Role of Elective Laparoscopic Appendicectomy for Chronic Right Lower Quadrant Pain

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Abstract Chronic right lower quadrant pain is a common clinical entity and continues to remain a diagnostic and therapeutic problem. Laparoscopy is changing the view regarding exploration in patients with chronic right lower quadrant pain. Of recent, chronic or recurrent right lower quadrant pain is an entity that has generated much interest, hence this study has been undertaken. To study the role of elective laparoscopic appendicectomy for chronic or recurrent right lower quadrant pain. To study the relationship between clinical improvement and histopathological findings of removed appendix. Forty three cases of chronic right lower quadrant pain, who met the inclusion criteria, were included in the clinical study. Three cases were excluded during initial diagnostic laparoscopy because of ovarian cyst. Laparoscopic appendicectomy was performed in 40 cases. In our study amongst 40 (100 %) patients, 36(90 %) patients were relieved of pain completely. Only 4(10 %) patients continued to have persistent right lower quadrant pain. Duration of follow up was 6 months. Postoperative pain scores favour appendicectomy ($p<0.005$). There was no association between postoperative pain scores and histopathology findings. There was no mortality in our study. Persistent or recurrent right lower quadrant pain can be treated successfully by elective laparoscopic appendicectomy in properly selected cases. Laparoscopic appendicectomy is a feasible and safe procedure. Histopathology of the removed appendix does not contribute to the diagnosis.

Keywords Chronic right lower quadrant · Chronic appendicitis · Laparoscopy · Appendicectomy

Introduction

Chronic right lower quadrant (RLQ) or abdominal pain is a common clinical entity and continues to remain a diagnostic and therapeutic problem. Although the typical presentation of acute appendicitis is well known, there is debate whether the so-called chronic or recurrent appendicitis may cause persistent or recurrent pain in the RLQ. Chronic RLQ pain causes disability and distress and results in significant costs to health services. Often, investigation by laparoscopy reveals no obvious cause for pain. Proponents of the theory of pain associated with chronic or recurrent appendicitis refer to the efficacy of elective appendicectomy in selected patients. Retrospective studies claim pain relief in about three-quarters of operated patients [1, 2]. Additional proof is provided by some observed histopathological changes, including fibrotic changes, lymphocytic infiltration, and luminal obstruction [2–4]. However, these studies are heavily biased owing to their retrospective nature, and histopathological changes can also be found in appendices removed from asymptomatic patients [5]. Very few studies are done pertaining to laparoscopic appendicectomy for chronic RLQ pain. We aimed to take up this study to evaluate the role of elective laparoscopic appendicectomy in chronic nonspecific RLQ pain.

Methodology

The study was performed in JSS Medical College and Hospital, JSS University, Mysore, Karnataka, India, between November 2009 and September 2011. Patients with chronic or recurrent RLQ pain, who met the inclusion criteria, were included in the study. A clinical history and physical examination was carried out. Results of further investigations including imaging modalities were evaluated, and inclusion and exclusion criteria were checked.

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Inclusion Criteria Patients included were in the age range of 15–60 years, and had suffered from chronic/recurrent RLQ pain for more than 3 months and in whom routine investigations did not reveal any pathology. They had to have experienced continuous pain or should have endured at least one pain attack in the month prior to inclusion.

Exclusion Criteria Exclusion criteria were history of chronic back pain, previous abdominal surgery with exception of diagnostic laparoscopy or laparoscopic sterilization, specific gastrointestinal disorders (such as IBD), gynecological diseases, and urological diseases. Patients in whom diagnostic laparoscopy revealed abnormalities, other than those related to the appendix, were excluded.

Routine laboratory investigations included hemoglobin percentage, serum leukocyte count and differential count, ESR, urine microscopy, random blood sugar, blood urea, serum creatinine, abdominal ultrasound (USG), and histopathological examination (HPE) of removed the appendix.

Eligible patients were subsequently informed about the study background and protocol. All patients gave written informed consent before definitive enrolment in the study. Patients filled in a diary, a scoring chart, pertaining to frequency, duration, location, and intensity of pain during 6-month period. The study was approved by the ethical committee.

