

# Laparoscopy in the Management of Children with Chronic Recurrent Abdominal Pain

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## ABSTRACT

**Background and Objectives:** The purpose of the present study was to evaluate the results of diagnostic laparoscopy in children with chronic recurrent abdominal pain.

**Patients and Methods:** Thirteen children with chronic recurrent abdominal pain were subjected to diagnostic laparoscopy. Ages varied from 10 to 17 years. There were six males and seven females. Abdominal pain was present from 3 weeks to 12 months (mean, 2 months). Extensive laboratory and imaging studies did not contribute to the diagnosis. In all patients, the pain was disabling and severe enough to warrant repeated visits to the pediatrician, emergency room visits, or hospital admissions, as well as absence from school.

**Results:** All children recovered uneventfully. Laparoscopic findings that identified the cause of abdominal pain were obtained in 12 of 13 patients. Laparoscopic appendectomy was done in all patients. There were no operative complications. One child presented three months later with incomplete small bowel obstruction, which resolved with conservative management. There were no other postoperative complications. Follow-up varied from six months to three years. Abdominal pain resolved in ten patients. One patient presented eight months later with biliary dyskinesia. She improved following laparoscopic cholecystectomy and later on sphincterotomy, but her pain has not yet completely resolved. One patient presented six months later with abdominal pain secondary to intestinal adhesions. Her pain completely resolved after laparoscopic lysis of adhesions. A third patient who developed lower abdominal pain six months after laparoscopy improved with conservative management and antibiotics for pelvic inflammatory disease.

**Conclusions:** Diagnostic laparoscopy is a valuable procedure in the management of children with chronic recurrent abdominal pain. In the present study, laparoscopic examination revealed the cause of abdominal pain in most patients, and this pain resolved in most cases. Based on our experience, we recommend diagnostic laparoscopy early in the course of debilitating chronic recurrent abdominal pain in children. Appendectomy should be done when no other significant cause of abdominal pain has been identified, even if the appendix looks normal.

**Key Words:** Chronic recurrent abdominal pain, Laparoscopy, Laparoscopic appendectomy.

## INTRODUCTION

Abdominal pain is one of the most common complaints in children.<sup>1</sup> In most cases, the pain resolves with conservative treatment.<sup>2,3</sup> Some children continue to have abdominal pain, and despite all investigations, no cause for the pain is found. These children are classified as having the syndrome of chronic recurrent abdominal pain.<sup>1,3-5</sup>

After extensive investigations fail to clarify the etiology of the pain, these children are often referred to the surgeon, in hope that a surgical intervention will alleviate the symptoms. Previously, laparotomy and appendectomy have been recommended.<sup>1,2</sup> The exploration was usually done through a right lower quadrant McBurney incision; this approach provided limited exposure of the peritoneal cavity.<sup>2,4</sup> With the advent of new minimally invasive surgical techniques, diagnostic laparoscopy has become a very important tool in the management of children with chronic recurrent abdominal pain.<sup>3,6,7</sup>

The purpose of the present study was to evaluate our experience with diagnostic laparoscopy in the management of 13 children with chronic recurrent abdominal pain.

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## PATIENTS AND METHODS

From 1994 to 1997, 13 children with chronic recurrent abdominal pain were subjected to diagnostic laparoscopy. Ages varied from 10 to 17 years (mean, 13 years). There were six males and seven females. The duration of abdominal pain varied from 3 weeks to 12 months (mean, 2 months). In all children, this pain was debilitating and severe enough to warrant repeated visits to the pediatrician, emergency room visits, or hospital admission, as well as absence from school.

Diagnostic investigations included abdominal ultrasound in 11 patients, computerized tomography (CT) of the abdomen in seven, upper gastrointestinal series in five, small bowel follow-through in three, contrast enema in two, Meckel's scan in one, upper gastrointestinal endoscopy in six, and colonoscopy in three. In all patients, extensive hematologic studies were done. None of these investigations provided data that contributed to the diagnosis.

Services consulted included the gastrointestinal service in 11 patients, gynecology in three, psychiatry in three and neurology in one.

