Original Research Paper

Volume-10 | Issue-2 | February - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Surgery

CIRCUMFERENTIAL OR LATERAL INCISION, WHICH IS BETTER IN LAPAROSCOPIC INGUINAL HERNIOTOMY?

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ABSTRACT The outcomes of indirect inguinal hernia operated laparoscopically with circumferential division [360 degrees] of the hernial sac versus lateral division [270 degrees] of the hernial sac followed by laparoscopic suturing of the peritoneum at the internal ring were compared. This is a 3-year prospective single blinded randomised study. All cases satisfying the inclusion & exclusion criteria, operated from Jan 1st 2011 to Dec 31st 2013 were included. Cases were randomly allocated into two groups, 50 in the circumferential incision group and 50 with the lateral division group. Out of the 100 hernias in 91 patients, 9 were bilateral. Age, sex and size of the defect were comparable. There were two recurrences in lateral incision group [4%] and none in circumferential group, but the P value was found to be 0.49 which was not significant and hence there is statistically no significant difference in the recurrence rate or operating time.

KEYWORDS : Inguinal Hernia, Laparoscopic Inguinal Herniotomy, Hernia Repair, Pediatric Hernia, Purse String Suture.

INTRODUCTION:

Indirect Inguinal has an incidence of 13 per 10000 populations [1] in childhood. Open herniotomy is the gold standard for the management of inguinal hernia in children with a recurrence rate of 0 to 1.2% [2]. Laparoscopic inguinal hernia repair has been proved to be a safe and reliable technique [3]. The recurrence rate with laparoscopic inguinal hernia repair was high initially [2.4 to 4.1%] [4, 5] but now with more experience, rates are comparable to open herniotomy [6] and with the added advantage of simultaneous visualization and repair of contralateral patent processus vaginalis if present. There would be a lesser chance of damage to the vas deferens since vas is not handled during laparoscopic repair in contrast to open repair where vas and testicular vessels has to be separated from the hernia sac.

Many techniques are used for laparoscopic inguinal hernia repair which include closing the ring with interrupted sutures, N type, Z type [5] Wheeler described division of the hernial sac with purse string suture [7] Lateral peritoneal incision [270 degrees] at the internal ring was started for the ease of taking suture at deep ring [6]. It creates a raw surface which hastens the healing by fibrosis [3] and simultaneously prevents risk of any damage to the vas which enters medially in the inguinal canal where peritoneum is not divided. Some studies showed that this technique does not reduce the recurrence rate [7]

However, the recurrence rate after circumferential division [360 degrees] of the peritoneum at the internal ring which duplicates open herniotomy, has not been evaluated. This is a comparative study of the outcome, mainly recurrence rates of the inguinal hernia following laparoscopic inguinal herniotomy with lateral incision [270 degrees] versus complete division [360 degrees] of peritoneum at the internal ring.

METHODS:

This was a randomised clinical study. All cases satisfying the inclusion criteria, operated in the Pediatric surgery department starting from Jan 1st, 2011 to Dec 31st, 2013 were included in the study. A total of 100 consecutive cases were randomly allocated into two groups. Group 1 had 50 hernias with circumferential incision of peritoneum at the internal ring. Group 2 had 50 hernias with lateral division of the peritoneum at the internal ring. The patient/relatives were blinded to the type of hernia repair. Age, sex, size of the defect, duration of surgery, time of recurrence, and complications were evaluated.

Inclusion criteria were children with inguinal hernia aged 2 months to 18 years who have fully descended testes. Children with incarcerated inguinal hernias, previous abdominal or inguinal surgery and undescended testis were excluded. All the cases were randomized and operated laparoscopically with either circumferential [360 degrees] division of peritoneum at the deep ring or with lateral division. Only clinically evident hernias were considered for the study of recurrence. Patients were followed up for a period of 12 to 30 months with an average follow up period of 22 months. Patients presented with bilateral hernias were taken as two cases. In those patients who presented with unilateral hernia, but intra operatively found to have an open contralateral deep ring, the open ring was closed. Only the clinically evident hernia was taken for the study of recurrence rate and was considered as a single case, but the data were used for the study of operative time in unilateral and bilateral hernia repair, as well as for the incidence of laparoscopically detected hernia.

