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OUTCOME OF LAPAROSCOPIC PERCUTANEOUS EXTRA PERITONEAL CLOSURE VERSUS OPEN REPAIR FOR PAEDIATRIC INGUINAL HERNIA

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Abstract

Background: Laparoscopic inguinal hernia repair (LIHR) has many benefits like less frequency of metachronous contralateral hernias, minimum complications, comparatively less duration of operation and better cosmetic outcome as compared to the open technique. Objective of the study was to compare the outcome of laparoscopic percutaneous extra-peritoneal closure (LPEC) and open repair for paediatric inguinal hernia in terms of contralateral metachronous hernia, operative time and recurrence. **Methods:** A randomized controlled trial was conducted at the Department of Paediatric Surgery, Children Hospital Lahore. Non-probability purposive sampling was used, and 296 cases were divided into group-1(managed with conventional open repair) and group-2 (managed with laparoscopic Percutaneous Extra-peritoneal closure). After taking informed consent, data was collected, and cases were studied for operative time, contralateral metachronous hernia and recurrence till 6 months postoperatively. Data analysis was done through SPSS 22.0. Chi-square and independent sample t-test was used for comparison. *p*-value ≤0.05 was taken as significant. **Results:** The mean operative time was statistically less in the LPEC group (24.79±3.44 minutes) when compared to the open repair group (28.71±4.54 minutes), *p*-value <0.001. In the Open repair group, there were 19 (12.8%) cases that had contralateral metachronous hernia, while in the LEPC group, 2 (1.4%) cases had contralateral

metachronous hernia *p*-value <0.001. In the Open repair group, 4(2.7%) cases had a recurrence, while in LPEC group 1 (0.7%) cases had a recurrence, with statistically same recurrence rate, *p*-value >0.05. **Conclusion:** The LPEC technique is better than conventional open repair in terms of CMIH, operative time, and recurrence rate.

Keywords: Inguinal Hernia; Laparoscopic Percutaneous Extra Peritoneal Closure; Open Repair; Contralateral Metachronous Inguinal Hernia

INTRODUCTION

The hernia is a very old ailment, as old as man himself.[1] Inguinal hernias are frequently seen in children presenting in outpatient office to a paediatric specialist, and inguinal hernia repair (IHR) is the most often performed medical procedure among paediatric medical procedures.[2] Male youngsters are more prone to develop an inguinal hernia, while the male to female proportion is 3:1 and 10:1.[3] Around 60% of inguinal hernias are on the right side brought about by right testis later drop and delayed obliteration of the processes vaginalis. About 25% of cases have it on the left side, while the remaining 15% had both sided inguinal hernia.[4]

Inguinal hernia won't improve all at once.[5] Early medical procedure is typically encouraged to prevent confinement chances concerning bowel, just as other concerns. It was accounted that around 90% of complications are prevented when the repair is performed during the initial months of finding. Plenty of specialists has prescribed hernia repair following analysis.[5]

Beforehand, the traditional strategy for open repair by performing herniotomy has been the most regularly accomplished treatment. However, it has a potential hazard about vas deferens and trauma to the spermatic cord, hematoma, wound infections, testicular atrophy, recurrence of hernia and iatrogenic cryptorchidism.[6,7]

In the course of the most recent couple of decades, the overwhelmingly expanding enthusiasm towards minimally invasive medical procedures worldwide has prompted the development and improvement in laparoscopic strategies used regarding IHR. The significant point of the laparoscopic strategy is the thought of a streamlined and safe procedure, with fewer paces of recurrence and the better restorative result was a significant

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concern.[8] Slow adjustments have been made by numerous paediatric specialists everywhere throughout the world. Major work has been done on the LPEC of the interior inguinal ring (IIR). In 2013, an investigation clarified that LPEC for inguinal hernia of kids is a basic technique wherein a purse-string stitch composed of non-absorbable material is set extra-peritoneally around the hernial hole through a specific sew up needle.[9] The laparoscopic IHR also aids in better inguinal region imagining in this way,

$$n = \frac{\left\{ z_{1-\alpha}\sqrt{2\bar{P}(1-\bar{P})} + z_{1-\beta}\sqrt{P_1(1-P_1)+P_2(1-P_2)} \right\}^2}{(P_1-P_2)^2}$$

permitting CPPV identification that can be shut at the same time since its existence could cause MCIH (metachronous contralateral inguinal hernia) development.[7]

