



Original Article

Advancement in Paediatric Laparoscopic Surgery: Two Years' Experience in A Tertiary Level Medical College Hospital in Bangladesh

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Abstract

Introduction: Laparoscopic surgery has evolved rapidly in recent years and is considered a standard procedure in Paediatric surgery¹. Recent advanced in the paediatric laparoscopy have largely concentrated on reducing the size of incisions needed to operate². Now a days an increasing number of diagnostic and therapeutic surgical procedures are being done laparoscopically³.

Methods: This retrospective paediatric laparoscopic study was carried in Dhaka Medical College and Hospital over a period of 2 years from Jan 2023 to Dec 2024. For different surgical conditions, age ranged 2 months to 12 years were operated laparoscopically for different surgical conditions.

Results: A total 264 patients were operated laparoscopically. Out of them laparoscopic hernia repair was done on 85 patients, followed by laparoscopic appendectomy was in 59

patients, laparoscopic orchiopexy was in 51 patients, laparoscopic cholecystectomy was in 24 patients, laparoscopic assisted pull through was in 11 patients, diagnostic laparoscopy was in 10 patients, laparoscopic assisted ano rectoplasty was in 07 patients, laparoscopic pyeloplasty was in 03 patients, laparoscopic ovarian cystectomy was in 03 patients, laparoscopic excision of prostatic utricle was in 03 patients, others procedures was in 8 patients.

Conclusion: Laparoscopic surgery is becoming the standard of care for many paediatric conditions. There is an increased demand from referring physicians as well as the public for laparoscopic surgery. Careful preparation and training are the cornerstones of successful outcome.

Key Words: Advance Laparoscopy, Paediatric Surgery, DMCH.

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Introduction:

Laparoscopic surgery has existed since the development of diagnostic laparoscopy in 1960s. The process of laparoscopic surgery from diagnostics to a surgical procedure at the beginning of the 1980s; and since it has become a frequently applied technique for a wide field of indication.

The benefit of laparoscopic surgery is improved visualization, minimal surgical trauma, enhanced cosmetic outcome, precise dissection, reduce risk of infection, shorter hospital stays, decreased blood loss, faster return to normal activities, early recovery and less post operative pain.

Methods: Two hundred sixty-four patients in paediatric age group were operated laparoscopically for various conditions in department of paediatric surgery

in Dhaka medical college and hospital, Dhaka, Bangladesh, from Jan 2023-Dec 2024, to see the feasibility and surgical outcomes of different laparoscopic procedures of paediatric age group 2 months to 13 years. All patients underwent laparoscopic procedures for various surgical conditions for both therapeutic and diagnostic purposes.

The various condition for which laparoscopic procedure was performed are inguinal hernia, appendicitis, impalpable testes, cholelithiasis, Hirschsprung's diseases, anorectal malformation, adnexal mass, DSD, PUJ obstruction, prostatic utricle, removal of retained DJ stent etc.

After elaborate history taken, through clinical examination and proper investigation diagnosis was made and the patients or guardians were counselled for the procedure whether therapeutic or diagnostic. Informed written consent were taken from parents or guardians before the procedures.

All the cases were done under general endotracheal anesthesia.

The first port placement for telescope in laparoscopy was made at supraumbilical region, initially was in open method but later on with experience switched over to blunt method in fresh cases. Pneumoperitoneum was achieved by using carbon dioxide and pressure was maintained at 6-12 mm of hg dependent upon age and contour of abdomen. 2nd, 3rd, or 4th port were made according to principle of baseball diamond concept for proper ergonomic.

A 5mm 0o or 30o telescope was used in majority of cases and 10 mm 30o telescope was used in few cases in older children or some time where the procedure involved removal of a large specimen under direct vision.

A though search of whole abdominal cavity was made to confirm preoperative diagnosis as well as any existence of other pathology in abdominal cavity.

Results: There were 264 patients of pediatric age group were operated laparoscopically for various surgical conditions.

Hepatobiliary system:

Laparoscopic cholecystectomy: We performed laparoscopic cholecystectomy in 24 patients for cholelithiasis. All cases were diagnosed by ultrasono-

gram. Age range between 2 years to 13 years. Two patients had hemolytic diseases. 8 patients were female and 16 were male. Conventional four port lap cholecystectomy was done. 3 patients required abdominal drain due to per operative oozing. Operating time range from 30 to 80 minutes with mean time 40 minutes. One case required conversion. Specimen retrieval was done via 10mm epigastric port. Majority discharged on 2nd POD after oral feeding established which was given on 1st POD after getting bowel sound. All patients followed up on 7th POD. Two patients had epigastric port site infection which managed by oral antibiotics.