OPERATIVE TECHNIQUES:

Laparoscopic Inguinal Herniotomy with Circumferential Incision of Peritoneum at deep ring: Group 1

After induction and general anesthesia patient was positioned in Trendelenburg position. First 5 mm umbilical camera port was placed. After creating the pneumoperitoneum with a pressure of 8-10 mm Hg, the 30-degree telescope was inserted via camera port. The open deep ring was confirmed and the contralateral side was inspected. Under laparoscopic vision two 3 mm subumbilical pararectal working ports were placed on the right and left side. Herniated contents if present were reduced into the abdomen. The size of the open deep ring was measured. The peritoneum at the border of deep ring was incised with electrocautery circumferentially. The incision was started laterally first and continued medially to complete the 360-degree division. Medially the peritoneum was incised after lifting it off the vas and vessels. The distal sac was seen to recede into inguinal canal after completion of circumferential division. The deep ring was closed with a purse string suture including peritoneal and sub-peritoneal tissue with 3-0 Prolene suture. The deep ring on the contralateral side if found open at laparoscopy, was also closed similarly. [Fig1]

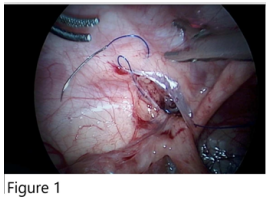
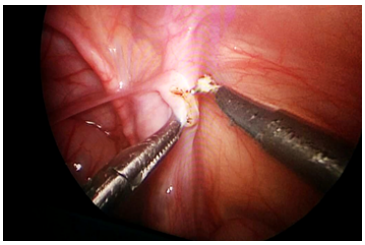


Figure 1

The feeding was started 4 hrs after surgery. Since most of our patients were coming from far off and surgeries finished late in the afternoon or evening they preferred to be discharged on the following day and so a uniform protocol of overnight stay was followed for all patients. The first follow up was at 1 week and later every 3 months for a period of 12 to 30 months. Patients who were from faraway places and did not visit for follow up were contacted over the telephone for any recurrence and complications.

Laparoscopic Inguinal Herniotomy with Lateral Incision of Peritoneum at deep ring: Group 2

All steps as in the above technique were followed except that the peritoneum at the deep ring was incised anterolaterally 270 degrees for this group. Incision started lateral to the vas and vessels and continued laterally, anteriorly and medially up to the medial part of the vas and vessels, incision sparing the area of vas and vessels [Fig 2].



STATISTICALANALYSIS:

To test the statistical significance of the difference in recurrence rates between the two groups Chi-square test was applied. To test the statistical significance of the difference in the duration of surgery between the two groups, Mann –Whitney U test was applied.

RESULTS:

Total no of hernia included in the study were 100 (91 patients with 9 bilateral hernias) in which 50 underwent herniotomy with circumferential incision of peritoneum (group 1) and 50 with the lateral division of the peritoneum at deep ring (group 2).

Out of total 100 hernias, 51(51%) were female hernias and 49 (49%) were male hernias. 59 (59%) were right sided hernia and 41 (41%) were left sided hernia. Age ranged from 2 months to 180 months (mean 54 +/- 34 months). Among 91 patients 9 (9.8%) patients presented with bilateral hernias. Among 82 patients with unilateral hernias, in 29 cases (35 %) opposite internal ring was found open.

Table -1: Comparison of recurrence rates in circumferential division and lateral division of peritoneum at deep ring.

Group	Recurrence		P value
	No n (%)	Yes n (%)	
Circumferential	50 (100.0)	--	0.495
Lateral	48 (96.0)	2 (4.0)	

There were two recurrences in group 2 (4%) and none in group 1, but the P value was not significant (0.49) [Table 1]. Both recurrences were on the right side. One recurrence was within 2 weeks of surgery; it was a male child with a right side triangular defect of size 1.5 cm and was operated at 84 months of age Another recurrence was at 18 months postoperatively and it was a female child with a right side oval defect of size 1 cm, operated at 60 months' of age. Open herniotomy was done in the first case and laparoscopic herniotomy in the other. This was according to parental preference.

