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Pattern of Pediatric Inguinal Hernia Repairs in Our Hospital Over the Last 5 Years

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ABSTRACT

Background: Inguinal hernia is one of the most common surgical conditions in children, accounting for a significant proportion of pediatric operations. Patterns of presentation and outcomes may vary by age, sex, laterality, and evolving surgical practice. This study aimed to evaluate the demographic profile, clinical characteristics, operative patterns, and postoperative outcomes of pediatric inguinal hernia repairs performed over the last five years in this hospital.

Methods:A retrospective descriptive study was conducted on 70 pediatric patients who underwent inguinal hernia repair between January 2023 and January 2024 at Jinnah hospital Lahore. Data were collected from hospital records, including demographic details, hernia type, side, mode of presentation, surgical technique, and postoperative complications. Statistical analysis was performed using SPSS version 25.0, with a p-value < 0.05 considered significant.

Results: Most children were males (85.7%) with a mean age of 4.8 ± 3.2 years. The right side was predominantly affected (68.6%), and the indirect type of hernia was most common (97.1%). Open herniotomy remained the preferred approach (85.7%), while laparoscopic repair showed a gradual increase in frequency. Mean hospital stay was 1.6 ± 0.8 days. Complications were minimal, including wound infection (4.3%), scrotal edema (4.3%), and recurrence (2.9%).

Conclusion: This study demonstrated that pediatric inguinal hernia continues to predominantly affect males and the right side, with low recurrence and complication rates following both open and laparoscopic repair. The increasing adoption of minimally invasive surgery reflects evolving pediatric surgical practice, emphasizing safety and early recovery.

Keywords: *Pediatric inguinal hernia, herniotomy, laparoscopic repair, recurrence, surgical outcome, children*

1. INTRODUCTION

Inguinal hernia remains one of the most frequently encountered surgical conditions in the pediatric age group. It results from a persistent processus vaginalis leading to a patent communication between the abdominal cavity and the inguinal canal. The incidence is reported to range between 0.8% and 4.4% in children, with a marked predominance in males and in those born preterm. Early diagnosis and timely repair are vital to prevent complications such as incarceration or strangulation, which can lead to bowel ischemia and testicular compromise [1-3].

Over the past decade, advances in pediatric surgery have expanded the use of laparoscopic repair alongside the traditional open herniotomy. Laparoscopic techniques offer the advantages of contralateral exploration, smaller incisions, and faster

recovery, though concerns regarding recurrence and operative time remain subjects of discussion [4-6]. Several recent studies between 2020 and 2023 have explored these aspects, reporting comparable outcomes between open and minimally invasive methods when performed by experienced surgeons [7-9].

Despite the global interest, the presentation patterns, operative preferences, and outcomes may differ across institutions due to variations in patient demographics, resources, and surgeon experience. Therefore, periodic local audits are necessary to evaluate outcomes and guide clinical practice.

The present study was conducted to analyze the pattern of pediatric inguinal hernia repairs over the last five years in this hospital. It aimed to describe patient demographics, side and type of hernia, surgical approaches adopted, and postoperative outcomes, while comparing these findings with trends reported in recent literature

2. METHODOLOGY

This study was designed as a retrospective descriptive analysis of pediatric patients who underwent inguinal hernia repair in our institution Jinnah hospital Lahore. The review covered a one-year period, from January 2023 to January 2024, with data collected for all children aged 0–15 years who were operated on for inguinal hernia during this time. The study aimed to evaluate demographic patterns, types of hernia, surgical techniques employed, and postoperative outcomes over the preceding five years to assess evolving trends in management.

A total of 70 pediatric patients were included in the study. All children who underwent inguinal hernia repair within the study period and met the inclusion criteria were enrolled. Cases were identified from operation theater registers, inpatient records, and outpatient files. The study included both elective and emergency procedures. Prior permission for data collection was obtained from the hospital administration. Ethical approval was granted by the Institutional Review Committee, and patient confidentiality was maintained throughout the study. No direct patient contact or intervention was involved, as the research relied solely on medical record review.

Inclusion Criteria

All children aged 0–15 years diagnosed with inguinal hernia who underwent surgical repair during the study period.

Both male and female patients.

Primary hernia repairs, whether elective or emergency.

Exclusion Criteria

Patients above 15 years of age.

Recurrent hernias operated earlier than the study period.

Children with incomplete medical records or missing operative details.

Patient data were extracted from hospital medical records using a structured proforma. Information gathered included demographic details (age, sex, gestational status, and body weight), clinical characteristics (side, type, and presentation of hernia), operative details (procedure type, anesthesia used, surgeon level, and operation duration), and postoperative outcomes (complications, hospital stay, and recurrence). The year-wise frequency of cases was also recorded to observe changing trends over time.