Gastrointestinal system:

Laparoscopic appendectomy: 59 patients underwent laparoscopic appendectomy. Among them 30 were girls and 29 were boys, age range from 3 years to 13 years. 10 were acute cases and rest were elective cases. Three ports were used, one 10 mm or 05 mm umbilical port for telescope and other two ports -one 05 mm port in the midline above pubic symphysis and one 05 mm port in right iliac fossa just below the umbilical level at mid clavicular line. In initial cases metallic or hemo clips were used at base of the appendix, later on after gaining experience intracorporeal knotting was done in maximum cases. Specimens retracted through 10 mm umbilical port with the help of long reducer. Operating time ranged from 20 minutes to 60 minutes, mean operating time was 35 minutes. Two patients had port site infection which was managed by oral antibiotic. Elective cases were discharged on 1st POD and acute cases were discharged on 2nd POD after oral feeding established.

Hirschsprung's disease: 11 patients including 07 males and 04 females, age ranges 1 year to 7 years. All patients underwent; laparoscopy assisted Swenson procedure. Three ports were used, one 10 mm umbilical port used as camera port and two ports on right and left iliac fossa below umbilical region in midclavicular line as working ports. Operating time ranged from 90 minutes to 140 minutes, mean time was 100 minutes. 10 patients had covering colostomy and one patient underwent single stage.

Anorectal malformation: 7 patients including 5 males and 2 females, age range 1 year to 4 years, anorectal malformation with pelvic colostomy in situ underwent laparoscopy assisted anorectoplasty. Three ports were used – umbilical port used as camera port and two

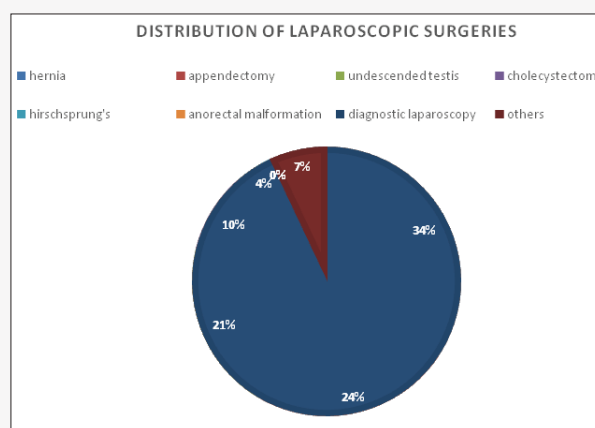
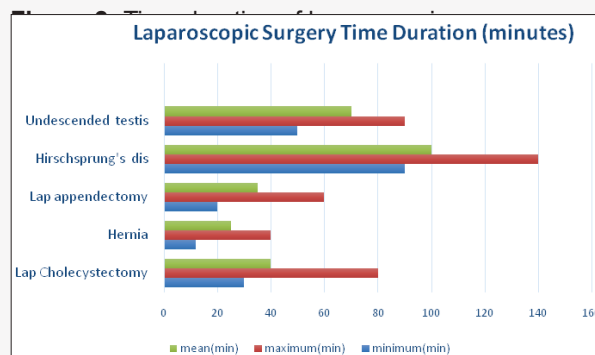
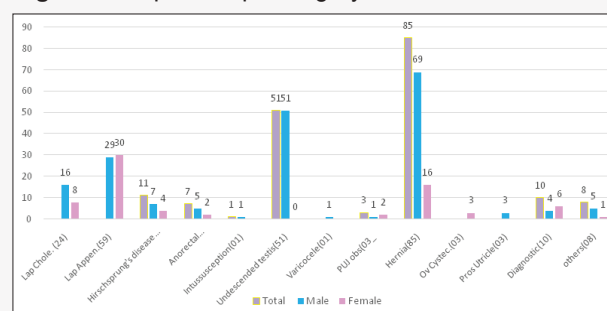
other ports used as working ports on either side at level of umbilicus in midclavicular line. Distal pouch dissected and fistulas were transfixated and cut where present then pulled through a hole made in the centre of the muscle complex and anoplasty was done.

