ORIGINAL ARTICLE

Laparoscopic surgery in children – 3 years institutional experience

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Abstract:

Background: Internationally increasing proportion of pediatric surgical procedures are done endoscopically. We report our experience of the last three years and review the trend at our institution.

Materials and methods: We performed 117 laparoscopic procedures in children aged between 4 days and 15 years. In all laparoscopic procedures, the primary port placement was by the Hasson's open technique. We have used 5 and 3 mm instruments. Our study includes 31 diagnostic laparoscopy for impalpable testis, 22 Appendectomies, 15 cholecystectomies, 10 inguinal hernia repairs.

Results: The ultimate outcome of the entire performed procedures showed satisfactory trend, the data of which are to be discussed.

Conclusion: We concluded that Laparoscopic procedures appear to be safe for a wide range of indications in neonates and children. As we gained experience the operating time showed a decreasing trend. The advantages we came across were better postoperative appearances but the claimed benefit of less pain and early discharge from the hospital were not observed in our series.

Keywords: Pediatric Laparoscopy, Diagnostic laparoscopy, laparoscopic appendectomy.

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Introduction:

In children non availability of miniaturized instruments and lack of single index cases like laparoscopic cholecystectomy for surgeons to develop technique resulting in slow acceptance of this technique. The field of Laparoscopic surgeries has grown remarkably over the past 2 decades. The courage and creativity of surgeons has led to a broad array of surgeries that can now be performed. Laparoscopic surgeries clearly has a steep learning curve. More recently, however, with increasing experience and advances in miniaturized instrumentation, the role of laparoscopy in the modern paediatric surgical armamentarium has become accepted. Laparoscopy helps reducing traumatic insult to the patient without compromise of the safety and efficacy of the treatment.

The objective of the study is to share our experience of laparoscopic procedures in relation to the trend both regional and international.

Material & Methods:

The audit data of the section of Pediatric surgery , Liaquat National Hospital was reviewed for the period of January 2007 to December 2009. During this period total number of Procedures performed were 4056, of these 117 were performed laparoscopically. This accounts for 2.88% of the total number of procedures [Table - 1]. Wide variety of laparoscopic procedures were performed including diagnostic laparoscopy(26.4%), Laparoscopic Appendectomy(18%), Laparoscopic Cholecystectomy(12%), Laparoscopic Inguinal hernia repair(8.5%)[Table - 2]. In all laparoscopic procedures, the primary port of 5mm was placed by the open technique. The abdomen was insufflated with carbon dioxide. The secondary ports of 3-5mm were put under direct vision. A

Table 1: *Ratio of laparoscopic procedures*

Year	Total Number of Surgical Procedures	Total Number of Laparoscopic Procedures
2009	1486	52(3.4%)
2008	1246	34(2.7%)
2007	1324	31(2.3%)
Total	4056	117(2.88%)

thorough diagnostic laparoscopy was done once the scope was inserted and then the procedure was completed depending on the pathology.

Results:

Diagnostic Laparoscopy for impalpable Testes

Thirty-one children with 51 impalpable testes underwent laparoscopy in our center. Among this, six had absent testes. 22 of the 45 testes(48.1%) were intra-abdominal. A high intra-abdominal testis is one, which is more than 2.5 cm from the internal ring. Six were high and all these were treated by a staged Stephen-Fowler orchiopexy. Sixteen were found at internal ring(peeping testes). Therefore groin exploration/abdominal exploration was carried out in 37 patients and orchidopexies were performed and 7 children had orchidectomy due to small atrophic testes

Laparoscopic appendicectomy

Twenty-Two children presented with history of migratory right lower quadrant pain and had features suggestive of acute appendicitis for whom laparoscopic appendicectomy was performed. All were found to have inflamed appendices. Of them Eight were operated using out-technique by TULA(Trans-umbilical Laparoscopic Appendectomy) where appendix was dissected inside the peritoneum and brought out through the umbilicus and removed after transfixating with vicryl suture at its base. Six of the appendix were removed by using in-technique in which endoloop was tied after dissection at its base while the appendix was intraperitoneal. Records were not clear about the technique used in 8 patients. For laparoscopic appendicectomy mean time taken was 90 min. The analgesic and antibiotic requirement was same as in open appendectomy. The mean postoperative stay was 4 day. We encountered no port site infection in our series.

Table 2: *Variety of laparoscopic procedures*

Laparoscopic Procedure	No. of Cases
Laparoscopic Appendectomy	22
Laparoscopic Inguinal Hernia repair	10
Diagnostic Laparoscopy for Undescended Testis	31
Laparoscopic Liver Biopsy	7
Laparoscopic cholecystectomy	15
Laparoscopic assisted E.R.P.T	5
Laparoscopic assisted P.S.A.R.P	1
Laparoscopic Splenectomy	2
Diagnostic Laparoscopy	24

Laparoscopic cholecystectomy

Since the introduction of ultrasonography, cholelithiasis in children is being increasingly recognized and referred to us. In our series fifeen patients underwent laparoscopic cholecystectomy. The youngest patient in the study was a 4year-old boy. Nine patients were males and six were females. All children were Symptomatic. Operative time varied from 120-150 mins. Majority were discharged on second postoperative day. We had no conversion in our series.

