

## Research Article

# Results of Inguinal Hernia Repair with PIRS Method in Girls

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### Abstract

**Objectives:** Inguinal hernia repair is one of the most frequently performed operations in pediatric surgery clinics. Although there has been an increase in the frequency of laparoscopic repair in recent years, repair using the standard inguinal approach with modified Ferguson surgery is still preferred by many surgeons.

**Methods:** The objective of this study was to present the short-term outcomes observed in girls who underwent standard inguinal surgery and standard laparoscopic inguinal hernia repair using the percutaneous internal suturing (PIRS) method described by Patkowski et al., which is now used in our clinic. A total of 42 female patients who underwent inguinal hernia repair with laparoscopic and standard inguinal techniques in our pediatric surgery clinic between January 2017 and May 2018 were included in the study.

**Results:** The patients were compared in terms of the length of hospital stay after surgery, monitoring for pain in the early postoperative period, initiation of oral feeding, and the amount of social security institution repayment.

**Conclusion:** It is the opinion of the authors that the PIRS method will be more popular in the future as it has a short operation time, a low complication rate, it can be learned quickly, does not require advanced laparoscopic skills or additional instruments, and results in perfect cosmetic outcomes.

**Keywords:** Inguinal hernia, laparoscopy, percutaneous internal suturing

Inguinal hernia repair is one of the most frequently performed operations in pediatric surgery clinics. Although there has been an increase in the frequency of laparoscopic repair in recent years, repair using the standard inguinal approach with modified Ferguson surgery is still preferred by many surgeons. High success rate and low recurrence and complication rates have influence on the application and preference of the standard inguinal approach.<sup>[1]</sup> Minimally invasive techniques have begun to be commonly preferred in the pediatric surgery in recent years. Many different open and laparoscopic examinations have been described in the repair of pediatric inguinal hernias.<sup>[2,3]</sup> In this study, we aimed to present the short-term outcomes in girls who underwent standard inguinal surgery and standard laparoscopic inguinal hernia repair using percutaneous internal

suturing technique (PIRS) described by Patkowski et al., which started to be used in our clinic.

### Methods

A total of 42 female patients who underwent inguinal hernia repair by laparoscopic and standard inguinal technique in our pediatric surgery clinic between January 2017 and May 2018 were included in the study. All laparoscopic inguinal hernia repair procedures were performed using percutaneous internal ring suturing (PIRS) technique. Patients who were included in the study as a result of pre-anesthesia examinations were classified as the ASA 1-2 risk group. The bladders of patients scheduled for laparoscopic inguinal hernia repair were drained with a thin catheter at the operation table before the surgery. Pneumoperitoneum was

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created by inserting Veress needle through the intraumbilical mini-incision. Both inguinal canals were assessed under direct vision with the help of a 30 degree telescope obtained by inserting 5 mm trocar through the umbilical incision. After the incision made over the internal ring region at the level of inguinal region internal ring, under direct vision, internal ring was tied around using 3/0 prolene suture (Ethicon Prolene Polypropylene) with the help of 18-20 G needle. Using the 3/0 prolene suture in the needle, internal ring was double-sealed extracorporeally. Patients began to be fed when their bowel movements recovered after the operation. Patients without any problems who began to be fed properly were prescribed with 50 mg/kg/day oral paracetamol and discharged. Outpatient clinic follow-up was recommended on the 10<sup>th</sup> day after discharge. Hernia repair was performed using modified Ferguson method in all patients in the standard inguinal surgery group. To the female patients operated due to bilateral hernia, Bastionelli procedure was applied. Patients who underwent inguinal hernia repair with laparoscopic and open surgical techniques were compared in terms of length of hospital stay after surgery, monitoring for pain in the early post-operative period, initiation of oral feeding and social security institution repayment amounts. Approval of the hospital Ethics Committee was obtained for the study. The results were analyzed with SPSS 17.0.