There is a lot of delay in picking the laparoscopic approach as an option for available methods. This fear depends just because no credible investigation has been done as far in our local setup, which was substantial enough to survey and think about the two methodologies without a predisposition, which gives the fundamental reason for this research. This study was designed to compare the outcome of laparoscopic percutaneous extra-peritoneal closure (LPEC) and open repair for paediatric inguinal hernia in terms of contralateral metachronous hernia, operative time and recurrence and is the 1st authentic research to be led from our institution concerning this comparison, particularly in paediatric age gathering.

MATERIAL AND METHODS

A Randomized controlled trial was conducted at the Department of Paediatric Surgery, Children Hospital Lahore, for a period of one year, from July 2019 to July 2020, after taking ethical approval from the ethical committee of University of Lahore, ERC# UHS/Educational/125-19/2477. Non-probability purposive sampling was used. The sample size was calculated applying the following formula taking 95% confidence interval.[10]

A total of 296 cases were recruited and divided into two groups (148 cases in each group) randomly using computer software. All patients aged 1 year and above to 12 years of both genders diagnosed with an inguinal hernia on clinical examination were included. Complicated hernia (obstructed or strangulated hernia) assessed on clinical examination (extreme pain, vomiting, intestinal obstruction), recurrent hernia assessed on their medical record and Patients with multiple congenital anomalies or syndromes were excluded. After taking informed consent, data was collected from the Department of Paediatric Surgery Children Hospital Lahore. In group-1, patients were

managed with conventional open repair, and in group-2, patients were managed with LPEC. A consultant surgeon operated on all patients. All cases were studied for operative time, contralateral metachronous hernia and recurrence till the 6th month postoperatively. Statistical analysis was performed in IBM SPSS version 22.0by entering all the data. The data was represented as frequency distribution and mean ± S.D. Chi-square test and independent-sample t-test were used for comparison, and *P-value* ≤0.05 was taken as significant. **Operative time:** It will be calculated in minutes from induction of anaesthesia to wound closure.

Contralateral metachronous hernia: It is defined as the development of hernia on the opposite side of the previously operated inguinal hernia side.

Recurrence: It is defined as the reoccurrence of the bulge at or near the site of a previously repaired hernia with loops of the intestine seen in the bulge on ultrasound.

RESULTS

The mean age of cases in the open and LPEC group was 4.96±3.13 years and 4.58±2.97 years respectively, with minimum and maximum age in the open group as 1 and 15 years while the minimum and maximum age in the LPEC group as 1 and 13 years. In the open repair group, there were 133 (89.9%) male and 15 (10.1%) female cases, while in the LPEC group, there were 133 (89.9%) male and 15 (10.1%) female cases.

The gender distribution was statistically the same in both groups, *p*-value >0.05. The mean operative time in the open group was 28.71±4.54 minutes, while the mean operative time in the LPEC group was 24.79±3.44 minutes (Table-1). The mean operative time was statistically less in the LPEC group when compared to the open repair group, *p*-value <0.001. In the Open repair group, there were 19 (12.8%) cases that had contralateral metachronous hernia, while in the LEPC group, 2 (1.4%) cases had contralateral metachronous hernia with a statistically higher contralateral metachronous hernia in the open repair group, *p*-value <0.001 (Table-2). In the Open repair group, 4 (2.7%) cases had a recurrence, while in LPEC group 1 (0.7%) cases had a recurrence, with statistically same recurrence rate, *p*-value >0.05 (Table-3).

