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Treatment of inguinal hernias in girls with laparoscopic Burnia technique versus open surgery

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Abstract

Introduction: At present, the debate is expanding on which technique would be better, comparing open surgery with the laparoscopic technique and the future cosmetic interest in female patients who require surgery, so the objective of the present study was to describe girls with inguinal hernia undergoing laparoscopic correction techniques (Burnia technique) versus conventional surgery for inguinal hernias.

Methods: The present observational study was carried out at the Dr. Roberto Gilbert Elizalde Children's Hospital, in Guayaquil, Ecuador, from January 2021 to February 2022. With a non-probabilistic sample, girls undergoing surgical treatment entered the study for inguinal hernia. Age, surgical technique, hospital stay, surgical time, and operative complications were recorded. Bivariate analysis is performed comparing the surgical techniques: open versus laparoscopic. Proportions are compared with Chi-square and means with Mann-Whitney U.

Results: 89 patients were included in the study, 76 cases by open technique (AT) and 13 cases by Burnia technique (TB). The average age was 3.8 years, 5.05 days of hospitalization in unilateral TA and 2.3 days in unilateral TB (P=0.03), 7.2 days of hospitalization in bilateral TA, and 2.25 days in bilateral TB (P=0.026). Surgical time was 46.9 minutes in unilateral TA and 40.38 minutes in unilateral BT (P=0.232). Operative time of 64.7 min in bilateral TA and 42.5 min in bilateral TB (P=0.038). Complications 2 cases (2.6%) in TA and 1 case (7.7%) in TB (P=0.35).

Conclusions: Using the laparoscopic technique decreased hospital stay times and surgical time when it is bilateral. From the aesthetic point of view, the scars were less visible in the minimally invasive surgical treatment.

Keywords:

MESH: Hernia, Inguinal; Women; Herniorrhaphy; Laparoscopy.

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Introduction

Inguinal hernias of congenital origin are very common in children; as a health problem in general, the risk of hernia incarceration and strangulation are causes that lead to the preference for surgical resolution at the time of diagnosis [1]. Its incidence in "term" newborns is 3-5% and reaches up to 13% in the case of "preterm" [2 - 3].

The risk factors associated with this pathology are prematurity, male sex, ascites, mechanical ventilation, peritoneal dialysis, and increased intraabdominal pressure due to ventriculoperitoneal shunts [4 - 6].

Currently, opinions remain controversial about the benefits of laparoscopic repair versus open surgery for the treatment of inguinal hernias, which is why it is necessary to increase the number of studies that compare both techniques, including Ecuador, a country in which no articles have been published that compare both techniques in children.

The objective of this article is to compare the laparoscopic Burnia technique and open surgery for the treatment of inguinal hernias in girls.

Population and methods

Design of the investigation

This was a retrospective observational study.

Scenery

The study was conducted at the Dr. Roberto Gilbert Elizalde Children's Hospital of the Benevolent Board of Guayaquil, Ecuador. The study period was from January 1, 2021, to February 28, 2022.

Inclusion criteria

Pediatric female patients under 18 years of age undergoing open or laparoscopic surgery (burnia) in treatment for inguinal hernia were enrolled in the study. Participants with incomplete records were excluded from the analysis.

Studio size

The population was made up of patients admitted to the hospitalization of the institution. The sample calculation was nonprobabilistic for convenience and census type, in which all possible cases that can be analyzed are included.

Variables

The variables were age, description of the laterality of the inguinal hernia, surgical technique, hospital stay, surgical time, and operative complications.

Data sources/measurement

The data were collected from the clinical history in a form designed exclusively for that purpose. The institutional electronic system was used for case investigation. The following root codes of the ICD-10 international classification related to inguinal hernias were used: K46.0, K46.1, K40.9, K40.2, K40.0, K40.1, K40.3, and K40.4. The database was coded with serial numbers, thus protecting the confidentiality of the information and identity of the patients.

