

Laparoscopic Herniotomy in Female Children: Our Experience in 110 Patients

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ABSTRACT

Aim of the study: To assess the results and complications of laparoscopic herniotomy in female children using percutaneous internal ring suturing (PIRS).

Materials and methods: One hundred and ten consecutive female children who were admitted with a unilateral or bilateral inguinal hernia from January 2015 to June 2018 to a medical college referral hospital were included in the study. The technique used was PIRS, using spinal needle 23 gaze and 3.0 prolene. All patients were followed up postoperatively. Babies with recurrent hernias and complicated inguinal hernia were excluded from this study.

Results: A total of 110 female children with unilateral or bilateral inguinal hernia were included in the study. Age ranged from 1 month to 15 years with a mean age of 3 years. The clinically unilateral hernia was present in 80 children but the patent internal ring was present on the contralateral side in 25 children and was repaired simultaneously. The bilateral inguinal hernia was present in 30 children. The total number of hernia units was 165. The mean operative time was 15 minutes, ranging from 12 minutes to 20 minutes for unilateral hernia and 15–30 minutes for a bilateral hernia. The mean postoperative stay was 1 day. The follow-up period ranged from 7 days to 2 years. Two babies had hematoma at the internal ring during the procedure, subsided with no postoperative sequel. One child developed hernia on contralateral side, who was operated for contralateral patent ring during repair of an ipsilateral clinical hernia. None other children who were operated for clinical hernia had a recurrence.

Conclusion: Laparoscopic herniotomy using the technique of PIRS is safe, quick with minimal postoperative pain, and short hospital stay, and had a very low incidence of recurrence.

Keywords: Hernia, Laparoscopy, Percutaneous internal ring suturing.

World Journal of Laparoscopic Surgery (2019): 10.5005/jp-journals-10033-1375

INTRODUCTION

Inguinal hernias in children are due to the protrusion of viscera through persistent process vaginalis. Conventional open therapy includes ligation of the sac at the internal ring. The same basic principle is used in laparoscopy also. Conventional open therapy has a high success rate and acceptable cosmetic results with few complications.¹ The main drawbacks of conventional open therapy are the inability to rule out the contralateral patent processes vaginalis and synchronous hernia. Nowadays, laparoscopy in children is increasingly used to repair inguinal hernias. Several laparoscopic techniques have developed over the past two decades aimed at improving the outcome.² This study is to assess the technique, results, complications of percutaneous internal ring suturing (PIRS) with the help of spinal needle 23 gaze, and 3.0 prolene.

MATERIALS AND METHODS

This was a prospective study conducted in the department of pediatric surgery. A total of 1,100 children with inguinal hernia were admitted for surgery from January 2015 to June 2018 to a medical college referral hospital. Out of the total 1,100 children with inguinal hernia, male children were 990 and female children were 110. These 110 female children with unilateral or bilateral inguinal hernia were chosen for this procedure. Consent was taken from all parents before the procedure. The technique used was PIRS using spinal needle 23 gaze and 3.0 prolene. All patients were followed up postoperatively. Male children with inguinal hernias and female babies with recurrent hernias and complicated inguinal hernias were excluded from this study.

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How to cite this article: Gontumukkala C, Venkata RNG, Golimi RK, et al. Laparoscopic Herniotomy in Female Children: Our Experience in 110 Patients. *World J Lap Surg* 2019;12(2):68–72.

Source of support: Department of Paediatric Surgery, Kurnool Medical College, Kurnool, Andhra Pradesh, India

Conflict of interest: None

Procedure

Laparoscopic repair is performed under general anesthesia. The patient is positioned supine, often in the Trendelenburg position. The surgeon stands on the side contralateral to the hernia with the monitor on the ipsilateral side. The instruments used are 5 mm umbilical port for the camera and 3 mm port on the contralateral iliac fossa for manipulation. The abdomen is insufflated through the umbilicus, to a pressure of 8–12 mm Hg depending on the size of the child. Any hernia contents are reduced before beginning the repair of the hernia. With laparoscopy, the contralateral side can be evaluated and bilateral repair performed when necessary.