Out of 51 female hernias 1 had recurrence (1.9 %) and 49 male hernias 1 had recurrence (2%) with P-value 1.

The Operative time was found less in group 2 in both unilateral [22 +/- 5 min] and bilateral hernias [31.4 +/- 6 min] compared to group 1 for unilateral (25 +/- 6.6 min) and bilateral hernia (34 +/-7.7 min) but the P value of unilateral group was 0.104 and for bilateral group was 0.145

Table- 2 comparison of operative time (min) unilateral and bilateral hernias in case of circumferential division or lateral division of peritoneum at deep ring.

Unilateral/ Bilateral	Groups	N	Mean time	Std. Deviation	Median	Minimum	Maximum	P Value
Unilateral	Circum.	24	25.00	6.633	23.50	16	45	0.104
	Lateral	28	22.86	5.024	22.00	17	39	
	Total	52	23.85	5.862	22.50	16	45	
Bilateral	Circum.	21	34.10	7.713	35.00	18	45	0.145
	Lateral	17	31.41	6.774	33.00	19	45	
	Total	38	32.89	7.337	34.50	18	45	

and both of P values are statistically not significant [Table 2].

Operative time for unilateral as well as bilateral hernias in female was found less compared to the male patients.

DISCUSSION:

The recurrence rate in patients who had lateral incision of peritoneum was 4% compared to 0% in those that had circumferential peritoneum incision. Our result is comparable to a report 0% in a study of 31patient who underwent laparoscopic inguinal herniotomy with the circumferential division of the peritoneum at deep ring [5].

Another study reported 2.4% recurrence rate in 284 hernias repaired laparoscopically with lateral incision of peritoneum at the deep ring [8]. This was lower than the present study that showed 4% recurrence rate in 50 laparoscopic herniotomies with lateral incision.

Study by Pant showed that there is no difference in the recurrence rate between circumferential division of the peritoneum with purse string suture and without closure of the internal ring. [9]

In this study hernia was found more in girls [51 %]. This is in contrast to the previous studies which reported incidence of hernia predominantly in boys [1] with boys: girls' ratio up to 5:1. This may be because female hernias tend to be picked by the parents earlier and brought to the hospital. The study found a 35 % incidence of contralateral open deep ring during laparoscopic herniotomy which is comparable to a study by Toufique Ehsan which also reported 39.7 % incidence rate of contralateral open deep ring diagnosed during laparoscopic herniotomy [10].

The recurrence rate of inguinal hernia was found equally in boys and girls. The operative time was less for group 2 in both unilateral [22 +/-5 min] and bilateral hernias [31.4 +/- 6 min] compared to group 1 for unilateral [25 +/- 6.6 min] and bilateral hernia [34 +/- 7.7 min]. This time difference is likely due to meticulous division of peritoneum over the vas and vessels in group 1which was not done in the group 2. The time difference between group 1 and group 2 for the unilateral as well as for the bilateral inguinal herniotomy was not statistically significant.

Hence it can be concluded from the present study that circumferential division of the peritoneum at the deep ring compared to the lateral division does not cause any significant increase in the operating time. However, it might require more number of cases to prove the statistical significance.

The study did not show a statistically significant advantage of circumferential division of the peritoneum at the deep ring over the lateral division of the peritoneum in the recurrence rate in contrast to what is reported in literature. However, a larger number of patients are required to confirm this finding.

COMPLIANCE WITH ETHICAL STANDARDS:

Permission from the ethical committee of the hospital was taken prior to the start of the study.

CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

LEGENDS:

Fig 1: Shows circumferential incision
Fig 2: Shows lateral incision

Table 1: Shows recurrence of hernia in both groups
Table 2: Shows comparison of operating time in unilateral and bilateral cases.

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