

LAPAROSCOPIC TREATMENT OF INGUINAL HERNIA IN CHILDREN, AN EXPERIENCE OF PURSE STRING AT THE LEVEL OF DEEP RING

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ABSTRACT

Objective: To share our experience of laparoscopic inguinal hernia repair with purse string around deep ring.

Material and Method: This retrospective study was conducted from July 2015 to January 2017 at Pediatric surgery unit of the Khyber teaching hospital - Peshawar, Pakistan. Children below 16 years with a diagnosis of reducible inguinal hernia were included. 68 laparoscopic repair of inguinal hernia performed on 60 patients, as 8 patients had bilateral inguinal hernia. Laparoscopic hernia repair was done with a technique of purse string around the deep ring (PSDR). Follow up period was of 6 months. Clinical and demographic data were collected and analysed using SPSS 20.

Result: Laparoscopic repair of inguinal hernia repair performed in 60 patients with an intraperitoneal technique of PSDR. Mean age was about 2.9 ± 2 year and mean weight of 13.3 ± 7.3 Kg. Male to female ratio was 5:1. Unilateral hernia was in 86.6% and contralateral patent processus vaginalis (CPPV) was found in 33.3%. Operative time for unilateral hernia repair 39.4 ± 10 min and bilateral hernia repair 57.6 ± 8.3 min. Wound infection in umbilical port site was 1.6%, hydrocele 6.6% and testicular atrophy 0%. Recurrence recorded in follow up period in 6.6%. Absorbable suture and low skills of intracorporeal suturing was recorded as a risk factor for recurrence.

Conclusion: Laparoscopic technique of Purse string at the level of deep ring using non-absorbable suture is a safe and effective method. High rate of recurrence in this technique can be overcome by gaining high skills of intracorporeal suturing and using non-absorbable suture.

Key words: Inguinal hernia, laparoscopy, complications, children.

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INTRODUCTION

Laparoscopic procedures have rapidly put back conventional surgery in many fields including pediatric surgery¹. Inguinal Hernia (IH) is frequent in paediatric population and most common surgical procedure on elective lists^{2,3}. Open repair of inguinal hernia with high ligation was practiced for the inguinal hernia treatment and considered the gold standard before the beginning of laparoscopic surgery. In order to convene the expedition for limiting pain and better cosmesis, laparoscopic management has been worldwide adapt-

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ed which reduces hospital stay, minimal dissection, shorten operative time, early return to normal activity, improved visualization of structure and elevate parents satisfaction^{4,5}. In recent years new techniques extended and continue to change. The technique can be divided into intraperitoneal and extraperitoneal repair of inguinal hernia⁶. Controversy exists between different laparoscopic technique and research work is required to look for feasibility of these techniques⁷. We adapted intraperitoneal technique for inguinal hernia repair by taking purse string at the level of internal ring. We conducted this study with the aim to share our experience and clarify effectiveness of purse string laparoscopic technique of inguinal hernia repair.

MATERIAL AND METHODS

This retrospective study was carried out in Pediatric surgery unit of Khyber Teaching Hospital, Peshawar

- Pakistan from January 2016 to October 2017. Children with age below 16 years and a diagnosis of reducible inguinal hernia and who underwent laparoscopic inguinal hernia repair with a technique of PSDIR were included in the study. Patients operated for inguinal hernia through other laparoscopic techniques were excluded. Patients having bilateral inguinal hernia were repaired in same anesthesia, while CPPV were followed for development of metachronous hernia.

All surgeries were performed by the same group of surgeons and in the same unit. All procedures were done under general anesthesia with the patient in supine position and endotracheal tube passed. Nasogastric tube passed in all patients before surgery on the table and catheterization done for distended bladder. Patient data were analyzed regarding age, gender, preoperatively laterality and outcome of surgery. Outcome parameters were recorded as operating time, postoperative complication and recurrence. Recurrence was further analyzed for suture type and skill level.

The data were tabulated and analyzed using SPSS version 20. Follow up period was of 6 months with 4 visits on a different interval. Patients were examined for postoperative complication and recurrence during the follow up period. Contralateral patent processus vaginalis were not repaired and looked for metachronous hernia during follow up. Laparoscopic repair of inguinal hernia was performed by an incorporeal suturing technique of taking a purse string at level deep inguinal ring. Absorbable and non-absorbable suture was used for purse string at the level of the internal ring. Absorbable suture was used for initial 30 cases and non-absorbable suture was used for the remaining 30 cases. Sampling was done through non probability consecutive technique.