Surgical procedure

In the operative procedure using the Burnia technique, it is performed in the operating room, placing the patient in the supine position, under general anesthesia, using laparoscopic materials such as a 3.5 mm and 5.3 mm 30° lens, as well as laparoscopic forceps and monopolar energy. After asepsis and antisepsis, a 0.5 cm umbilical incision is made, using the Hasson technique. A disposable 5 mm trocar is introduced for the introduction of the laparoscopic vision lens, pneumoperitoneum is produced with CO_2; with pressures that vary according to the age of the patient but that oscillate between 10 and 12 mmHg; panning of the abdominal cavity and inguinal region is carried out, managing to identify the affected side of the hernia as well as assessing the contralateral side. Next, a second 0.5 cm incision is made on the right flank for a second 3 mm trocar, where a work clamp with a 3 mm monopolar connector is inserted, and the peritoneum-vaginal duct of the affected inguinal canal is identified. Without content and with the Babcock work forceps, the hernial sac is pulled away from the peritoneal wall. With the use of monopolar energy, the electrofulguration of the same is proceeded until the obliteration of the peritoneum-vaginal duct is observed. Once the procedure is carried out, the pneumoperitoneum is evacuated, the trocars are removed under direct vision, and finally, the procedure is performed. Closure of planes with absorbable monofilament suture. In the case of open surgery, the Ferguson technique was performed for preschoolers or older girls, and the Mitchell-Banks technique was performed for infants.

Statistical method

The data analysis is univariate and descriptive for age, laterality, and surgical technique. Bivariate analysis was performed comparing the open versus laparoscopic surgical techniques. Proportions are compared with Chi-square and means with Mann-Whitney U; differences are considered when the P value is < 0.05. The statistical package SPSS v.25 (Armonk, NY: IBM Corp.) was used for the analysis.

Results

Eighty-nine patients were analyzed, 13 of whom were operated on with the Burnia technique and 76 of whom were operated on by open surgery.

General characteristics of the study sample

Table 1 shows the general results regarding the age group, laterality, and surgical technique, where it is highlighted that 59.6% of them are between one and five years old, 40.4% have a hernia in the left area, and 85.4% used open surgery.

Table 1. Descriptive analysis of age group, laterality, and surgical technique.

	Frequency N = 89	Percentage	Accumulated percentage
Age group			
< 1 year	14	15.7%	15.7%
1 to 5 years	53	59.6%	75.3%
6 to 10 years	22	24.7%	100%
Laterality			
Right	33	37.1%	37.1%
Left	36	40.4%	77.5%
Bilateral	20	22.5%	100%
Surgical technique			
open	76	85.4%	85.4%
laparoscopic	13	14.6%	100%

In patients who showed bilateral hernias, Table 2 highlights the results of hospital stay and surgical time concerning the technique performed; again, the averages observed in the laparoscopic Burnia technique were lower in both items, with elements very positive to take into account in the comparative analysis.

In addition, good evolution was observed in all the patients operated on by open surgery or the laparoscopic technique (Table 2 Complications according to the surgical technique). However, in the case of the former, two patients were seen with some difficulty (one with cellulitis and another with rupture of the hernial sac), and in the latter, only one case of isolated burn in the skin of the umbilical port due to the use of metallic trocars was shown to be inconvenient.

Table 2 shows the results of the surgical technique performed concerning laterality; in this aspect, a more significant number of hernias can be seen in the left area, with 36 cases (40.4%), followed by 33 patients (37.1%) affected in the right area and 20 girls (22.5%) with bilateral hernias. When comparing the results of the hospital stay and the surgical time according to the technique performed, it is specified in table 3 that as a general average, the lowest values corresponded to the patients operated by laparoscopy with values of 2.31 hours of stay and 40.38 minutes of operation, respectively, and in that exact order, they took 5.05 hours in the institution and 46 minutes the time of the operation.

Table 2. Operative variables in the study groups.

Variable	Open n=76	Laparoscopic n=13	*P*
Laterality			
Right	26 (34.2%)	7 (53.8%)	
Left	34 (44.7%)	2 (15.4%)	0.1363
Bilateral	16 (21.1%)	4 (30.8)	
Hospital stay			
Days/hospitalization	5.05	2.31	0.030
Surgical time			
Operative minutes	46.91	40.38	0.232
Hospital stay in bilateral hernias			
Days/hospitalization	7.19	2.25	0.026
Surgical time with bilateral hernias			
operative minutes	64.69	42.50	0.038
Evolution			
Without complications	74 (97.4%)	12 (92.3%)	0.35
Complication	2 (2.6%)*	1 (7.7%)* *	

* Complications: cellulitis, hernial sac rupture. **complications: Burn.

Discussion

As stated in the scientific literature, in general, inguinal hernia children suffer from an indirect permeable process since the hernial sac crosses the inguinal canal

[8 - 9]. Inguinal hernia repair stands out for being one of the most frequent procedures performed in pediatric surgery; currently, the debate is expanding on which technique would be better between open surgery and laparoscopic surgery [7].