Following are the steps of the procedure:

- Introduce the 3.0 prolene suture through the barrel of the 22 or 23 gaze spinal needle (Fig. 1).

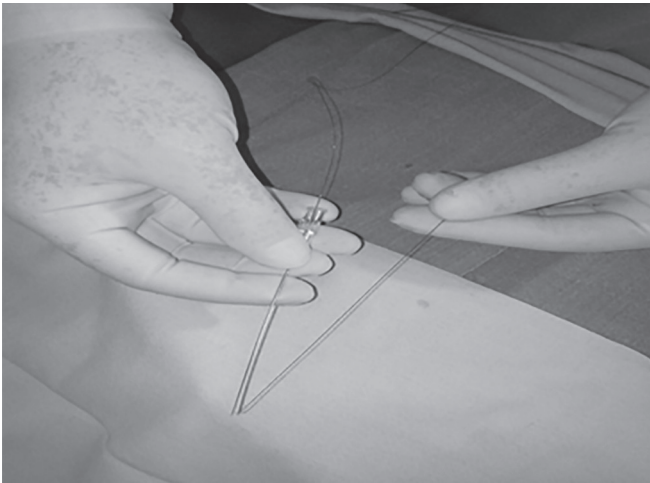


Fig. 1: Preloaded prolene into the spinal needle to make a loop

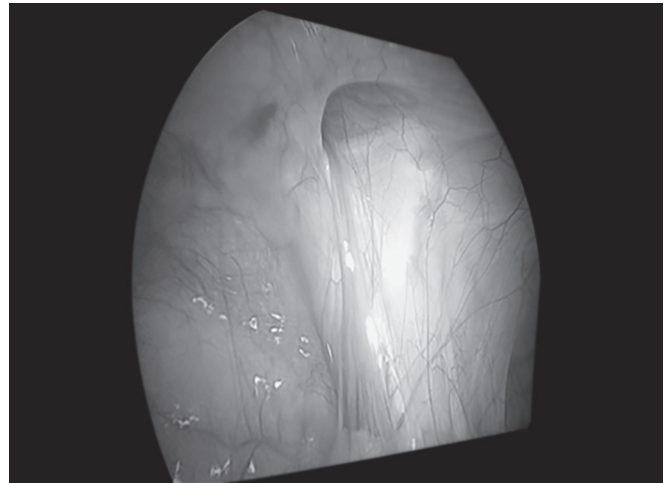


Fig. 2: Laparoscopic view of patent internal ring

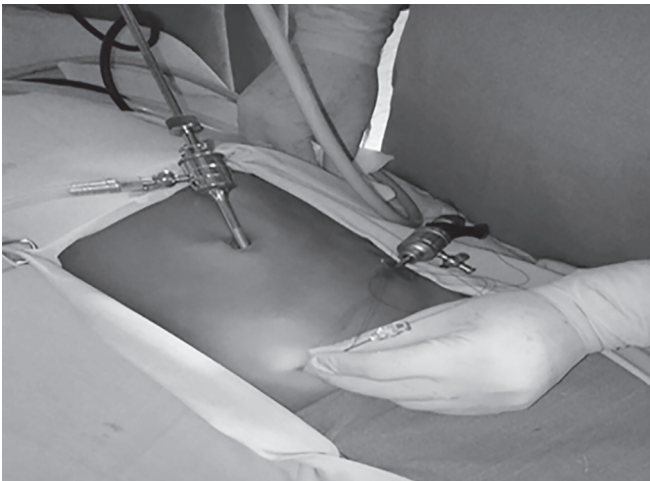


Fig. 3: Insertion of preloaded suture loop into the pre peritoneum from outside

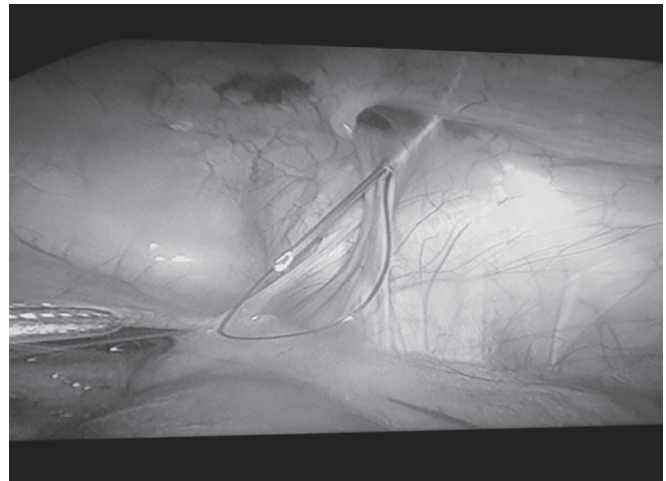


Fig. 4: Needle along with suture loop advanced under the peritoneum around the lateral half of ring and entered the peritoneum at midpoint

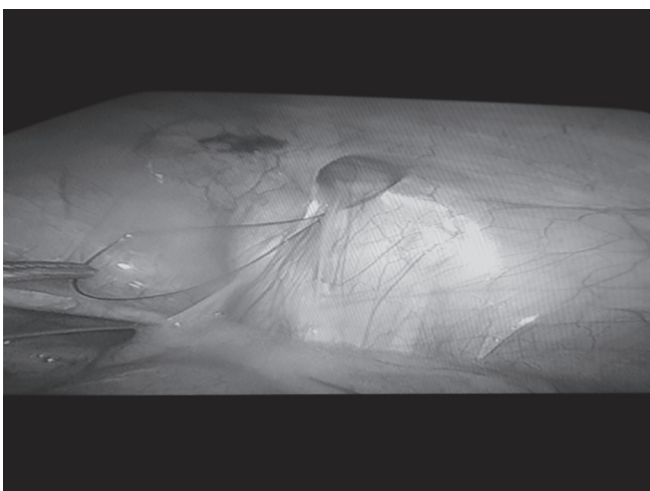


Fig. 5: Needle is withdrawn leaving the suture loop *in situ*

- Maintaining both ends of the preloaded suture extraperitoneal, advance the needle under the peritoneum around the lateral half of the internal ring (Figs 2 to 4).
- Enter the peritoneum and advance the suture into the abdominal cavity, creating a loop (Fig. 4).
- Remove the needle, leaving the loop in place (Fig. 5).
- Advance the needle through the same skin puncture site around the medial half of the ring and enter the peritoneum at the same site of previous loop and pass the needle into the loop of previous suture (Fig. 6).
- Pass prolene suture through barrel needle into the loop (Fig. 6).
- Withdraw the needle leaving prolene suture in the loop (Fig. 7).
- Catch the suture end of the loop outside the abdomen and withdraw them together, now the prolene thread is all around the internal ring (Fig. 8).
- The abdomen is desufflated and any air or fluid in the sac is manually expressed with external compression and tie suture extracorporeally (Fig. 9).
- Now the internal ring is reinspected (Figs 10 and 11).



Fig. 6: Now the needle reinserted through the same skin puncture site and advanced around the medial half of the ring and entered the peritoneum at the same site of previous loop and pass the needle and thread into the loop of previous suture