## RESULTS

**Table 1** summarizes patient characteristics, laparoscopic/histological findings, and outcomes. Laparoscopic findings included cecal adhesions in five patients, inflammatory bowel disease in two, large mesenteric lymph nodes in two, kink in the appendix in two, Fallopian tube cysts in two, torsion of an ovarian cyst in one and salpingitis in one. Laparoscopic appendectomy was done in all patients. Histological examination of the appendix demonstrated acute appendicitis in two patients, periappendicitis in two, congested appendix in two, and eosinophilic infiltrates in one. Histologically normal appendix was reported in six patients. An appendicalith was found in three patients. There were no reports of chronic appendicitis.

All patients recovered uneventfully. There were no operative complications. One patient presented three months following laparoscopy with incomplete small bowel obstruction, which resolved with conservative management. There were no other postoperative complications.

The abdominal pain completely resolved in ten patients following laparoscopy. Three patients returned with

abdominal pain. A patient presented eight months later with right upper quadrant abdominal pain. She was found to have gallbladder dyskinesia.<sup>8</sup> Her pain resolved following laparoscopic cholecystectomy. She was well for three months, but then her pain recurred in the epigastric area and right upper quadrant. Endoscopic retrograde cholangiopancreatography demonstrated high biliary pressure and partial pancreas divisum. She was treated with sphincterotomy. Although she had significant improvement, her pain has not yet completely resolved. A second patient presented six months later with left-sided abdominal pain. A second laparoscopy revealed intestinal and splenic adhesions. Her pain resolved following laparoscopic lysis of adhesions. A third patient presented six months following laparoscopy with lower abdominal pain and fever, secondary to pelvic inflammatory disease. Her symptoms resolved following antibiotic treatment.

The two patients with inflammatory bowel disease improved with medical management. The patient with salpingitis responded to antibiotic therapy. Preoperative hospital stay varied from 1 day to 16 days (median, 4 days). Postoperative hospitalization ranged from 2 to 5 days (median, 3 days). Except for the patient with biliary dyskinesia, all other patients are now symptom free.

## DISCUSSION

Chronic recurrent abdominal pain is a common problem in children and adolescents. The cause of the pain is seldom found by clinical, laboratory, and imaging studies. It has been estimated that no organic cause for the pain is found in over 90% of children.<sup>1,9,10</sup> The best approach in children with chronic recurrent abdominal pain must include a careful and detailed clinical history and physical examination, as well as judiciously applied laboratory and imaging studies.<sup>1,5</sup>

Abdominal ultrasound is usually the first investigation ordered. This test was done in 11 patients in the present study. It did not reveal any abnormalities, even in a 14-year-old girl with intermittent torsion of a large ovarian cyst. Generally, ultrasound has been recommended as one of the initial examinations, mainly because it is noninvasive and can exclude serious abdominal pathology. In a recent study in 57 children with recurrent abdominal pain,<sup>5</sup> the findings of abdominal ultrasound were normal in 56 (98%), three of whom subsequently had appendectomy. The lack of positive findings by

**Table 1.**  
Patient Characteristics and Clinical Outcomes.

Age (yr)	Sex	Duration of pain	Findings/Histology	Results
10	M	4 wk	Large mesenteric lymph nodes; normal appendix	Resolved
10	M	2 mo	Inflammatory bowel disease; normal appendix	Resolved
11	M	4 wk	Large mesenteric lymph nodes; cecal adhesions; normal appendix	Resolved
12	M	6 mo	Fibrosed kinked appendix; eosinophilic infiltrate	Resolved
12	F	12 mo	Cecal adhesions; Fallopian tube cyst; normal appendix	Resolved
12	M	4 wk	Cecal adhesions; congested appendix	Resolved
14	F	3 mo	Acute appendicitis; fibrosis	Resolved
14	F	3 mo	Torsion of ovarian cyst	Resolved
15	F	2 mo	Normal appendix; fecalith	Returned 1 yr later with biliary dyskinesia; had cholecystectomy
15	M	3 mo	Inflammatory bowel disease; periappendicitis	Resolved
15	F	2 mo	Cecal adhesions; fecalith; congested appendix	Returned 6 mo later with intestinal and splenic adhesions; resolved after laparoscopic lysis
15	F	3 wk	Acute appendicitis; Fallopian tube cyst	Resolved
17	F	3 wk	Inflamed Fallopian tube; cecal adhesions; fecalith; normal appendix	Resolved

sonography has been confirmed by other investigators.<sup>3,5,6</sup> The role of ultrasound continues to be that of reassurance to parents and treating physicians, as it is useful in excluding important pathology amenable to ultrasound detection.

