

A Comparative Study of Pediatric Inguinal Hernia Repair by Open Technique versus Laparoscopic Repair

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ABSTRACT

Background: Herniotomy / open surgery has been the time honoured treatment for paediatric inguinal hernia. The improvement of paediatric Laparoscopic hernia and increased experience with Laparoscopic technique become an important skill. Laparoscopic repair of inguinal hernias in children is adopted too quickly, cost effective, cosmetically, less invasive, more feasible and less painful. This procedure is that, it could allow contralateral hernia detection and repair in same setting.

Aims and objectives: In our study we aimed to compare between the outcome of inguinal hernia repair in two study group open hernia repair and Laparoscopic hernia repair by Z suture or purse string technique and study to the early and late complication.

Materials and methods: the current prospective study carried out in Department of General Surgery, SVBP Hospital Meerut which included 40 patients duration of period from September 2018 to September 2019. Among them, 20 patients in group 1 were repaired by Open procedure and another 20 patients in group 2 were repaired by Laparoscopic procedure.

Results: The study included 40 patients. The mean time of operation in Laparoscopic repair (41.50 minute) is slightly shorter than that of open repair (47.50 minute) technique. Postoperative pain was much less in LH group then open hernia group. Hospital stay in LH (1.55 days) and in OH (2.20 days). Oral ships were allowed and well tolerated as early in LH (7.3 hrs) and in OH (10.90 hrs), this was statistically significant. Patients' financial

satisfaction was lower in group 2 than in group 1 repair.

Conclusion: The data from study confirmed that the results of Laparoscopic technique has advantage of reduced postoperative pain, diagnosis of CPPV with its management in the same sitting, rapid return to everyday activities, better cosmetic results, cost effective, more feasible and less painful.

Keywords: Pediatric Inguinal Hernia Repair, Open Technique, Laparoscopic Hernia Repair, Herniotomy.

INTRODUCTION

Laparoscopic hernia repair for paediatric patient is emerging as an alternative, superior to open herniotomy. Approximately 80-90% of inguinal hernias appear in boys. One-third of hernias in children appear in first 6 months of life. When closure of processus vaginalis is delayed/incomplete, it may stretch and eventually become a hernia. Its peak incidence is maximum in first year of life. Boys are affected about 6 times higher than girls and more common in right sided then the left sided. Hernia is bilateral in 10% of cases ^[1]. The first Laparoscopic repair of inguinal hernia was reported round in the 1990 ^[2]. Since then many technique have been described which can be divided in to two groups ^[2]. Intra-corporeal technique that included dissection, ligation and division of sac the resemble the true classic inguinal herniotomy ^[3,4]. The indications of LH are

not different from those of OH. Recent studies have shown that the age, size, and body weight of patients are not limiting factors in laparoscopic repair. [5,6] Laparoscopic approach provides a large working space which enhances the relative ease of the procedure, but in small babies, it present a challenge to paediatric surgeons. Therefore, inexperienced surgeons remain reluctant in performing laparoscopic repair in children, especially in neonates or infants in the early age group [7,8,9]. LH has advantages in this age group considering that open repair also has difficulties in those patients. Open repair in small babies needs technical skill because of the common difficulties of the open approach in these patients, including the fragility of the hernia sac and the vulnerability of spermatic cord. [10,11]. Subsequently, the rates of recurrence and testicular atrophy are increased in neonates or small infants. [12,13] In comparison, laparoscopic repair has a straight forward approach to the opening of inguinal hernia, and repair could be performed with minimal manipulation of spermatic cord. In children, these operations are performed under general anaesthesia, laparoscopy was used to examine the contralateral internal ring. [14]. Becmeur et al. and Tsai et al. described a technique in which they resected the processus vaginalis and then close the inguinal ring and they claimed that they have excellent results with 0–1.2% recurrence [15]. There are 2 different approaches to repair paediatric hernias-open repair and Laparoscopic repair, with different laparoscopic repair techniques like purse string or z-suture. The study aims to compare paediatric inguinal hernia repair by open versus two methods (Z suture or purse string) techniques of laparoscopic repair, their outcomes and their early and late complications. From this study, LH is good alternate to open repair, so needs a study which could show clear superiority of one technique to other. So, this review aims to compare LH and OH with regards to operative time, patency of contra-lateral

deep ring, post-op complications and recurrence rates.