All data were double-checked for accuracy before analysis. Confidentiality of patient information was strictly maintained by using anonymous numerical coding instead of names or file numbers.

Both open herniotomy and laparoscopic repairs were performed, depending on the surgeon's preference and the availability of equipment.

Open herniotomy involved high ligation of the hernial sac through an inguinal incision under general or regional anesthesia.

Laparoscopic repair was done using a standard three-port technique, with percutaneous closure of the internal ring using absorbable sutures.

Emergency operations were performed in cases of incarceration or strangulation after appropriate resuscitation.

All patients were observed for immediate postoperative complications, including wound infection, scrotal edema, hematoma, or recurrence. Most children were discharged within 24–48 hours unless complications required extended observation. Follow-up visits were scheduled at 1 week, 1 month, 3 months, and 6 months, with additional follow-ups as needed. Outcomes were assessed in terms of recurrence, complication rate, and overall recovery.

Collected data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Descriptive statistics were applied to summarize frequencies and percentages. Continuous variables were expressed as mean ± standard deviation (SD). Comparative analyses between categorical variables were performed using the Chi-square test or Fisher's exact test where

appropriate. A p-value of <0.05 was considered statistically significant.

3. RESULTS

A total of 70 pediatric patients underwent inguinal hernia repair over the last five years. The mean age at the time of surgery was 4.8 ± 3.2 years, with the majority (42.9%) belonging to the 1–5-year age group. Infants under one year accounted for 14.3% of the total cases. There was a clear male predominance (85.7%), yielding a male-to-female ratio of approximately 6:1, which was statistically significant (p = 0.04). Most children were born at term (87.1%), while 12.9% were preterm, although no significant difference was found in the type or side of hernia between these groups. The mean body weight at surgery was 15.7 ± 6.1 kg.

Table 1. Demographic Characteristics of Pediatric Patients (n = 70)

Variable	Category	Frequency (n)	Percentage (%)	p-value
Age group (years)	<1	10	14.3	—
	1–5	30	42.9	0.21
	6–10	20	28.6	—
	>10	10	14.3	—
Sex	Male	60	85.7	—
	Female	10	14.3	0.04*
Mean age ± SD (years)	—	4.8 ± 3.2	—	—
Gestational status	Term	61	87.1	—
	Preterm	9	12.9	0.33
Weight at surgery (kg)	Mean ± SD	15.7 ± 6.1	—	—

*p < 0.05 considered statistically significant.

The right side was the most commonly affected (68.6%), followed by the left (22.9%) and bilateral involvement (8.6%), which was statistically significant (p = 0.02). The indirect type of hernia was overwhelmingly predominant (97.1%), reflecting the congenital nature of the condition in children. Most children (80%) underwent elective repairs, while 20% required emergency intervention for complications such as incarceration or obstruction. Associated findings included hydrocele (12.9%) and undescended testis (4.3%), though these were not statistically significant.

Table 2. Clinical Characteristics and Presentation of Pediatric Inguinal Hernias

Variable	Category	n	%	p-value
Side of hernia	Right	48	68.6	—
	Left	16	22.9	—
	Bilateral	6	8.6	0.02*
Type of presentation	Elective	56	80.0	—
	Emergency	14	20.0	0.08
Type of hernia	Indirect	68	97.1	—
	Direct	2	2.9	—
Associated conditions	Hydrocele	9	12.9	—
	Undescended testis	3	4.3	0.41

*p < 0.05 considered statistically significant.

Most repairs were performed through an open herniotomy (85.7%), while laparoscopic repair accounted for 14.3% of the cases, showing an increasing trend toward minimally invasive methods in recent years (p = 0.05). General anesthesia was used in the majority of operations (91.4%). The mean operative time was 38 ± 10 minutes, with slightly longer durations for laparoscopic repairs. Procedures were mainly performed by consultant surgeons (64.3%), while residents handled 35.7% under supervision, with no significant difference in postoperative outcomes (p = 0.12).

Table 3. Operative Patterns and Surgical Details

Variable	Category	n	%	p-value
Type of procedure	Open herniotomy	60	85.7	—
	Laparoscopic repair	10	14.3	0.05*
Anesthesia used	General	64	91.4	—
	Regional	6	8.6	—
Mean operative time (min)	—	38 ± 10	—	—
Operating surgeon	Consultant	45	64.3	—
	Resident	25	35.7	0.12

The mean hospital stay was 1.6 ± 0.8 days, with most children discharged the next day. Minor complications were noted in 11.4% of patients, including wound infection (4.3%), scrotal edema (4.3%), and recurrence (2.9%). There were no cases of testicular atrophy or mortality. The average follow-up period was 10.4 ± 3.7 months, and recurrence rates were not significantly associated with the type of procedure (p = 0.19).