Laparoscopic inguinal herniorrhaphy

This series includes 10 children with inguinal hernia treated laparoscopically (1 male,9 females). The age range was from 2 to 8 years. Total of 14 hernias were repaired. Seven patients presented with right hernia, three had left sided hernia and four had a contralateral patent processus vaginalis (PPV). In none of the patient, both the internal rings were found to be closed. In female, majority were repaired using an endoloop and the redundant sac was left in the abdomen. The type of repair in male was dissection and intracorporeal suturing(purse-string). We use 3-0 Vicryl sutures. The operating time showed a decreasing trend as the team gained experience. There were no conversions to open herniotomy in our study. We had no recurrences so far.

Laparoscopic assisted Endorectal pull through

Three patients underwent single stage Lap.assisted pull through and all these cases were performed for Hirschsprungs disease. Laparoscopi-

cally level of ganglionic segment was identified by frozen section biopsy, abdominal part of dissection and mobilization was done laparoscopically.

Discussion:

Minimal invasive surgeries is in vogue for decades. Arthroscopy, endoscopy (eg, cystoscopy, esophagogastroscopy, colonoscopy), and gynecologic endoscopic procedures are done routinely for quite sometime. In adults therapeutic endoscopic abdominal procedures have really taken off since successful laparoscopic cholecystectomy. Pediatric surgery lagged behind adult surgery mainly because of lack of miniature instruments and non-availability of bulk index procedures as cholecystectomy in adults. Gradually more and more centres have taken up laparoscopy and in some cases laparoscopy now has become gold standard.

Laparoscopic Repair of inguinal hernia:

Repair of inguinal hernia is one of the most common procedures performed by pediatric surgeons. A 1996 survey of members of the Surgical Section of the American Academy of Pediatrics noted that 65% of respondents explored the contralateral side of males 2 years of age and 84% explore females up to 4 years old.1 Laparoscopy helps in minimizing this approach of open exploration. Different techniques are used to evaluate the contralateral side for hernia2,3,4,5,6.

Meta-analysis by Miltenberg et al7 determined laparoscopic evaluation of contralateral hernia to have a specificity of 99.4% and sensitivity of 99.5%, based on their analysis of published studies We identified 4 contralateral PPV in 10 presenting hernias in our series and repaired them endoscopically. This procedure has increased cost of instrumentation and prolonged learning curve but helps to avoid negative contralateral exploration and better cosmesis.

Laparoscopic appendectomy(LA):

Appendectomy is the most common emergency operation performed by pediatric surgeons. Laparoscopy provides the surgeon and the assistant visual access to a large part of the abdominal cavity and other causes of abdominal pain can be evaluated, and incidental findings may be noted or treated.8 Meguerditchian et al9 reviewed 391 appendectomies performed over a 3-year period and showed shorter hospitalization (2.38 days vs 2.94 days) and longer operative time (45.7 minutes vs 40.6 minutes). Blakely et al10 and Hay11 reviewed published literature comparing OA and LA and determined that LA is associated with less postoperative pain, fewer wound complications, quicker return to normal activities, and a more desirable cosmetic result. In our short series the advantage was better cosmesis.

Laparoscopic Cholecystectomy(LC):

Laparoscopic cholecystectomy (LC) has replaced open cholecystectomy in adults as the technique of choice for removal of the gall bladder. Pioneering work of Holcomb and others demonstrates that it is the preferred technique in children as well.12–18 Infants can be successfully treated with LC.19,20. Mattioli et al22 reported 58 patients under the age of 10 years who underwent LC for stone disease. All but 1 was completed laparoscopically. In our series none of the patients had inflamed gallbladder at the time of procedure and we did not encounter any complication.

Diagnostic laparoscopy for impalpable testis

Laparoscopy has come to play an important role in the management of the child whose testis cannot be palpated. For patients whose testis is palpable in the internal ring, laparoscopy may serve a role if short testicular vessels are the limiting factor to completion of the orchidopexy. When the testicle cannot be palpated, laparoscopy allows both visualization of the gonad and access to the vessels (which can be divided laparoscopically) and surrounding tissues for dissection.Laparoscopy is more sensitive than nuclear magnetic resonance in detecting a nonpalpable testis.23 Numerous authors report successful outcomes using laparoscopy for boys with a nonpalpable testis.24–30

In our study proportion of procedures performed laparoscopically is small but in line with other centres evolved through this stage. It is

encouraging to note that the trend is to perform proportionally more procedures endoscopically. Limitation of bulk index case can be compensated by more practice in wet lab and getting assistance of adult laparoscopic surgeons during individual case.

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