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Original Research Article

A study of evaluation of chronic pain abdomen in pediatric patients by laparoscopy

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ABSTRACT

Background: Pain in abdomen of chronic nature is common in children but being so common difficult to determine the exact cause. It has been estimated that around 2-4% of all the pediatric patients attend the outpatient department are due to pain in the abdomen that is of chronic nature in children. It has been seen that routine diagnostic and therapeutic procedures fail to make a justice of the diagnosis and management for the pain in the abdomen of chronic nature. The aim was to study the role of laparoscopy in children with chronic pain abdomen.
Methods: Interventional follow up study was carried out among 19 children with pain in the abdomen of chronic nature. Detailed history pertaining to pain in the abdomen, history of surgical explorations was taken. As a part of the work up of a patient the investigations were done routinely. All children were evaluated by laparoscopy.
Results: Majority of the children were in the age group of 11-12 years i.e. 42.1%. Male and female children were almost equal in distribution. USG was diagnostic in 9 patients (47.36%). Laparoscopy was diagnostic in all 18 other cases (95% cases). 73.68% had not complication after the procedure. Only four patients had fever after the surgery and only one patient had wound infection. Thus, overall the laparoscopic procedure was very successful. Laparoscopy and USG were equally effective in diagnosing inguinal hernia.
Conclusions: Laparoscopy had better diagnostic value compared to ultrasonography. Laparoscopic intervention was successful with minimum complications.

Keywords: Chronic pain, Evaluation, Laparoscopy, Pediatric patients

INTRODUCTION

Pain in abdomen of chronic nature is common in children but being so common difficult to determine the exact cause. It has been estimated that around 2-4% of all the pediatric patients attend the outpatient department are due to pain in the abdomen that is of chronic nature in children. If the child complains of pain in the abdomen, in the last three months period for at least three times and that kind of pain was able to interfere with the functioning then it is classified as "chronic abdominal pain".[1] Chronic pain abdomen in clinical practice is considered when the pain in the abdomen is more than for one to two months.[2] Symptoms like loss of weight, presence of fever, diarrhea of severe nature, bleeding in the gastrointestinal tract, severe vomiting are some of the symptoms that give suspicion of an organic cause.[1,3]

Due to chronic nature of this condition, the children are likely to be seen by more than one pediatrician and are therefore subject to a number of tests which are empirical. Even repeated laparotomies are also likely.

After this entire >40% such children end up in no clue. Appendicitis, adhesions in the intestine and biliary problems can cause pain in abdomen of chronic nature in children. These were the organic causes. Functional causes may be due to disorders of the motility, migraine of the abdomen, irritable bowel syndrome etc.[2,3]

It has been seen that routine diagnostic and therapeutic procedures fail to make a justice of the diagnosis and management for the pain in the abdomen of chronic nature. Sonography is useful but may not be able to identify adhesions of the intestine and not a therapeutic procedure but only a diagnostic one. Under these circumstances, laparoscopy is the correct solution. As there is direct visualization of the internal structures, it is diagnostic and at the same time therapeutic.[2,4]

It is possible for the pediatric surgeon to identify correctly the pathology exactly present in the abdomen by using the laparoscopy. Immediate intervention can be carried out using the laparoscopy. If there is dilemma in the diagnosis of the pain in the abdomen of chronic nature, then laparoscopy is the solution for such dilemma.[4]

Previous studies have given the reports in favor of laparoscopy. Use of laparoscopy has been found to be associated with improved outcomes. All these studies point out that in children with pain in the abdomen of chronic nature, diagnostic laparoscopy should be used which is safe, effective and is associated with improved outcome.[2]

In the present study, author studied the role of laparoscopy in the diagnosis and management of pain in the abdomen of chronic nature in children.

METHODS

This was an interventional follow up study conducted at Department of Pediatric Surgery, Karnataka Institute of Medical Sciences, Hubli, Karnataka, India with sample size of 19 children with pain in the abdomen of chronic nature carried out from December 2013 to October 2015.