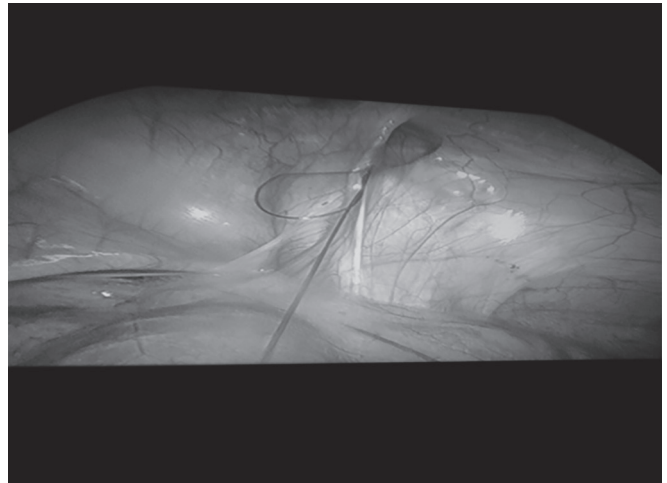


Fig. 7: The needle is withdrawn leaving the thread *in situ*

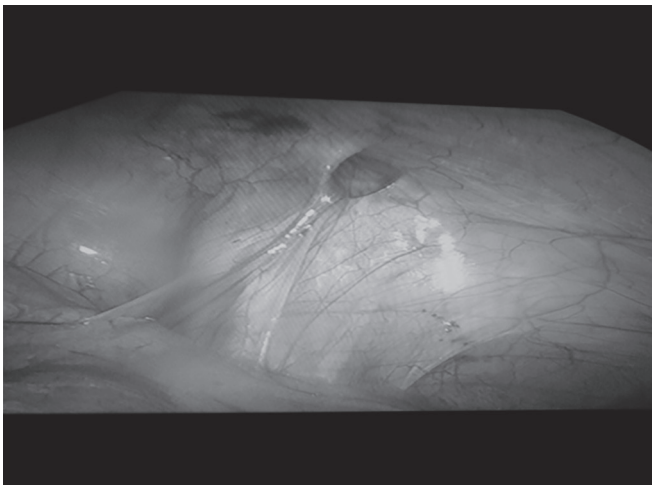


Fig. 8: Loop is pulled from outside, now the prolene thread is all around the internal ring



Fig. 9: Pneumoperitoneum deflated and thread is tied outside the abdomen

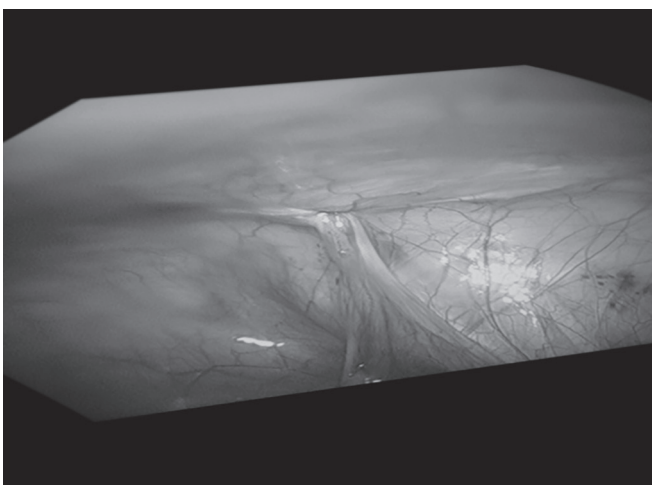


Fig. 10: The internal ring is reinspected



Fig. 11: Appearance after the procedure

RESULTS

A total of 110 female children with unilateral or bilateral inguinal hernia were included in the study. Age ranging from 1 month to 15 years. The mean age of 3 years. The clinically unilateral hernia was present in 80 children. The right inguinal hernia was seen in 50 and left inguinal hernia was seen in 30 children. During laparoscopy for unilateral hernias, the patent internal ring was present on the contralateral side in 25 children (31.25%) and was repaired simultaneously. The bilateral inguinal hernia was present in 30 children. A total number of hernia units was 165. Preoperative ultrasonography was done in all patients to confirm the diagnosis. The mean operative time was 15 minutes, ranging from 12 to 20 minutes for unilateral hernia and 15 to 30 minutes for a bilateral hernia. The mean postoperative stay was 1 day, ranging from 1 day to 3 days. All patients were followed up postoperatively. The follow-up period ranged from 7 days to 2 years. Two babies had hematoma at the internal ring during the procedure and subsided with no postoperative complications. One child had prolene stitch granuloma during follow-up 2 months postoperatively which was removed. One baby developed hernia on the contralateral side who was operated for the contralateral patent ring during the repair of ipsilateral clinical hernia (0.6%). None other children who were operated for clinical hernia had a recurrence.