RESULTS

Inguinal hernia repair was performed in 60 patients through a laparoscopic technique of PSDR during the study period. A total of 68 inguinal hernia repair were performed on these 60 patients, as 8 patients had bilateral hernia which were repaired during same anesthesia. Patient age range from 2 months to 16 years with a mean age of 2.9 ± 2 years. Mean weight of patients was 13.3 ± 7.3 Kg. Gender distribution shows male predominance with 5:1. Patients with unilateral IH were 86.6% (52 out of 60) and bilateral IH were 13.4%. CPPV detected in 33.3% (20 out of 60) cases and out of these only 15% (3 out of 20) presented in follow up period with metachronous hernia.

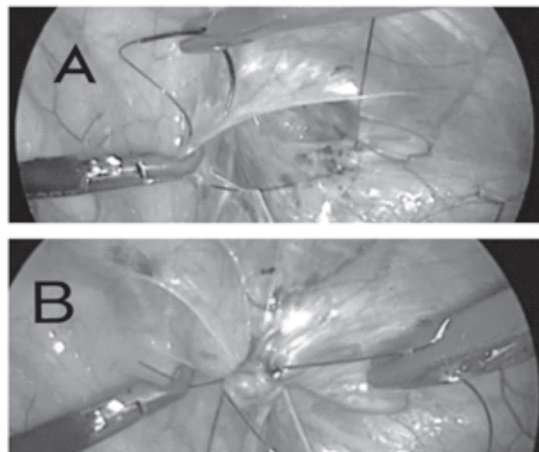


Fig 1: Technique showing Purse string around deep ring. (A) Patent internal ring with technique to secure purse string, (B) Internal ring closed

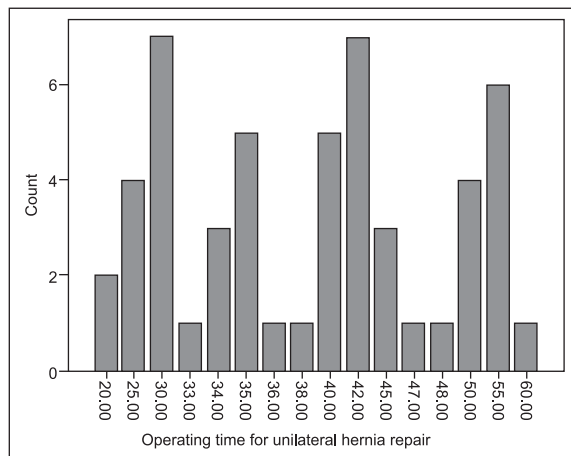


Fig 2: Operating time for unilateral hernia repair

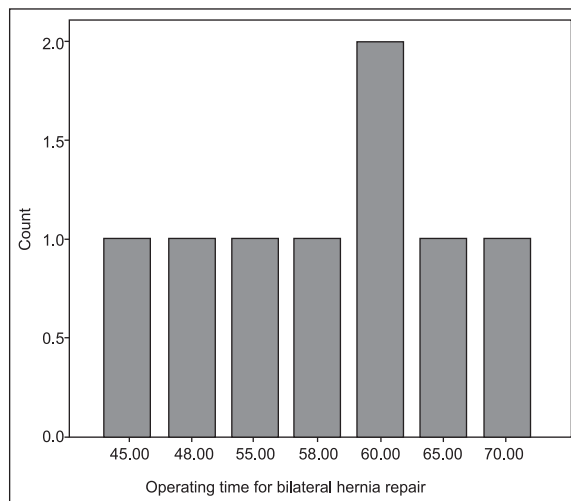


Fig 3: Operating time for bilateral hernia repair

Table 1: Postoperative complications

Recurrence	5.8% (4 out of 68)
Wound infection	1.6% (1 out of 60)
Hydrocele	5.8% (4 out of 68)
Testicular atrophy	0% (0 out of 68)

Table 2: Factors affecting recurrence

	Total cases	Recurrence	%	P value
Suture Type				
Absorbable suture	30	3	10	P=0.045
Non absorbable suture	38	1	2.6	
Skill level				
1st 30 cases	30	3	10	P=0.045
2nd 30 cases	30	1	3.3	

The outcome of the surgery was calculated by operating time and postoperative complication. Operating time for unilateral hernia was 39.4±10 min and bilateral hernia 57.6±8.3 min. Operative time distribution for both unilateral and bilateral hernia repair is shown in Fig1 and 2. Single patient developed wound infection at umbilical port. Hydrocele recorded in 4 patients and testicular atrophy not detected in any patient (Table 1). Recurrence developed in 6.6% cases (4 out of 60). Factor affecting recurrence was further analysed as shown in table (table 2)