In this sense, both technical variations continue to be performed. Currently, the efficacy of the laparoscopic approach can be demonstrated where one of the main advantages is the aesthetic issue, the expeditious recovery, and the excellent visualization of the inguinal canal. It is highlighted that in the last decade of the present century, repair using the Burnia technique has become a well-established technique for the surgical treatment of inguinal hernias in girls, not only because of the aesthetic result, where it surpasses the technique open but also due to the recovery, the postoperative result and the advantage of the possibility of revising the contralateral inguinal canal, which are elements that tip the balance in favor of this technique. However, it is fair to state that a long learning curve is necessary for achieving smooth operations [10-11].

In the absence of vulnerable elements such as in the inguinal canal of the male gender (deferent ducts and testicular vessels), it is very safe to carry out this operation; the electrofulguration of the hernia sac in women, specifically in girls, several studies have been published that recommend it, increasing other techniques in the repair of inguinal hernias usable for the application of the laparoscope, having as examples inversion ligation and percutaneous ligation [12].

Regarding the results by age group, our work coincides with that carried out by Han et al. (2019), who found a higher number of inguinal hernia repairs in 5-year-old children [13]. Ho et al. (2018) observed in their comparative study between laparoscopic repair and open surgery that the most frequently obtained diagnosis was a bilateral inguinal hernia. In addition, a good juncture for intraoperative inspection of the contralateral groin has been reported as a benefit of laparoscopic repair [14].

Regarding the conventional inguinal hernia repair technique, fewer variants have been described, and the results differ significantly. On the other hand, when observing the anatomy of the inguinal sac in girls, the noninclusion of vital structures such as gonadal vessels and vas deferens stands out as an advantage, which is why in the studies that the Burnia technique has experimented with the proposal of the electrofulguration of the hernia sac without sutures burned by monopolar heat, the short operation time and the nonrecurrence in the medium term have been demonstrated as a positive aspect [9].

The indicators of hospital stay and surgical time favored the laparoscopic technique; however, in the work of Nakashima et al. (2019), it was stated that there was no difference in the length of hospital stay, and the incidence of recurrence was not significantly different between the two surgical techniques [15].

As authors of this research, it is essential to support the outstanding character that has been given to the use of the laparoscopic technique in the pathology of the inguinal canal, although it is worth noting when comparing it with conventional (open) surgeries that it is used in less than 20% of inguinal herniorrhaphies and highlight the importance of the time dedicated to learning, however, according to González (2020), who recommends in those cases that good practice and the necessary resources are available since the recovery achieved in patients is faster. The risk of chronic pain is reduced [16-17].

Being faced with a disease with a wide incidence is fair and coincides with the point of Shehata et al. (2018), who conclude that no single laparoscopic technique is adequate for all inguinal hernias. However, the successes achieved with open repair can be achieved laparoscopically, and for this, professionals must adapt according to each team's criteria, experiences, and resources [17].

The limitations of the present study are that the investigation is limited to the fact that it is a retrospective work. It is also to recognize the presence of a small number of cases of patients operated on for laparoscopic Burnia, but being the first study, it is considered very important to carry out prospective, multicenter studies with a more significant number of patients.

Conclusions

The laparoscopic Burnia technique proved safe; it also allows additional advantages, such as exploration of the contralateral side, reduction of operative time when the hernia is bilateral, and hospital stay.

Abbreviations
ICD-10: International Classification of Diseases.

Supplementary information
Supplementary materials are not declared.

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Author contributions
Randy Mendoza-Vera: Conceptualization, Data Curation, Fundraising, Research, Resources, Software, Writing - original draft.
Karen Serrano-Concha: conceptualization, data retention, supervision, fundraising, research, resources, writing: proofreading and editing.
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Jorge Oliveros-Rivero: conceptualization, data retention, supervision, supervision, methodology.
All authors read and approved the final version of the manuscript.

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Availability of data and materials
The data sets generated and analyzed during the current study are not publicly available due to participant confidentiality but are available through the corresponding author upon reasonable academic request.

Statements
Ethics committee approval and consent to participate
It was not needed.

Publication consent
It does not apply to studies that do not publish MRI/CT/Rx images or physical examination photographs.

Conflicts of interest
The authors declare no conflicts of interest.

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