Children with pain in the abdomen of chronic nature for >3 months and parents willing to include their children in the present study were included. Patients with acute abdomen and parents not willing to include their children in the present study were excluded.

Detailed history pertaining to pain in the abdomen was recorded in the pre-designed, pre-tested and semi structured study questionnaire.

History of surgical explorations, co-morbid conditions, like tuberculosis and chronic cough were looked for. History of pica or bulimia was looked for investigations were done as per suspicion as a part of the work up of a patient the following investigations were done routinely such as complete hemogram, blood grouping, bleeding time, clotting time, random blood sugar, serum electrolytes, blood urea, serum creatinine, urine for albumin, sugar and microscopic examination, ultra sonogram abdomen and pelvis, chest X-ray and the other investigations were done as and when indicated which was LFT, erythrocyte sedimentation rate, serum amylase and lipase and stool for ova and cyst.

Written informed consent was taken prior to all the procedures.

All surgeries were carried out under general anesthesia pneumoperitoneum was created using Hassan's technique. 5mm umbilical camera port was inserted and two lateral 5mm ports depending on the organ of interest and the suspected pathology.

Diagnostic laparoscopy of the abdomen was carried out carefully inspecting the entire visceral contents of the abdomen for any pathology.

Findings in these cases were appendicitis with or without adhesions, undescended testis and inguinal hernia with one case of ambiguous genitalia.

In case appendicitis standard three port appendicectomy was done in most of the cases. All the adhesions surrounding the appendix were divided with the help of monopolar/bipolar cautery. Mobilization of appendix was done, mesoappendix divided and appendicular artery was safely coagulated with bipolar electro-cautery, extracorporeal knot was applied before division of stump, base was not buried, appendix was removed through 5 mm umbilical port.

In cases of inguinal hernia laparoscopy was done in females, the patients were evaluated clinically for hernia, routine investigations were done and ultrasound abdomen was performed to look for bilateralism, intra-abdominal pathology related to Mullerian duct abnormalities, intra-abdominal testis to rule out androgen insensitivity syndrome.

Single port laparoscopic inguinal hernia repair was performed, supraumbilical incision of around 1cm was taken and 5mm port introduced using Hassan's technique, pneumoperitoneum was created with pressure of 8-10mmHg, 5mm 30degree scope was introduced and peritoneal cavity examined to look for bilateralism (patient processes vaginalis on opposite side) ovaries fallopian tubes and uterus were examined for any malformations. Deep ring was localized with a 26 G needle and intra corporeal purse-string suture was taken over deep ring, sac ligated, pneumoperitoneum was deflated and port site closed with vicryl 2-0.

In cases of undescended testis (non-palpable testis) testis was pulled in the scrotal pouch and fixed. In case of high undescended testis if mobilization of testis was not

possible then fowler Stephen technique was followed. Peritoneum was incised just above the spermatic vessels and spermatic vessels ligated avoiding injury to vas. Testis was mobilized as far as possible and left intra-abdominally sub peritoneally for collaterals to develop for next stage procedure which was performed after 6 months. In case of ambiguous genitalia only diagnostic laparoscopy was done as consent was not taken for oophorectomy and hysterectomy.

Post-operative most of the cases were allowed orally on PODI, I.V. fluids according to weight was given on day of surgery, I.V. antibiotics were given for two days followed by oral antibiotics in most of the cases, relief of symptoms was noted. Analgesics were given on individual basis NSAIDS in all the cases none of the case required opioids.

The parents were asked to come for the follow up visits at one week, one month and at the end of three months of the procedure.

The data was analyzed using proportions. The values were expressed as percentages.

RESULTS

Table 1 shows age distribution of patients. Majority of the children were in the age group of 11-12 years i.e. 42.1% followed by the age group of 9-10 years i.e. 31.57%. There were no cases in 0-2 years of age group as well as in the age group of 5-6 years.