Operative and Administrative Procedures

Diagnostic standard three-trocar laparoscopy was performed. If the laparoscopic inspection revealed no abnormalities, the patient was subjected to laparoscopic appendicectomy. After discharge, patients were seen at 6 weeks, and at 3 and 6 months period after surgery in the outpatient department.

Assessment of Pain

The primary outcome measure was pain scored by the patient 6 months after operation. At each follow-up, patients were instructed to score pain on a two-point scale. Pain scores include the following: 1, pain unchanged (or even worse); 2, completely pain free (no more right lower quadrant pain).

Histopathology

The secondary outcome investigated was the relationship between clinical improvement and histopathological findings of the removed appendices. Scoring of histopathological changes of all appendices was standardized by two blinded pathologists. Based on published information [3, 4, 6, 7], a scoring system for the histological investigation of the

appendices was developed. Appendices had either signs of acute appendicitis (infiltration of granulocytes into the epithelial mucosal layer or deeper) or signs thought to be compatible with chronic or recurrent appendicitis (eosinophilic or plasma cell infiltrates, lymphocytic infiltration of the lamina propria, significant lymphoid hyperplasia, fibrosis, serosal adhesions, luminal obstruction, or dilatation). Finally, based on the overall findings, the pathologist scored the appendix as normal or having signs of appendicitis (acute inflammatory changes or chronic inflammatory changes).

Statistical Analysis

All the statistical methods were carried out through SPSS for Windows (version 16.0) and Minitab (version 11.0) for Windows. The analysis of primary outcome was performed on an intention-to-treat basis. $P < 0.050$ was considered statistically significant.

Results

Forty-three cases of chronic RLQ pain, who met the inclusion criteria, were included in the clinical study (Fig. 1). Three cases were excluded during initial diagnostic laparoscopy because of ovarian cysts. Laparoscopic appendicectomy was performed in 40 patients.

Of 40 (100 %) patients who underwent laparoscopic appendicectomy, 18 (45 %) were male and 22 (55 %) were female with median age of 27 years (range 15–60 years). The age group (Fig. 2) with maximum number of cases with

Fig. 1 Flow chart of the study

chronic or recurrent RLQ pain was the 21–30 years, both in males and females, the total being 22 cases, accounting for 55 % of all cases in the study.

Pain scores 6 months after operation are shown in Fig. 3. About 90 % (36) of the patients were completely pain free, and only 4 (10 %) patients did not improve after laparoscopic appendectomy. There were no postoperative complications such as port-site infections or intra-abdominal collection. There was no mortality.

Table 1 shows the histopathological results for all 40 appendices. Out of 40 patients, 22 (55 %) patients had pathological signs of appendicitis (10 cases of acute appendicitis and 12 cases of chronic appendicitis) and 18 (45 %) patients showed the normal appendix.

Discussion

Our study has shown that removing the appendix from patients with persistent or recurrent RLQ pain is more likely to alleviate the pain than leaving the appendix in situ. However, the magnitude of beneficial effects of elective laparoscopic appendectomy on postoperative pain needs long-term follow-up.

Abdominal pain was the universal complaint present in all 40 (100 %) patients, while vomiting was present in 5 (12.5 %) patients and fever in 4 (10 %) patients. Unlike acute appendicitis, no clinical characteristics that might aid in a diagnosis of chronic appendicitis (other than recurrent abdominal pain) had been identified. Signs and symptoms were less obvious than in acute appendicitis. There were no typical findings or routine diagnostic modalities to diagnose chronic appendicitis. It has been a diagnosis of exclusion [8]. The imaging modality used was USG abdomen and pelvis. USG detected the inflamed appendix in 9 (22.5 %) patients only. Laparoscopy is changing the view regarding exploration in patients with chronic RLQ pain. Chronic or

Fig. 2 Age and sex distribution

Fig. 3 Distribution of pain scores in patients with laparoscopic appendectomy

recurrent RLQ pain is one such entity that has garnered much attention. In initial diagnostic laparoscopy, three cases were excluded from the study because of ovarian cysts and intra-operatively appendicitis was diagnosed in 12 (30 %) patients.

