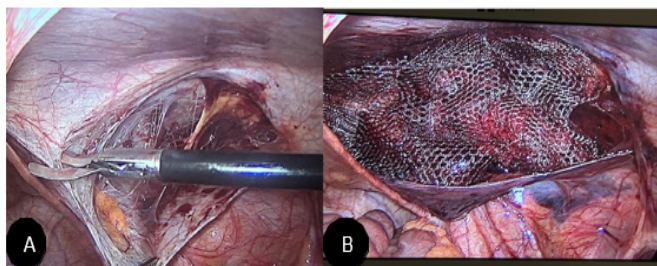


Figure 2 Peritoneal flap placement. B: Placement of polypropylene mesh.

Data were collected on established variables of interest: age, sex, surgical time, reintervention. Two groups were formed, differentiated by date of performance. Group A (procedures performed between March 2021 and September 2022) and group B (procedures performed between September 2022 and March 2024).

Statistical analysis

The data collected from the medical records provided by the Department of Medical Records of the Hospital de Clínicas were stored and analyzed with EpiInfo v7 software.

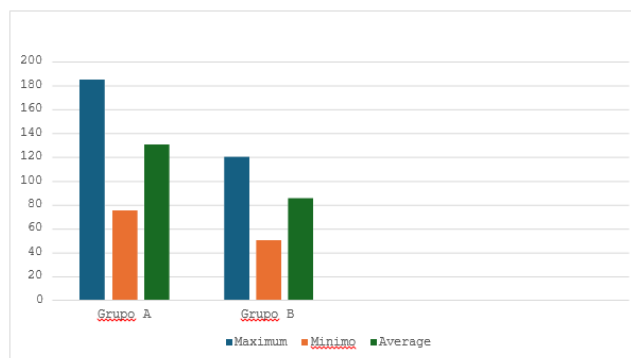
Continuous variables (surgical times) were described as means. To study whether they showed statistically significant differences, nonparametric tests (Mann-Whitney U Test) were used. A $p < 0.05$ was considered statistically significant.

Results

Of the total number of patients collected, 87 met the established criteria. The N for group A was 40, while the N for group B was 47.

Eighty-five percent of the patients were male, while the remaining 15% were female.

The average age was 48.9 years, with a minimum of 20 and a maximum of 75 years. The average surgical procedure time for group A was 130 minutes, while for group B it was 85 minutes (Figure 1), showing a P-value of 0.0002. An average time reduction of 34.5% (45 min) was observed. No reinterventions were recorded Graph 1.



Graph 1 Surgical Time by Group.

Discussion

The learning curve in laparoscopic inguinal hernioplasty is evaluated mainly through the analysis of three variables: reduction of surgical time, decrease of complications and percentage of recurrences. In Bracale U et al, they propose the need for 60 to 65 procedures to reach the level of expert surgeon.² On the other hand, the International Endohernia Association (IEHS) guidelines do not state how many TAPP procedures should be performed in surgical training, but different publications describe a wide range that extends from 13 to 80 operations.

Basanal et al. clearly define in their experience, that after 13 to 15 procedures, there are no statistically significant differences in terms of surgical times or complications, compared to an expert surgeon.³ Certainly the center effect and the formation of units have a positive impact not only on the training of the resident but also on the results obtained. Generating shorter waiting times, shorter surgical times with the lowest possible morbi-mortality rate.

In our environment there are several university centers within which Wall Units have recently been formed. Our hospital is the only university hospital that depends directly on the Faculty of Medicine, being a reference center for the population with the most complex pathology in the country. It also focuses on training excellence with state-of-the-art technology, which led to the creation of different care units that allow grouping pathologies achieving better results.

Concomitantly, emphasis was placed on the attendance of residents to workshops in the laparoscopy laboratory, increasing their skills and surgical performance.

At the Hospital de Clínicas, the Wall Unit was created a little less than two years ago, with specialized staff and the support of referents from abroad as a guide for its creation and teaching enrichment. For this reason, for the present study we evaluated the results in surgical time two years prior to the creation of the unit versus the last two years. This allowed us to demonstrate a statistically significant difference in the duration of the procedure with a p of 0.0002, which translates into a 34.5% reduction.

If we evaluate the results of nearby international registries, Orrego et al. report an average time reduction of 25.4% (19.4 min) in unilateral hernioplasties and 28.5% (33.6 min) in bilateral hernioplasties. The number of procedures necessary to demonstrate the reduction in surgical time was 78 cases. The present study shows a 34.5% decrease in surgical time after performing 40 procedures.⁴

One of the limitations of the present study is that the presence of complications was not evaluated, although we know that there were no reoperations. It would therefore be desirable to generate a second study that would allow a comprehensive evaluation, not only of the learning curve but also of the results of the unit.

Conclusions

Although there is no consensus on the surgical times and the number of procedures necessary to complete a learning curve in

laparoscopic inguinal hernia surgery, we have been able to evaluate it in our hospital.

The creation of the wall unit had a positive impact, generating a decrease in surgical times.

Acknowledgments

None.

Conflicts of interest

The authors declare no conflicts of interest.

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