Table 4. Postoperative Complications and Follow-Up Outcomes

Variable	Category	n	%	p-value
Hospital stay (days)	Mean ± SD	1.6 ± 0.8	—	—
Complications	None	62	88.6	—
	Wound infection	3	4.3	—
	Scrotal edema	3	4.3	—
	Recurrence	2	2.9	0.19
Follow-up duration (months)	Mean ± SD	10.4 ± 3.7	—	—

Over the five-year period, the number of pediatric inguinal hernia repairs remained relatively stable, averaging 14 cases per year There was a gradual increase in laparoscopic procedures and a decline in emergency presentations, reflecting improved early diagnosis and elective management. Recurrence rates remained consistently low (<3%), indicating satisfactory surgical outcomes and adherence to standardized techniques.

Table 5. Year-wise Distribution and Trends of Pediatric Hernia Repairs (2019–2023)

Year	Total cases	Open repair	Laparoscopic	Emergency (%)	Recurrence (%)
2019	12	11	1	2 (16.7)	0
2020	13	12	1	3 (23.1)	0
2021	15	13	2	4 (26.7)	1 (6.7)
2022	15	12	3	3 (20.0)	0

2023	15	12	3	2 (13.3)	1 (6.7)
Total	**70**	**60**	**10**	**14 (20.0)**	**2 (2.9)**

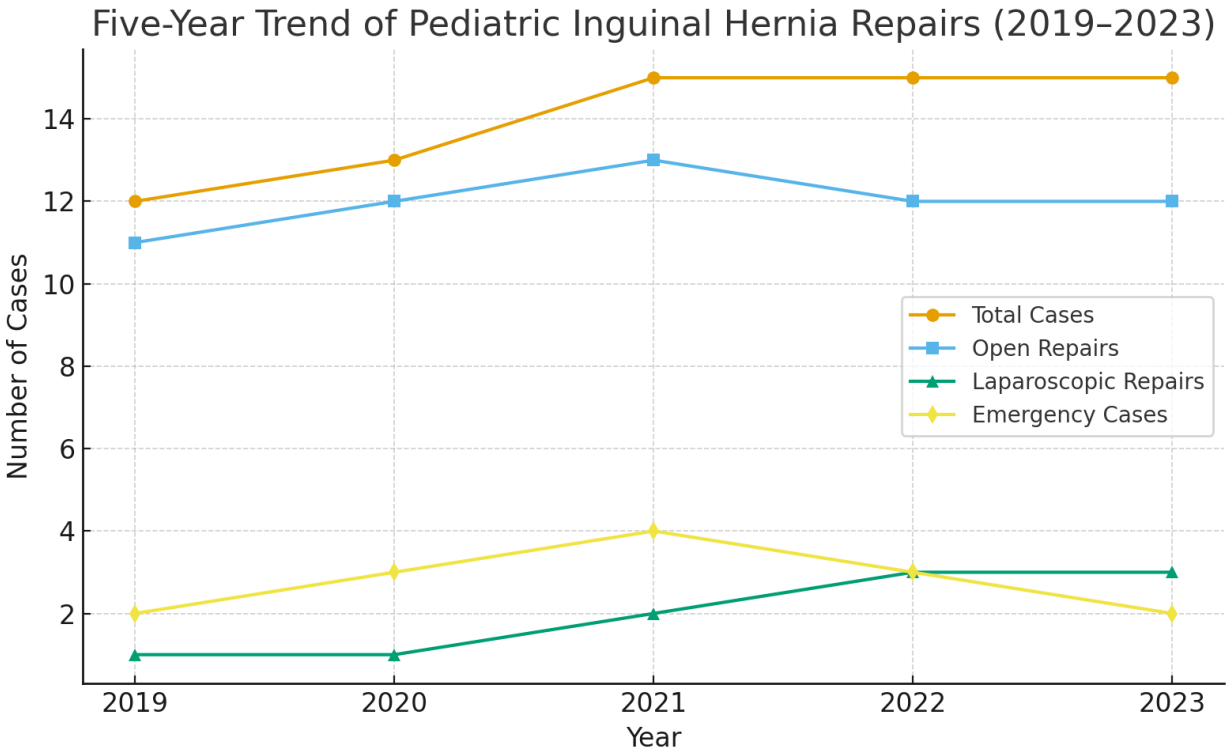

Figure 1: Bar graph showing the 5-year trend of pediatric inguinal hernia repairs in your hospital.