Intussusception: One 08 months old boy diagnosed as intussusception on the background of history, clinical examination & ultrasonogram underwent laparoscopy. Three ports were used – umbilical port used as camera port and two other ports used as working ports on either side below level of umbilicus in midclavicular line. Ileocecal intussusception reduced laparoscopically and patient was discharged on 2nd POD after feeding established.

Table-1 : Laparoscopic surgeries age and sex distribution

Surgery		Age range	Total	Male	Female
Hepatobiliary system	Lap. cholecystectomy	2yr-13yr	24	16	08
	Lap. appendectomy	3yr-13yr	59	29	30
Gastrointestinal system	Hirschsprung's disease	1yr-7yr	11	07	04
	Anorectal malformation	1yr-4yr	07	05	02
	Intussusception	08 mon	01	01	00
Genitourinary system	Undescended testes	07mon-06yrs	51	51	
	Varicocele	07 yrs	01	01	
	PUJ obstruction	1yr-3yr	03	01	02
	Hernia repair	02mon-12yr	85	69	16
	Ovarian cystectomy	7yrs-11yrs	03		03
	Prostatic utricle excision	4yrs-7yrs	03	03	
Diagnostic laparoscopy		2yrs-12yrs	10	04	06
others			08	05	03
Total		02 mon-13 yrs	264	192	74

Figure-1: Laparoscopic surgery sex distribution



Genitourinary system:

Undescended testes (Non palpable): A total 51 patients, age ranged 7 months to 6 years, underwent laparoscopic orchiopexy for NPUDT. Three cases underwent stage procedure, (Fowler Stephen stage 1 and stage 2) second stage was done after 6 months later. Operation time ranged from 50 minutes to 90 minutes, mean time was 70 minutes. Three ports used, umbilical port as camera port, on either side of umbilicus two ports as working ports. Lengthening of cord was achieved very carefully without injuring vas and vessels. When testes moved on opposite internal ring easily then it was fixed to sub dartos pouch with absorbable suture. Majority of cases testes was brought out into the sub dartos pouch making a tunnel medial to inferior epigastric vessel.

Varicocele: One patient underwent varicocelectomy at the age 7 years, port position same as hernia, and time needed 50 minutes.

PUJ obstruction: Three patients were diagnosed as PUJ obstruction and underwent laparoscopic pyeloplasty age ranged 1 year to 3 years, 2 were girls one was boy. Three ports used, 5 mm umbilical as camera port and two others as working on either side of

camera port as baseball diamond concept. After identifying pelvis, it was dissected and dismembered properly. PUJ removed and lateral spatulation was done. The posterior layer was closed with 5/0 vicryl in continuous manner and DJ stent was placed properly. Anterior layer was closed with 5/0 vicryl in same manner as posterior layer. A drain was kept in anastomotic bed. All patients were discharged on 3 POD after removing drain. Patient were followed up after 7 days, 4 monthly for 1 year, 6 monthly for next 2 year and annually thereafter.

Hernia repair: A total 85 patients underwent hernia repair laparoscopically, among them 69 were boys and 16 were girls. Age ranged from 2 months to 12 years. 8 patients were diagnosed as bilateral after introducing camera. 3 patients were bilateral hernia diagnosed preoperatively. Single port (60), two ports (10) and three ports (15) were used for hernia repair. In single port and two ports extracorporeal knotting were done whereas in three ports intracorporeal knotting were done. For extracorporeal knotting 3/0 proline and intracorporeal knotting 4/0 vicryl were used.

In single port, operation time was 12 minutes to 25 minutes. In two port operation time was 20 to 30 minutes. In three ports operation time was 20 to 40 minutes.

4 patients developed hematoma in single port, 1 patient developed hematoma in two ports and 2 patients developed hematoma in three ports. All patients were managed conservatively.

There was one recurrence in single port hernia repair.

Discussion: Laparoscopic surgery has continuously developed over the past years, advancing from an invasive diagnostic tool to an efficient for surgical treatment. On going training, experience and development in images and laparoscopic instrument have facilitated extension of the application of laparoscopic surgery.

Faster convalescence, reduced hospital stays, and faster return to normal activity are the most evident advantages of laparoscopic surgery.