Table 1: Age distribution of patients.

Age (in years)	No. of patients	%
0-2	0	-
3-4	1	5.26
5-6	0	-
7-8	4	21.05
9-10	6	31.57
11-12	8	42.10
Total	19	100

Table 2 shows sex distribution of patients. Male and female children were almost equal in distribution. There were 10 male children and 9 female children. Thus, sex wise there was not much difference between males and females.

Table 2: Sex distribution of patients.

Sex	No. of patients	%
Male	10	52.63
Female	9	47.36

USG was diagnostic in 9 patients (47.36%), two cases were falsely diagnosed as enteritis but later on laparoscopy were found to have recurrent appendicitis. One case was diagnosed as undescended testis was found to have female pseudo-hermaphroidism. USG was non-diagnostic in 7 patients (36.84%) of patients (Table 3).

Table 3: Diagnosis by ultrasound.

Diagnosis by ultrasound	No. of patients	%
Appendicitis	2	10.52
Undescended testis	3	15.78
Inguinal hernia	4	21.05
Enteritis	2	10.52
Crossed fused left ectopic kidney	1	5.26
Normal USG	7	36.84

Six patients in this group had adhesions in right iliac fossa involving appendix cecum and distal ileum, Adhesiolysis and appendectomy was done. Laparoscopic hernia repair was done in these patients. Author did laparoscopic appendicectomy for 1 case with normal study. Sonographically, the patient was having crossed fused left kidney, HPE was unremarkable. 2 patients were having undescended testis. One was bilateral in whom laparoscopic orchidopexy stage 1 procedure was done. Other was unilateral where laparoscopic mobilization of testis and orchidopexy was done. Diagnosis of female pseudo-hermaphroidism was made in 1 patient. It was later confirmed by demonstrating Barr body in slide prepared from buccal mucosa (Table 4).

Table 4: Distribution as per diagnosis and procedure done by laparoscopy.

Diagnosis	Procedure	No. of patients	%
Appendicitis	Appendicectomy	4	21.05
Appendicitis with adhesions	Adhesiolysis and appendicectomy	6	31.57
Normal study	Appendicectomy	1	5.26
Undescended testis	Orchidopexy	2	10.52
Inguinal hernia	Laparoscopic herniotomy	4	21.05
Female pseudo-hermaphroidism	-	1	5.26
Intestine duplication cyst	Excision	1	5.26

Appendicitis/appendiceal pathology was diagnosed only in two out of ten cases by USG. Laparoscopy and USG were equally effective in diagnosing inguinal hernia; single port laparoscopic inguinal hernia repair was done in all cases. Out of the three cases diagnosed as undescended testis by USG one was found to have female pseudo-hermaphroidism laparoscopically.

USG was non-diagnostic in 47% of cases as compared to 5% by laparoscopy. Out of the 9 cases undiagnosed by USG eight were having appendicitis one was having

intestinal duplication cyst. One case was diagnosed to have cross fused kidney which could not be assessed by laparoscopy, which was normal in that case. Laparoscopy was diagnostic in all 18 other cases (95% cases) (Table 5).

Table 5: Comparison of diagnosis by ultrasound and laparoscopy.

Disease	USG diagnosis	Laparoscopy
Appendicitis	2 (10.52%)	10 (52.63)
Undescended testis	3 (15.78%)	2 (10.52%)
Inguinal hernia	4 (21.05%)	4 (21.05%)
Female pseudo-hermaphroidism	-	1 (5.26%)
Intestinal duplication cyst	-	1 (5.26%)
Cross fused It ectopic kidney	1 (5.26%)	-
Non-diagnostic	9 (47.36%)	1 (5.26%)

Table 6 shows post-operative complications. 73.68% had no complication after the procedure. Only four patients had fever after the surgery. And only one patient had wound infection. Thus, overall the laparoscopic procedure was very successful.