Table-1: Comparison of operative time (minutes) in both study groups

Study groups	**Operative time (minutes)**				***p*-value**
	Mean	SD	Minimum	Maximum	
Open Repair (n=148)	28.71	4.54	15	40	<0.001
LPEC (n=148)	24.79	3.44	17	34	
Total (n=296)	26.75	4.47	15	40	

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Table-2: Comparison of contralateral metachronous hernia in both study

		Study Group		Total
		Open Repair	LPEC	
Contralateral metach-ronous hernia	Yes	19 (12.8%)	2 (1.4%)	21 (7.1%)
	No	129 (87.2%)	146 (98.6%)	275 (92.9%)
Total		148 (100.0%)	148 (100.0%)	296 (100.0%)

Table-3: Comparison of recurrence in both study groups

		Study Group		Total
		Open Repair	LPEC	
Recurrence	Yes	4 (2.7%)	1 (0.7%)	5 (1.7%)
	No	144 (97.3%)	147 (99.3%)	291 (98.3%)
Total		148 (100.0%)	148 (100.0%)	296 (100.0%)

DISCUSSION

In 2004, Becmeur and colleagues, as observed by Ostlie and Ponsky, depicted the laparoscopic division and hernia sac resection at the internal ring level with resulting closure of the peritoneal edges.[11] The proposed benefits of the laparoscopic procedure are contralateral abnormality visualization, reduced postoperative pain, improved restorative outcomes, and progressively quick recovery. Disagreement remains, notwithstanding, with respect to a potential enhancement in the duration of operation, costs, indications, contraindications and complications.[6]

The study uncovered that in COR gathering, the mean age of the cases was 4.96±3.13 years, while in LPEC gathering, the mean age of the cases was
4.58±2.97 years. An investigation attempted by Sharifuzzaman showed that in COR gathering, 33.3% of patients were up to 5 years of age, and the mean age of the cases was 6.93±2.92 years in the LPEC group, the mean age of the cases was 8.42±3.07 years.[3] The findings of a study carried out by Elekiabi and co-workers exhibited different scenarios who reported that mean age in the COR group was
15.14±4.92 months and in the LPEC group was 20.58±3.52 months.[12]

Undoubtedly, the study featured that in the two gatherings (COR and LPEC), a large portion of the patients (89.9% in each gathering) were males. The outcome of our investigation is practically similar to an examination directed by Zenitani and partners, who declared that the dominant part (63.3%) of patients were males.[13] Sharifuzzaman and associates likewise revealed in their investigation that in the two gatherings large part of the patients were males.[3]

It is imperative to refer to that in LPEC

gathering, 95.9% cases had a duration of operation

<30 min (mean duration of operation 24.79±3.44) while in COR gathering, 64.2% of patients had a duration of operation <30 minutes (mean duration of operation 28.71±4.54). An investigation performed by Louati and accomplices displayed a distinctive situation that in LPEC bunches mean duration of operation was 26 minutes, while in COR bunch mean duration of operation was 25 minutes.[14] Similarly, another investigation done by Acharya and colleagues affirmed that in LPEC bunches mean duration of operation was 35 minutes and in COR bunch mean duration of operation was 20 minutes.[15] It was noticed during the study that in COR gathering, the contralateral metachronous inguinal hernia was pervasive among 12.8% of patients, yet in the LPEC bunch, just 1.4% of patients had CMIH. The outcome of our examination is equivalent to an investigation completed by Saka and partners, who announced that in COR gathering, CMIH was pervasive in 2.2% of patients while in the LPEC bunch, none of the patients had CMIH.[16] Another investigation attempted by Miyake *et al*. likewise affirmed that 6.48% of patients in COR gathering and 0.33% patients in the LPEC bunch had CMIH demonstrating the viability of the LPEC system.[10] Zenitani and partners likewise featured in their investigation that CMIH frequency was lower among patients managed with the LPEC method.[12]

The study demonstrated extremely favourable outcomes that in COR gathering, the recurrence rate was 2.7%, while in LPEC gathering, the recurrence rate was just 0.7%. Another investigation led by Zenitani and partners likewise affirmed that a low rate of recurrence was seen in LPEC gathering (0.83%) than COR gathering (2.4%).[12]

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