## Results

The median age of the 20 female patients who underwent laparoscopic inguinal hernia repair using PIRS method between January 2017-May 2018 in the Pediatric Surgery Clinic of our hospital was 7.5 (4-15), whereas the median age of the female patients who underwent inguinal hernia repair using classical standard open surgery was 4.5 (3-9). Based on the physical examination and anamnesis of patients, it was found that 18 had right, 19 had left, and 4 had bilateral inguinal hernia. In the laparoscopic inguinal hernia repair group, 4 patients had unilateral inguinal hernia based on the preoperative diagnosis but bilateral hernia repair was performed after seeing the opposite inguinal canal was also open.

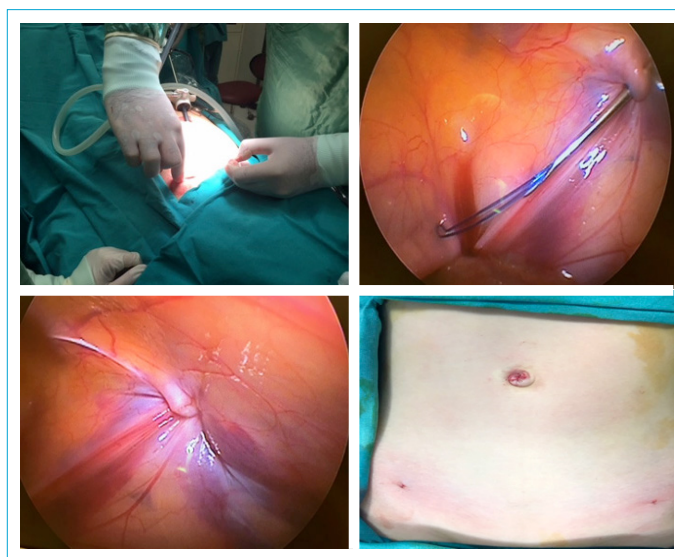
When the PIRS and standard inguinal surgery groups were compared in terms of their length of operation, PIRS group had a mean length of 30.6±5.6 min, whereas the standard surgery group had a mean length of 29.0±10.5 min ( $p=0.42$ ). The mean length of hospital stay was 16.0±8.2/hours for the PIRS group while it was 13.8±7.8 hours for the standard surgery group ( $p=0.64$ ). The mean postoperative oral feeding initiation time was 237.0±63.0 min for the PIRS group, and 198.6±38.7 min for the standard surgery group. The

mean postoperative oral feeding initiation time was shorter for the standard inguinal surgery group. The statistical difference between the two groups was significant in favor of the standard inguinal surgery group ( $p=0.05$ ). The mean cost of the patients operated using PIRS method was 176.15±13.6 TL, while the mean average cost per patient in the standard inguinal surgery group was 166.5±8.5 TL. In the repayment system of Social Security Institution (SGK), package cost of laparoscopic inguinal hernia repair was 1443 TL, whereas the cost of standard inguinal surgery was 715 TL. While the package cost of the bilateral laparoscopic inguinal hernia repair group was 2337 TL, standard inguinal surgery for bilateral inguinal hernia repair was 1254 TL. When hospital costs were deducted, no complications were observed in the patients included in the study during the follow-up period.

## Discussion

The most commonly used classical inguinal hernia operation in children is the modified Ferguson high ligation technique, performed with inguinal approach. Additionally, Bastionelli procedure is applied to female patients who have bilateral inguinal hernia. This method has low complication and a very high success rate. The recurrence rate of inguinal hernias have been reported as 0.8-3.8% in various series. In the premature patients, incarcerated inguinal hernias and additional pathologies that increase intraabdominal pressure (ventriculo-peritoneal shunt, peritone dialysis, intraabdominal acid), the recurrence rate is higher.<sup>[4]</sup>

Many techniques regarding the laparoscopic inguinal hernia repair in the pediatric age group have been described. These techniques are aimed at sealing the internal ring as extraperitoneal and intraperitoneal. Sealing the ring using