Table 6: Post-operative complications.

Post-operative complications	No. of cases	%
Fever	4	21.05
Wound infection	1	5.06
No complications	14	73.68

DISCUSSION

In the present study, author included children up to 12 years of age. Out of 19 cases, studied males and females were almost equal. Kolts RK et al, found that the average age studied by them was slightly more of 13 years with a range of 2-22 years.[5] While author studied children below the age of 12 years of age.

Panchalingam L et al, observed that the average age was 11.9 years with a range of 9-14 years.[6] Charlesworth P et al, in their study had average age as 12.2 years with a range of 9.6-14.4 years.[7] Stringel G et al, studied 50 patients and found that the average age was 14 years with a range of 6-18 years.[8]

Kolts RK et al, Panchalingam L et al, and Charlesworth P et al, found in their studies that majority were females.[5-7] This finding was not in accordance with the present study where author found that both the sexes were equally affected. Stringel G et al, reported females were only 36%.[8] Author found that the average pain duration in children was one year with range of 3 months to four years. Similar findings were given by Stylinos S et al, Panchalingam L et al, and Charlesworth P et al.[6,7,9]

The diagnostic accuracy of laparoscopic in the present study was found out to be 95%. Decou JM et al, reported similar best accuracy rates of 87% in their series related to laparoscopy.[10]

In a study by Kolts RK et al, involving 44 patients, 72.7% of patients had appendiceal pathology.[5] In a study by Charlesworth P et al, involving 16 cases, laparoscopic appendicectomy was done in all 16 cases 9 out of 16 had appendiceal pathology.[7] In the present study, author found that there was no organic cause found in one case (5.06%).

In Panchalingam L et al, study the normal study rate was more i.e. 18%.[6] Still higher rate (27.3%) was recorded by Kolts RK et al.[5] Stringel G et al, found this rate as 20%.[8] In a study by Charlesworth P et al, involving 16 patients, 88% of patients had normal findings and underwent appendicectomy, seven of the 14 normal appendixes were having features of chronic appendicitis.[7]

Conversion to laparotomy in most of the studies was 6.5%.[4] In present study, conversion to laparotomy was done in two out of 19 cases (10.52%). This Fairley correlates with other studies.

Author followed the patients for three months. In the study done by Kolts RK et al, mean duration of follow up was 2 years.[5] Mean duration of follow up in study done by Charlesworth P et al, and Decou JM et al, was 19 months each.[7,10]

In a study done by Budianto IR et al, involving 23 patients, laparoscopy was found to be an effective tool for the management of impalpable testis.[11] It precisely locates intra-abdominal testis, diagnosed vanishing testis/absent testis and evaluate the possibility of bringing the testis into the scrotum without tension.

Laparoscopy is effective tool for staged Stephen fowler technique and helps in avoiding unnecessary dissection in case of high intra-abdominal testis, decreases morbidity, pain and is associated with low complications, further it is also an effective tool for diagnosis and treatment of Mullerian duct abnormalities in case of bilateral undescended testis.[11] Hazrat G and Tang PMY gave similar results.[12,13]

Single port laparoscopic hernia repair was performed in cases of female inguinal hernia to look for bilaterality, androgen insensitivity syndrome and other genital pathology. Laparoscopy was found to be effective in diagnosing and management of inguinal hernia had a better cosmetic outcome been associated with less pain.

Study by Kumar A showed that single port laparoscopic inguinal hernia repair can be safely done in pediatric population advantages of minimal instrumentation and avoidance of intracorporeal knotting makes it a feasible technique.[14]

CONCLUSION

The diagnostic accuracy of laparoscopic was double as compared to ultrasonography. Both sexes were equally affected. Diagnostic accuracy of laparoscopy was 95% compared to only 47.36% of ultrasonography. Thus, all children with pain in the abdomen of chronic nature should be evaluated by laparoscopy only. At follow up very few had minor complication, nobody had major complication.

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