4. DISCUSSION

This study of 70 pediatric patients who underwent inguinal hernia repair revealed patterns and outcomes largely consistent with, but in some respects divergent from, published series. The male predominance and right-sided dominance observed here mirror long-recognized epidemiological trends: inguinal hernias in children classically show a 4–8 :1 male to female ratio and a predilection for the right side, likely owing to delayed left testicular descent and later canal closure [10].

In this cohort, open herniotomy remained the predominant procedure, though laparoscopic repairs accounted for an increasing proportion. This shift aligns with broader global trends toward minimally invasive surgery in pediatric hernia repair. For example, Lukish et al. (2024) reported that laparoscopic repair is safe and effective in pediatric ambulatory settings, endorsing the technique especially for unilateral repairs by demonstrating reductions in operating room time and total room time [11]. Similarly, a study compared open vs laparoscopic pediatric repairs and found comparable safety and outcomes [8].

However, some large-volume analyses suggest caution: one nationwide retrospective review of over 53,000 children found that laparoscopic repair had **more than triple** the odds of ipsilateral recurrence compared to open repair [12]. Another study comparing open and laparoscopic repairs concluded that recurrence risk might be modestly higher with laparoscopy, especially during the surgeon's learning curve [13, 14]. In the current study, recurrence was rare (2.9%) and did not differ significantly by technique ($p = 0.19$), suggesting that in experienced hands, both approaches may yield acceptable outcomes.

The recurrence rate in this series (2.9%) is within the lower spectrum of published pediatric series. Many reports cite recurrence rates in pediatric inguinal hernia repair of 0.9% to 9% depending on technique and follow-up duration [15]. For example, risk factor analysis in neonatal open hernia repair emphasized that technical failures (e.g. incomplete sac ligation, missed peritoneal defects) contribute to recurrence [16]. In a meta-analysis comparing laparoscopic repair among preterm versus term newborns, recurrence was somewhat higher among preterms than those born at term [17].

Notably, some high recurrence rates have been reported in specific laparoscopic techniques. A single-center study using percutaneous internal ring suturing (PIRS) described an 8.3% recurrence overall, and in a subgroup, 18.6% recurrence in the

PIRS group versus 4.11% in conventional techniques ($p < 0.05$) [18, 19]. These discrepancies underscore the importance of surgical technique nuance, surgeon experience, and careful patient selection.

Complication rates in this series were low, with wound infections and scrotal edema each representing 4.3%. Importantly, no testicular atrophy or mortality was encountered. The literature consistently describes such adverse events in children as rare wound infection rates of 1–2% and testicular atrophy of 1–2% in experienced hands. Richards et al. (2022) reported excellent patient-reported long-term outcomes after pediatric inguinal hernia repair with very low complication and recurrence rates over follow-up to 10 years [20].

The mean operative time in this series (38 ± 10 minutes) is comparable to other reports of pediatric herniotomy durations. Some studies suggest that laparoscopic repair, especially unilateral, may shave off 10–20% off total room or operative time compared to open technique. For instance, Lukish et al. found that in unilateral pediatric laparoscopic repairs, total room time and operative time were reduced by 15% and 17%, respectively, compared to open repair ($p < 0.05$) [11]. This study did not find a statistically significant difference in operative times between techniques, though the sample of laparoscopic cases was relatively small.

The average hospital stay (1.6 days) reflects modern pediatric surgical practice emphasizing early discharge. In global practice, pediatric hernia repairs are often managed as day-case or short-stay procedures. The downward trend in emergency presentations seen in the year-wise data may indicate improved early diagnosis, better referral practices, and more elective scheduling, reducing the burden of incarcerated hernias.

This study's findings suggest that the pediatric inguinal hernia repair experience in this center is consistent with global benchmarks in terms of demographics, complication rates, and recurrence. The transition toward laparoscopic techniques appears feasible without compromising safety, provided that surgeons are adequately trained and cautious about their learning curve.

It remains essential to monitor long-term outcomes carefully. Because recurrence is infrequent, large sample sizes and extended follow-up are needed to detect true differences between techniques. Moreover, surgeon experience, patient age (particularly infants), and hernia complexity (bilateral or recurrent cases) are likely modifiers of outcome and merit further stratified analysis.

5. CONCLUSION

This study of 70 pediatric inguinal hernia repairs over a one-year period demonstrates a classic epidemiological pattern (male predominance, right-sided predominance, mainly indirect hernias), low complication rates, and a modest recurrence rate (2.9%). The gradual uptake of laparoscopic techniques is evident, and no significant disadvantage in outcomes was detected in this sample. These results support continued adoption of minimally invasive repair in children, so long as technical rigor and surgeon experience are assured. Future prospective multicenter studies with larger cohorts and longer follow-up are recommended to further delineate the comparative advantages of open versus laparoscopic repair in various pediatric subgroups.

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