DISCUSSION

The incidence of indirect inguinal hernia in careful controlled population studies is 1–5%³ with male-to-female ratio is 8:1–10:1. The incidence of bilateral inguinal hernia is greater in female patients in all age groups with a reported incidence of 20–50%.⁴ Injury to the reproductive organs during herniotomy in female patients is extremely low so some surgeons advocate bilateral exploration in all female patients.

Laparoscopic repair for inguinal hernias in pediatric patients was first described by El-Gohary.⁵ Laparoscopy-assisted extracorporeal suturing was first described by Prasad et al.⁶ Lee and Yeung used a specially designed herniotomy hook to place suture extraperitoneal around the internal ring and tie it subcutaneously.⁷ Percutaneous internal ring suturing (extracorporeal) was first described by Patkowski et al.⁸ They used 18 gauge needle and 2.0 nonabsorbable suture to accomplish the procedure. We have modified this technique that we use 23 gauge spinal needle and 3.0 prolene. The main advantage of laparoscopy is the inspection of contralateral ring and the diagnosis of ipsilateral hernia and repair of both simultaneously.

A contralateral patent process vaginalis was seen in 31.25% of our children in contrast with Rathauer and Rowe et al. who have reported contralateral patent process vaginalis in 50–90% of their patients.^{9,10} Two babies had hematoma during the procedure but subsided postoperatively without any complications.

The reported recurrence rates after conventional open herniorrhaphy among children range from 0.8 to 3.8%.¹¹ The technical errors for the recurrence are (1) failure to find the hernial sac, (2) insufficient low-level ligation of the sac, (3) injury to the floor of the inguinal canal due to operative trauma, (4) failure to close the internal ring in girls, and (5) postoperative wound infection and hematoma.^{11,12} All these technical problems for recurrence can be avoided by laparoscopy.¹³

Though laparoscopic herniotomy theoretically provides high ligation of the hernia sac more proximally than does open repair,

higher rates of recurrence have been reported with a laparoscopic procedure. Schier et al. and Chinnaswamy et al. reported the recurrence rate of 3.1–4.4% after intraperitoneal Z-type suture or with simple purse-string suture.^{14–16} This is in contrast with our low recurrence rate of 0.6% after laparoscopic PIRS. We had one baby developing clinical hernia (0.6%) who was operated for contralateral patent ring during ipsilateral clinical hernia. The reason for recurrence may be due to a small patent contralateral ring and was technically difficult to encircle ring completely with suture.

Verma et al.¹⁷ operated 150 cases of inguinal hernias and hydroceles using laparoscopic herniotomy performing at the neck of the sac. The proximal part of peritoneum was closed with nonabsorbable suture. The mean operative time was 25 minutes for unilateral and 34.8 minutes for bilateral hernias. They have reported the recurrence rate of 1.33% and a conversion rate of 0.66%.

Spurbeck et al., Kastenberget al., and others^{8,18–21} used laparoscopic-assisted extraperitoneal circuit suture and reported the recurrence rate ranging from 0 to 4.3%. Some other authors^{22–25} claim the lowest rate of recurrence with a laparoscopic technique involving complete division and then stitching of the hernia sac at an internal inguinal ring. They have reported a recurrence rate ranging from 0% to 1.3% which is comparable with our recurrence rate of 0.6%. The low incidence rate in children with PIRS is due to tying the knot outside the peritoneal cavity more securely after desufflation, when compare with intracorporeal suturing in an insufflated abdomen where the positive pressure is working against the closure of the ring.

CONCLUSION

Laparoscopic herniotomy using the technique of PIRS using spinal needle 23 gauge is safe, quick with minimal postoperative pain and short hospital stay, had the least rate of complications and associated with a very low incidence of recurrence.

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