DISCUSSION

Laparoscopic repair of inguinal hernia has achieved attractiveness and many new techniques have been developed. Development of these new laparoscopic methods of hernia repair has given birth to new debate between these methods. Laparoscopic repair of inguinal hernia can be performed with extraperitoneal and intraperitoneal ligation on internal ring. Intraperitoneal technique requires a high level of intracorporeal suturing practice and is the pioneer laparoscopic technique of hernia repair. Intraperitoneal laparoscopic repair can be performed with various technique like Z-type, W-type and purse string. We adopted the intraperitoneal technique of taking purse string at the level deep inguinal ring without division of the sac. Some studies have reported the division of sac distal to the purse string at internal ring^{8,9}. Another study showed

that sac division alone is as effective as sac division plus purse string¹⁰. Laparoscopic approach for hernia repair in children has diagnostic value in detecting the CPPV and this approach can put a stop to inguinal exploration which was the standard before¹¹. Literature review showed CPPV in up to 50% cases. Some researcher have reported to explore contralateral inguinal exploration on the basis of ultrasound¹².

Current study revealed the beauty of laparoscopy to detect CPPV in 33.3 % and do not favour inguinal exploration for it. Controversy exist on repair of CPPV in same anesthesia to prevent metachronous hernia. But this idea has been rejected by some author with plea that percentage of developing metachronous hernia is very low¹³. Metachronous inguinal hernia (MIH) has reported in 12.3% cases and 91% of these patient require surgery, which goes in favour of contralateral repair¹⁴. Other studies showed that very low incidence of metachronous inguinal hernia and do not favours exploration¹⁵. Current study have reported incidence of MIH in 15% cases which goes in favour to repair of CPPV in same anesthesia.

Operative time is an important parameter to measure feasibility of the procedure. Operative time for unilateral hernia in our series was 39.4 min and for bilateral hernia 57.6 min. Variability in operative time has been reported and dependent on surgeon experience. Operative time in the literature ranges from 20 min to 60 min^{16,17}. Our result of operative time is parallel with other studies. The operative time is dependent on surgeon experience and learning curve of the procedure.

Comparative study with open surgery revealed high, but comparable recurrence rate with laparoscopic repair. Recurrence in hernia is a major complication reported in inguinal hernia repair and high level of recurrence has been reported after laparoscopic surgery. Recurrence after conventional open hernia repair is up to 3.9%¹⁶. Reported recurrence rate after laparoscopic hernia repair ranges from 0% to 4.4%¹⁸. Another study reported recurrence rate of 6.5%¹³. Reported recurrence rate in experience hand after laparoscopic hernia repair is 0%^{7,18}.

In the current study recurrence rate is 5.8%, which is high compared with other studies. Such high recurrence rate can be explained by early series having low level of intracorporeal suturing practice. The only reported disadvantage of this purse string technique is as it requires a high level of intracorporeal suturing

practice. Research showed that recurrence rate can be controlled after gaining the learning curve²⁰. Choice of suture yield some controversy regarding recurrence of hernia. Our study too has identified a suture type as a factor affecting the recurrence. High level of recurrence is noted with absorbable suture. Literature reviewed has clarified the issue by reporting low level of recurrence with non absorbable suture as compared to absorbable suture²¹.

Post operative wound infection is common after open hernia repair and less common after laparoscopic repair. Up to 1% port site wound infection has been reported by some researcher¹⁸. Current study only a single patient developed umbilical port site infection. Hydrocele reported incidence is up to 4% after laparoscopic surgery and mainly attributed to non resection of sac and skipped area during repair. In our study hydrocele occurred in 5.8% cases and can be explained by skip area while securing purse string at deep ring⁸. Laparoscopic repair has the beauty of better visualization to avoid injury to testicular vessel. That's why testicular atrophy incidence is very low after laparoscopic repair and current study endorses this result^{22,23}.

Limitation of study

Small sample size and early follow up period can affect the result of this study. Further research with randomized controlled trial is required to know the impact of purse string technique laparoscopic hernia repair.

CONCLUSION

Purse string at the level of internal ring is safe and effective technique in experienced hands. High level of recurrence can be overcome by gaining learning curve..

RECOMMENDATIONS

Long term follow up and randomized controlled trial are our recommendation to establish the dominance of this novel technique.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Rehman FU: Conception of Idea, article drafting and data analysis.

Rehman IU: Critical appraisal, data interpretation and Proof Reading.

Amin H: Data Collection & Literature Review.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.