CT of the abdomen was done in seven patients in the present study. It also did not reveal any abnormalities. The role of this more invasive and expensive investigation in the management of children with chronic recur-

rent abdominal pain remains to be evaluated, since it contributes very little to diagnostic efforts in the patient with normal findings on abdominal ultrasound.

We feel that upper gastrointestinal endoscopy is important when ulcer disease or *Helicobacter pylori* is suspected as the cause of abdominal pain. Colonoscopy was done in three patients with suspected inflammatory bowel disease. However, it did not contribute to the diagnosis.

In the past, laparotomy through a limited right lower quadrant McBurney incision and appendectomy have been recommended.<sup>2,4,11</sup> This approach has provided good results for some investigators, with resolution of symptoms in the majority of patients, despite the fact that the appendix was histologically normal in most patients cured by appendectomy.<sup>1,3,4,11</sup> This finding has led some authors to postulate a placebo effect of appendectomy.<sup>4</sup>

In 10 of 13 cases in the present series, the pain completely resolved following laparoscopy and appendectomy. Two patients returned with pain and required further treatment. Six patients had a histologically normal appendix, of whom only one patient had no other significant findings, except for large mesenteric lymph nodes; another patient had inflammatory bowel disease, and the remaining four had fecaliths and inspissated fecal material in the lumen of the appendix. The presence of inspissated fecal material in the appendiceal lumen has been associated with chronic abdominal pain in children.<sup>2</sup>

Cecal adhesions were observed in five patients. This finding could represent previous cecal or appendiceal inflammation. Interestingly, of the two patients with histologically confirmed acute appendicitis, one had a 3-month history of abdominal pain, and the other a 3-week history. Of the three patients who returned with abdominal pain, one had biliary dyskinesia<sup>8</sup> and, although she has significantly improved following cholecystectomy and sphincterotomy, her pain has not completely resolved. The second patient returned with abdominal pain secondary to adhesions, and her pain resolved following laparoscopic lysis of adhesions. The symptoms in a third patient who returned six months later with lower abdominal pain and fever secondary to pelvic inflammatory disease, resolved with antibiotic therapy.

Overall, laparoscopic findings identifying factors associated with abdominal pain were observed in 12 of 13 patients in the present study. In a recent report, positive findings were encountered by laparoscopy in 73% of children with chronic recurrent abdominal pain.<sup>3</sup> The laparoscopic findings and results in our small group of patients validate the conclusions of other investigators that chronic recurrent abdominal pain has an organic basis in a significant number of patients.<sup>3</sup>

With the advent of modern techniques and equipment, diagnostic laparoscopy has become an important tool in

the management of children with chronic recurrent abdominal pain. When laparoscopy is undertaken, it should be performed methodically and thoroughly. Careful examination of the whole peritoneal cavity must be done, including running of the small bowel and examination of the Fallopian tubes, uterus and ovaries. When a significant finding such as acute appendicitis or salpingitis is encountered, the procedure can be terminated after appropriate action has been taken. Since the safety of laparoscopic appendectomy has been well established,<sup>12</sup> laparoscopic appendectomy should be done when no other significant cause of abdominal pain has been identified, even if the appendix looks normal.

A careful and detailed clinical history and physical examination remain the most valuable tools in the management of children with chronic recurrent abdominal pain. The judicious use of imaging studies and laboratory investigations can contribute to eliminating some serious causes of the pain. As we gain more experience and confidence with diagnostic laparoscopy, this procedure is becoming a powerful tool in the management of these children. The early use of diagnostic laparoscopy may avoid unnecessary and expensive tests as well as prolonged hospitalization. It can also alleviate the uncertainty and anxiety in families and patients alike.

## CONCLUSIONS

Based on our experience and results, we advocate the early use of diagnostic laparoscopy in children with chronic recurrent abdominal pain after reasonable investigations have not helped to establish an accurate diagnosis, and conservative management has failed to alleviate this pain.

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