Aims: In our study we aimed to compare between the outcomes and complications of the conventional opened repair and the laparoscopic repair of paediatric inguinal hernia.

MATERIALS AND METHODS

This comparative study which was designed to compare between laparoscopic repair and open repair in management of paediatric inguinal hernia regarding outcomes, benefits and drawbacks. A comparative study was carried out in Department of General Surgery, LLRM Medical College, Meerut, over 1 year period. This study was approved by ethical committee. Forty patients, between 2-14 years of age, presenting and clinically diagnosed as case of either inguinal hernia or congenital hydrocele, were randomized into two groups, forty patients in group one of open repair and twenty patients in group two of laparoscopic repair.

Relevant routine investigation was performed and pre anaesthetic assessment was done for their fitness for anaesthesia. All these patients were planned for surgery.

Laparoscopic surgery was performed using the standard three 5mm ports with an intra abdominal pressure 8-10mm Hg. The internal ring was obliterated by purse string or z suture technique by using 3-0vicryl. A similar procedure was performed on the contralateral side, if found to be patent. open herniotomy was performed using a skin crease incision. High ligation of sac was performed by using 3-0 RB Vicryl suture. The distal sac was slit to prevent postoperative hydrocele formation. The wound was closed in layers.

Written informed consents were acquired from all patients' guardians for all surgeries.

Study parameters:

Table shows the parameters assessed. Postoperative pain was assessed

using the Children and infants postoperative pain score for children 2-7years. And children 8-12years by visual score.

Parents of the patients were asked to bring the patients back for review to the outpatient department on specific days. They were assessed for postoperative pain, postoperative complication, recurrence, and change in testicular size, cosmesis of scar, if any, as compared with the preoperative status. Patients were followed up for an average of 6 months to evaluate these short outcomes.

Statistical analysis: In this study obtained data were presented as mean +/-SD, ranges number and ratio. Statistical analysis result

was analysed using number in study by student T test and ranges (categories data) by Chi square test and fishers exact test also used for proportions. P value less than 0.05 was considered statistically significant

RESULTS

Table 1: Shows Post Operative Parameters

Serial no.	Parameters
1	Operation time
2	Size of incision
3	Intraoperative complications
4	Intraperitoneal pressure
5	Postoperative pain
6	Recovery
7	Postoperative complications
8	Discharge
9	Recurrence
10	Cosmesis

Table 2: Distribution of Male & Female Cases in Group 1 & Group 2

Diagnosis	Group 1(%)		Group 2(%)		Total(%)
	Male	Female	Male	Female	
Right Inguinal Hernia	11 (55)	1(5)	11(55)	2(10)	25(62.5)
Left Inguinal Hernia	4 (20)	2(10)	4(20)	1(5)	11 (27.5)
Bilateral Inguinal Hernia	1 (5)	1(5)	1(5)	1(5)	4 (10)
Total	20		20		40/100



Figure 1: Laparoscopic view of right sided inguinal hernia in male child



Figure 2: Picture shows intra-op findings during open herniotomy (R). Black arrow showed Hernia Sac, Blue arrow showed Spermatic cord

The study was conducted on 40 patients. In group one 12 patient were in 2-5 years, 6 patients fell in 6-10 years, 2 patients in 11-15 years. In group two 8 patient were in 2-5 years, 11 patients fell in 6-10 years, 1 patients in 11-15 years. Study 32 patients were male and 8 patients were female. In our study, male: female for group 1 is 4:1 with 16males and 4 females. In group 2 males: females ratio is 4:1 with 16 males and 4 females.

Hernias were clinically right-sided in 25 (62.5%) patients, left sided in 11 (27.5%) patients and bilateral in 4 (10%) patients. Average age of patients in this study was 5.8 years. No patients below 2 years were operated in this study. Only 5% cases were converted from laparoscopic to open procedure. Duration of surgery in open procedure was 47.50 minute and 41.50 minute in laparoscopic procedure, the mean time duration of operation in laparoscopic repair is slightly shorter than that of open repair and their difference was found to be statistically not significant (p value =0.0655).

In Post-operatively recovery was faster in patients in laparoscopic group. Patients in group 1 were allowed orally after 10.90+/-3.63 hours and in group 2 after 7.3+/-2.20 hours and the difference between two groups were found to be statistically significant. In postoperative complications, pain score in group 1 was 8.75+/-2.31 and in group 2, it was 7.35+/-1.73. we found that pain measures on CHEOPS scoring for 2-7 years, difference was found to be statistically significant ($p=0.0364$). VISUAL scoring for 8-12 years for laparoscopic and open group. Judged on a visual analogue scale by the mother of the patients. Both groups scored well, but patients randomised to laparoscopic were more satisfied with cosmetic result. And post op its result was also significant. Nausea, vomiting and post-operative fever between two groups were found to be statistically insignificant.