In our study, no postoperative complications or mortalities were encountered.

In our study, histopathological examination of appendices revealed inflammation in 22 (55 %) patients. Of 22 patients, 10 (45.45 %) patients were having acute inflammation and 12 (54.55 %) patients had chronic appendicitis. The present dataset provides circumstantial evidence that adds credibility of chronic appendicitis being a separate clinical entity.

A study was performed in one teaching hospital in the Netherlands between September 1994 and November 2004 by R.M.H Roumen and colleagues. It was a single-centre, double-blinded randomized control trial. In this study, patients with chronic or recurrent RLQ pain of unknown origin were evaluated. Of 40 patients, 18 patients underwent laparoscopic appendectomy and only 22 patients diagnostic laparoscopy. Six months after operation based on pain score, they observed that higher proportion of patients in the appendectomy group had significant improvement in pain than the inspection only group. Those who still experienced abdominal complaint and had appendix in situ were offered the second laparoscopic procedure for intended appendectomy. A secondary outcome evaluated was the relationship between the clinical response

Table 1 Histopathology results of all removed appendices

HPE	Number of patients	Pain-relieved patients
Normal	18	15
Pathological		
Acute inflammation	10	10
Chronic inflammation	12	11
Total	40	36

and appendiceal histopathology. It is concluded that the right lower abdominal pain can be treated successfully by elective appendectomy in properly selected patients. Histopathology of the removed appendix does not contribute to the diagnosis [9]. In the inspection only group, two patients underwent emergency appendectomy, indicative of risk to the inspection only group, adding to economical burden for the patients.

Mussack et al. conducted study between November 1995 and February 1998 in which 322 patients underwent appendectomy due to typical symptoms of appendicitis. The study concluded that three quarters of all patients with pain in the RLQ, without significant signs of inflammation, showed the histological criteria for chronic appendicitis [2]. Criteria for chronic appendicitis include symptoms lasting longer than 4 weeks, confirmation of chronic signs through histopathological examination, and improvement of symptoms after appendectomy [10].

In Fayez et al. study, 63 patients who had appendectomy for chronic RLQ pain were reviewed. Histologically, 92 % of removed appendices revealed abnormality and 95 % of these patients were completely cured. It is concluded that chronic appendicitis does exist and could be the cause of chronic RLQ pain [11].

Krone and Sperke analyzed 1718 prophylactic appendectomies during gynecological operations and found histopathological proof of acute appendicitis in 8 %. Moreover, signs of chronic appendicitis were observed in an astonishing 65 %. Only 21 % were considered microscopically normal. The clinical relevance of such a high percentage of pathological appendices in patients undergoing an “en passant appendectomy” remains unclear. The lack of correlation between routine histopathology and clinical pain scores suggests the presence of a noninflammatory pain pathway [5].

But in a study conducted by Popovic et al. between 1999 and 2000, published in *Croatian Medical Journal*, 41 out of 53 cases underwent laparoscopic appendectomy. The study showed that laparoscopic appendectomy had similar long-term results to the patients without appendectomy. Results also showed that the therapeutic results were similar whether the removed appendix was normal or pathologically changed. But based on their experience, they also mentioned that appendectomy should be performed even though there is no macroscopically visible reason because of the intraluminal changes [12].

In our study, 36 (90 %) patients were completely pain free and only 4 (10 %) patients continued to have persistent RLQ pain.

Although the clinical data on pain relief following appendectomy are convincing, the histopathological results are difficult to understand in this context. There is no correlation between pain and histopathological findings. Published figures on the correlation between symptomatology and histopathology are inconsistent.

Conclusion

Elective laparoscopic appendectomy in patients with chronic RLQ pain may be an effective therapeutic procedure in properly selected cases. Laparoscopic appendectomy is a feasible and safe procedure. A stringent preoperative assessment is necessary to identify patients who may benefit from surgery. Histopathology of the removed appendix does not contribute to the diagnosis. However, there appears to be definite scope for a much longer duration of follow-up study of the patients with chronic RLQ pain.

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