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Laparoscopic inguinal hernia repair in children: A single-centre experience over 7 years

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ABSTRACT

Background: To evaluate 209 consecutive children who underwent laparoscopic hernia repair over a 7-year period. Technical details and clinical results are reported. **Materials and Methods:** A total of 284 open internal rings were closed laparoscopically in 209 children (142 boys and 67 girls, aged 30 days to 15 years, mean 44 months). One 5-mm and two 3-mm instruments were used to access the peritoneal cavity. A 270° anterolateral peritoneal incision was made. The internal inguinal ring was closed with a nonabsorbable suture. **Results:** There were no significant intraoperative complications. Length of procedure ranged between 15 and 65 minutes with a mean of 30 minutes. Postoperative hospital stay ranged from 1 to 9 days. Thirty children who presented with a right-sided hernia and 23 with a left hernia (total of 53) were found to have a patent contralateral internal ring on laparoscopy. Mean follow-up was 30 months. There were 2.4% hernia recurrences and cosmesis was excellent. **Conclusions:** Laparoscopic hernia repair in children can be a routine procedure with increasing experience and better learning curve of surgeons. There is clear visualization of structures and vas remains untouched. The recurrence rate is comparable to that of the traditional open approach with a superior cosmetic result.

Key words: Children, inguinal hernia, laparoscopy, recurrence

INTRODUCTION

Inguinal hernia is one of the common surgical conditions in infancy. Open herniotomy has been the treatment of choice.[1] Recently, laparoscopic repair has become an alternative to the open herniotomy[2,3] more so in recurrent hernias.[4] Laparoscopy also helps in the identification of contralateral open internal rings. At present, it has not found general acceptance among paediatric surgeons. The concerns about paediatric laparoscopic hernia repairs are the longer operative time, conversion of an extraperitoneal procedure into a transperitoneal one, and a higher recurrence rate with no overall advantage compared with the open procedure.[3] However, with refinement in the techniques and continued experience, the reported recurrence rate has been declining.[3,5-8] This study reports the experience with laparoscopic hernia repair in a single centre over a period of 7 years with technical details and clinical results.

MATERIALS AND METHODS

Medical records of 209 consecutive children who underwent laparoscopic repair of 284 open internal inguinal rings at the Department of Pediatric Surgery, Amrita Institute of Medical Sciences and Research Centre, Kochi, India, from January 2002 to December 2008 were examined. In most of the cases, the initial diagnosis was established by a referring paediatrician and confirmed preoperatively by a paediatric surgeon. Three paediatric surgeons and senior trainee operated on the patients. After induction of general endotracheal anaesthesia and caudal block, the patient was placed in the Trendelenberg position. A 5-mm port was inserted through the umbilicus for a 30° telescope. A pneumoperitoneum pressure of 8–12 mm Hg was created. The internal opening of the hernia was confirmed, and the opposite side was inspected. Two 3-mm ports were placed lateral to the rectus muscle just below the level of the umbilicus under telescopic vision. If bowel or ovary was found in the hernia sac, it was reduced into the abdomen. The peritoneum at the anterolateral border of the internal inguinal ring

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was incised with electrocautery for 270 degrees so as to avoid injury to the vas deferens and testicular vessels. A nonabsorbable 4-0 suture with the length cut to 10 cm was inserted through the abdominal wall near the internal inguinal ring and grabbed from inside by a needle driver. A purse-string suture was placed around the internal ring including the peritoneum with subperitoneal tissue and knotted intracorporeally [Figure 1]. Deeper tissues (muscular tissue) were taken at the cranial margin of the internal ring and less at the caudal circumference because of the neighboring vas, vessels, and nerves. Open ring on contralateral side admitting the 3-mm needle driver was also closed. The ends of the stitches were cut, and the needle was removed via the port. After release of the pneumoperitoneum, the ports were removed. The wound was closed using skin steristrips, except for the umbilical wound where fascia closure was done with 2-0 prolene. Patients were discharged home the following day because of geographical location and some with associated anomalies. Regular feedings or diet was offered to the children 6 hours after surgery. The patients were followed up in outpatient 2 weeks and 6 months after surgery and yearly thereafter. Patients not seen at follow-up were contacted over the telephone for any recurrence and other complications. SPSS version 16.0 was used for analysis. Chi-square test was used to compare categorical values. The level of significance was set at $P < 0.05$.

RESULTS

There were 132 boys and 77 girls in the 209 children studied with age ranging from 30 days to 15 years and a mean of 44 months (median 36 months). One hundred seventeen children presented with a right-sided inguinal hernia, 69 with a left hernia, and 23 were bilateral. Thirty children who presented with a right-sided hernia and 23 with a left hernia (total of 53) were found to have a patent contralateral internal ring on laparoscopy. The operating time from skin-to-skin ranged from 15 to 60 minutes (median 30 minutes). Postoperative operative stay ranges from 1 to 9 days. One 20-month-old child with associated Atria septal defect stayed 9 days postoperative and another child with hypertophic pyloric stenosis stayed 5 days. There were five children with incarcerated hernia that was reduced nonoperatively before laparoscopic herniotomy. Seven other procedures were done concomitantly. Six laparoscopic-assisted orchidopexy was done for five children at a median age of 12 months (range 10 months to 3 years) and pyloromyotomy ($n = 1$). There was no significant intraoperative or postoperative complication. One child with incarcerated hernia had scrotal edema lasting 72 hours. Follow-up ranged from 6 to 55 months (mean 30 months). There were five hernia recurrences (2.4%), four in boys and one in a girl. $P = 0.4$, right ($n = 3$), left ($n = 1$), and bilateral ($n = 1$) $P = 0.33$ with no statistically significant difference in age, sex, and operated side for the recurrence. Four (80%) of the five recurrence were in the first 4 years and only one in the later 3 years.