Hospital stay in group 1 was 2.20+/-0.9 days and 1.55+/-0.76 days in group 2, their difference was found to be statistically not significant.

DISCUSSION

40 patients with inguinal hernia were operated upon by 2 different techniques. Group 1 was subjected to assist by open hernia repair. Group 2 was subjected to laparoscopic hernia repair. Inguinal hernia affects boys approximately 6 times more often than girls.

Ramanathan Saranga Bharathi [16] 2007 studied 69 children and found male patients are more than female patients. (30 out of 35 patients in laparoscopy group while 32 out of 34 patients in open group)

Inguinal hernia is a common problem in children, and open herniotomy is its standard treatment against which all alternative modalities of treatment are evaluated. It is credited with being easy to perform. However, it has the potential risk of injury to the testicular vessels and vas deferens, hematoma formation, wound infection, iatrogenic testicular ascent, testicular atrophy, and recurrence.

The limiting step in laparoscopic hernia repair is documented as the intracorporeal suturing of the Internal inguinal ring.

Contralateral patency

Although laparoscopy proves advantageous over open surgery by precise detection and simultaneous repair of CPPV, as rate of meta-chronous hernia is no low that, it only necessitates subsequent surgery in less than twentieth of patient. In our study also there was no reported case of CPPV.

Operative time

In open surgery, time is consumed in gaining access, obtaining adequate exposure, in localizing and in isolating the sac from the cord structure. In LS approaching from within marks area of interest bloodless, and the magnification renders anatomy splendidly clear, making surgery precise. But the time limiting step remains intracorporeal suturing that places considerable demands on the requirement of hand-eye coordination, especially while negotiating the posterior and medial hemi-circumference of the internal ring, over the iliac and inferior epigastric vessels. We found LS marginally quicker.

K.L. Chan et al 2003 in a study of 83 patients found the operative times of laparoscopic repair versus open herniotomy as (39.08 ± 13.37 min vs 34.0 ± 11.31 min) was not statistically significant ($p = 0.623$).

McCormack et al 2003 Duration of operation was longer in the laparoscopic groups than open group. ($p < 0.01$)

Ramanathan Saranga Bharathi 2007 studied 85 children and found laparoscopic hernia repair was slightly quicker than open herniotomy (25.31 vs 30.65 min), but the difference was neither statistically nor clinically significant ($P=0.06$).

Postoperative pain

The difference in postoperative pain following OH and LH is subject to controversy. Some reports less pain while

others greater pain in the immediate postoperative period following LH compared with OH. We found pain perception following either procedure to be less in LH. In addition to parietal pain caused by port placement, capnoperitoneum causes visceral pain due to stretching (peritoneal and diaphragmatic) and acidosis. Neither the use of smaller ports nor the use of caudal analgesia would completely obliterate pain following laparoscopy. Hence the difference in postoperative pain between LH and OH is significant. LH is less postoperative pain surgery.

McCormack et al 2003 found less post operative pain in Laparoscopic techniques than open techniques for inguinal hernia repair ($p=0.001$)

Ramanathan Saranga Bharathi 2007 found no significant difference in pain perception in two groups ($p=0.449$)

Recovery and Discharge

Recovery from the effects of anaesthesia was delayed in greater proportion of patients undergoing LH. This may be due to deeper anaesthesia and muscle relaxation needs for intubations in LH. OH can well be performed with the patient under a face mask, especially when caudal analgesia is administered simultaneously. Good recovery was seen in OH.

None of the patients was discharged on same day of operation. In our study, the mean time of hospital stay after laparoscopic repair was lesser than open repair.

The difference between hospital stay of two procedures was statistically significant.

CONCLUSION

Open inguinal hernia repair is an excellent method of repair in the paediatric population. However, when compared to laparoscopic procedure, there is more duration of surgery, prolonged hospital stay, more post-operative analgesia and poor cosmesis. Present study, therefore indicates

that Laparoscopic herniotomy for paediatric patients is safe, effective and more patient-friendly, experience for laparoscopic techniques.

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