**Figure 1.** Inguinal hernia repair by PIRS method.

absorbable suturing after the incision of the peritoneum at the internal ring level or sealing the ring after the incision and excision of the hernia sac toward the inguinal canal after incision is performed. In the pediatric laparoscopic inguinal hernia repair, intracorporeal or extracorporeal knot tying techniques are preferred depending on the experience and skills of the surgeon.<sup>[5-8]</sup>

Discussions regarding the inguinal hernia repair in children, which have recently started, continued until the publication of reports stating that this procedure can be performed on children and is safe.<sup>[9]</sup> Ongoing debates have reached to the point of deciding which one of the laparoscopic or standard inguinal open surgery should be preferred in pediatric inguinal hernia repair.<sup>[10]</sup>

Disadvantages of the laparoscopic technique in pediatric inguinal hernia are its high price, longer operation length, high recurrence rates and longer learning curve compared the traditional open surgery. In addition, experience, competence and equipment problems can be the limiting factors for laparoscopy. More recent laparoscopic techniques are simple, applicable and safe. In addition, it has advantages such as the evaluation of the opposite inguinal canal, and the ability to diagnose and treat the femoral, obturator or internal hernias and other underlying abdominal pathologies at the same surgery.<sup>[11]</sup>

PIRS method used in the laparoscopic inguinal hernia repair involves tying the non-absorbable thread inside the 18-20 G needle, which was inserted subcutaneously, with the help of a telescope placed through the abdominal wall into the peritoneal cavity, around the neck of the hernia sac, removing the thread from the same puncture point and tying it extracorporeally. PIRS method has advantages such as easy learning, simple application, short operation length, no requirement for special equipment and advanced laparoscopy skills, less scarring due to the single port, and low cost (Fig. 1).<sup>[12-13]</sup>

In our study, we found that there was no difference between PIRS method and standard inguinal surgery in terms

of operation length, length of hospital stay and cost. In our country, between the laparoscopic and standard surgery, there is a difference of 728 TL for unilateral inguinal hernia and 1083 TL for bilateral hernia in the social security institution SGK repayment system. (Table 1)

The most commonly observed intraoperative complication in this surgery is the bleeding caused by the needle. Bleeding mostly occurs from the iliac vein. Particularly during the insertion of the first thread, the needle must not be pushed forward before its tip is visualized. In our study, no recurrence of inguinal hernia was observed throughout the study period. No major vascular vein-related complications other than the localized limited minimal bleeding were observed.

## Conclusion

Laparoscopy has an important place in the pediatric inguinal hernia repair. Although there are still many techniques that are successfully performed in laparoscopic inguinal hernia repair, new techniques are still being developed. The current trend is toward a single port and extracorporeal tying methods. We think that the PIRS method will be more popular in the future as it has a short operation length, low complication rates, can be quickly learned, does not require advanced laparoscopic skills and additional instruments, and results in perfect cosmetic outcomes.

## Disclosures

**Ethics Committee Approval:** For this study, 30278912 permission was obtained from Derince Training and Research Hospital TUEK Committee.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Authorship contributions:** Concept – Y.A.B.; Design – Y.A.B., D.E.G.; Supervision – Y.A.B.; Materials – Y.A.B., S.E.S.; Data collection &/or processing – Y.A.B.; Analysis and/or interpretation – Y.A.B., D.E.G., S.E.S.; Literature search – S.E.S., D.E.G.; Writing – Y.A.B.; Critical review – Y.A.B., D.E.G., S.E.G.

**Table 1.** Our results of standard surgical method with inguinal hernia repair with PIRS method

	Laparoscopic	Open	p
Number of patients	20	22	
Age (Median)	7	4	
Length of Operation (min)	30.6+5.6	29.0+10.5	>0.05
Length of hospital stay (hour)	16.0+8.2	13.8+7.8	>0.05
Initiation of Oral Feeding (Min)	237.0+63.0	198.6+38.7	>0.05
Hospital Cost Per Patient (Unilateral Hernias)	176.15+13.6	166.5+8.5	>0.05
Sgk Package Repayment (Unilateral Hernia) (TL)	1443	715	728
Sgk Package Repayment (Bilateral Hernia) (TL)	2337	1254	1083

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