DISCUSSION

The quest for limiting pain and access damage together with the pursuit of better cosmesis has led to the development of laparoscopy and other video-assisted surgical procedures. These were made possible by advances in technology and instrumentation affording surgical precision through enhanced visualization and magnification.[9]

Various techniques of laparoscopic hernia repair for

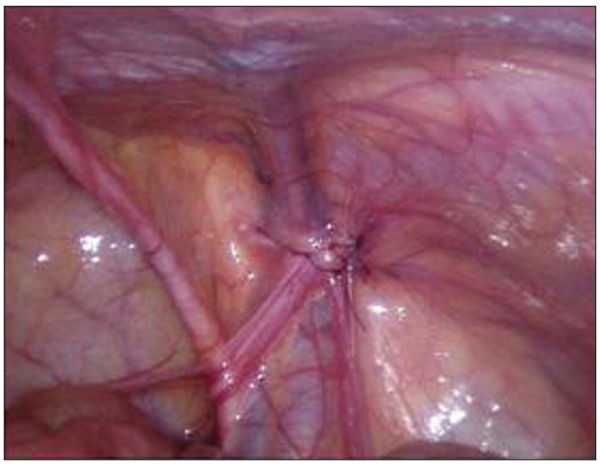


Figure 1: Showing intracorporeal purse string knotting

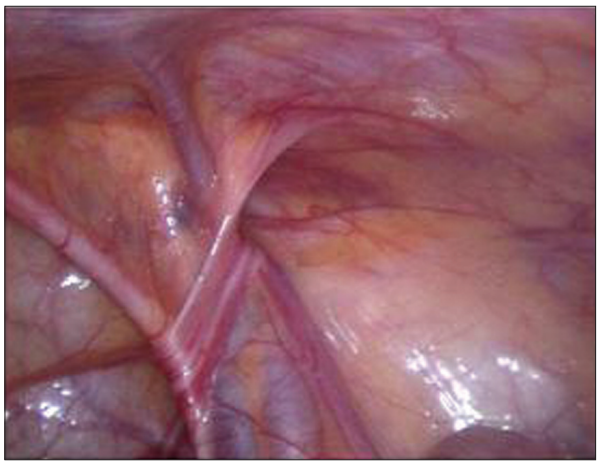


Figure 2: Showing clear visualization of structures

children have been described,[3,6,7,10] but it is still a technically demanding procedure, when compared with the open method, and it is now becoming popular among paediatric surgeons. We made an anterolateral peritoneal incision to create a raw surface for hasting healing and preventing recurrence.

Cord structures are not touched with this technique and the trocar placement is identical for any side or hernia type; intraoperatively, there was never a doubt about the affected side. The 2.4% recurrence rate in this study is consistent with other series.[3,5,10,11] The five recurrences were recorded during our initial series. Laparoscopy requires the same operating time as conventional surgery in cases of unilateral inguinal hernia, but may be even faster in cases of bilateral inguinal hernia surgery without the need for additional trocars. Considering the 5.6%–16% chances for children who will develop a contralateral inguinal hernia,[2,10,12] laparoscopic repair resolves the problem bilaterally at once, thus obviating the need for a second operation and thus anesthesia, and reducing both economic impact and risks to the patient.[10] We repair contra lateral open internal ring in 53 (25.4%) children in this series. Seven concomitant procedures were also carried out which is an added advantage of laparoscopic approach. In recent years, laparoscopy has been considered the most reliable method for localizing nonpalpable testes and assessing treatment option.[13,14] Apart from the advantages of magnification and precision of dissection, it allows for extensive mobilization of the spermatic vessels and the vas, a very important requisite for a successful orchidopexy.[15] Operating time of 15–60 minutes was comparable to other reports.[6,10,11] We, however, spend less time as our experience increased. Routine caudal block in our centre aids postoperative pain relief and reduces the dosage of analgesics needed in the patients. However, children who have a laparoscopic repair suffer less pain.[1] There was only one scrotal edema in a child with incarcerated inguinal hernia which was not unexpected. The complication rate in this study is less than that reported for open approach.[16] The wound cosmesis are more satisfactory and the vas deferens remained untouched. The visualization of structures is clear [Figure 2] and leads to a defect-specific closure. Same trocar placement was used to repair contralateral hernia and other associated anomalies. Although recurrences were slightly more frequent in the early stages, now they are closer to the rate with the open procedure. We recorded four recurrences in the first 4 years while only one recurrence was noticed in the later 3 years.

CONCLUSION

As experience with laparoscopic hernia repair increases and the learning curve for surgeons become shorter with continue improve technology, application of this minimally invasive repair may become a common place. The recurrence rate though higher than the traditional open approach it give better cosmesis and avoids injury to the vas deference. Long-term follow-up is, however, needed to validate this result.

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