The outcome, efficiency, decreased incidence of wound infection and reduced perioperative morbidity of minimally invasive procedure have been shown across different application^{4,5}.

Majority of procedure were simple including hernia

repair, orchiopexy, cholecystectomy, and appendectomy. We also performed some advance cases like Lap assisted pull through, Lap assisted ano rectoplasty, Lap pyeloplasty, removal of retained DJ stent, excision of prostatic utricle.

Early study we mostly used open technique for camera port but with the gaining of experience we used blind technique for camera port.

We presented our experience of performing laparoscopic surgeries in paediatric age group over last two years.

Based on difficulties encountered and expertise available we divided this procedure in to simple and advanced procedures.

Laparoscopy in paediatric age group is gaining momentum day by day with increased pouring in of reports from many studies conducted all around the globe^{5,7}.

Laparoscopic cholecystectomy is the most common laparoscopic procedure performed in adults⁸. Non haemolytic cholelithiasis is the commonest indication for lap cholecystectomy in children in our study which corroborated with the global scenario⁹. Laparoscopic approach offers the advantages of minimal morbidity, shorter hospital stays, earlier return to school and better cosmetic results¹⁰. In our study we found the patients guardians was highly satisfied with early recovery of child with less hospital stay, less pain, and small scar.

Appendectomy is a common surgical procedure in paediatric population. In 1981, Semm from Universitäts Frauenklinik, Keil, Germany performed the first laparoscopic appendectomy which is now considered as a safe alternative to open appendectomy in paediatric patients and our study shows shorter hospital stay, less post operative pain, less post operative complications, less post operative ileus, and of course, a better cosmesis (11,12,13).

Hirschsprung's disease: The surgical management of Hirschsprung's disease has developed rapidly from two stage or three stage procedures to a single stage surgery and the clinical practice has been modified in the last three decade from open to trans anal and laparoscopic assisted surgery (14,15,16,17).

Laparoscopic assisted Swenson pull through is a feasible, safe, and suitable technique for the treatment of

classical Hirschsprung's disease in the children with favorable outcomes (14,15,16,17).

Due to less pain, short hospital stays, less post operative complications and high cosmetic outcomes laparoscopic assisted pull through is gaining popularity in recent year.

The first LAARP for imperforate anus was applied in 2000 by Georgeson et al. The procedure combines minimal perineal dissection, preservation of the distal rectum within the levator ani and external anal sphincter muscle complex¹⁸. The cosmetic results, the wound infection, the requirement of post operative analgesia and the consequent surgical stress, are in favor of the LAARP technique. On contrary the extensive perineal dissection of the PSARP predisposes the patient to increased risk of wound infection and post operative pain and stress¹⁹. As in LAARP muscle complex are not divided, continent of LAARP is better.

The use of laparoscopy for the repair of inguinal hernia remains a topic of debate, although evidence of the various advantages over open surgery has been increasing in recent years²⁰.

The overall operative time in single port and two ports hernia repair was less in both unilateral or bilateral inguinal hernia pair. Less hospital stays, less post operative pain and operative time are paramount issue for the patient's guardian. The diagnosis of contralateral inguinal hernia is an additional advantages of laparoscopic hernia repair. Three ports intracorporeal inguinal hernia repair is time consumes and needs more expertisation in intracorporeal knotting²¹. The recurrence rate in laparoscopic inguinal hernia repair is less than open surgery.

Open dismembered pyeloplasty described by Anderson Hynes in 1949, has been for many years the gold standard in treatment of UPJO in children with a success rate around 90% (22;23). Since the 1990, laparoscopic and later Robot assisted, pyeloplasty have become more and more popular (24,25,26,27). Despite this fact, operation still remains the most common operation in children with hydronephrosis. The major advantages of laparoscopic pyeloplasty for UPJO are less post operative pain, shorter hospital stay, early recovery and a better cosmetic result.

Conclusion: Laparoscopic procedures in paediatric patients has proven to be a game changer in the field of paediatric surgery. Its minimal invasive nature offers

several benefits including less pain, faster recovery, shorter hospital stays, minimal scarring, reduced risk of infection, improved visualization, more precise surgery, reduced blood loss, enhanced cosmetic outcomes and faster return to normal activities. Despite lot of advantages there are also some challenges like technical expertise development, equipment, cost, limited surgical field, pneumoperitoneum, patient selection, and ergonomic.

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