



Role of diagnostic laparoscopy in chronic abdominal pain: Experience in a rural area

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Original Article

Abstract

BACKGROUND: Chronic abdominal pain is a frequent cause of surgical consultation. This study is conducted to evaluate usefulness of laparoscopy in diagnosis of chronic abdominal pain so as to reduce suffering and depression associated with condition. This study aims to define the role of diagnostic laparoscopy in chronic abdominal pain.

METHODS: A hospital-based prospective study was conducted in the Department of Surgery, Shri Vasantnao Naik Government Medical College, Yavatmal, India, a tertiary care center in the rural area from January 1, 2016 to June 30, 2017 with 50 patients to evaluate the role of laparoscopy in patients with chronic abdominal pain. All the patients underwent diagnostic laparoscopy with methodical inspection of the whole abdominal cavity. Statistical analysis was done using SPSS software.

RESULTS: The majority of the patients (36%) were in the age group of 21-30 years with women affected more (66%). The most common symptom was pain (100%) for more than 4-5 months. Laparoscopic findings were appendicitis (30%) followed by Koch's abdomen (26%), adhesions (24%), sub-acute intestinal obstruction (SAIO) (8%), ovarian cyst (4%), and hernia (2%) which were treated accordingly. Resolution of pain was seen in 94% of the patients over a follow-up period of 3 months.

CONCLUSION: Diagnostic laparoscopy is a safe and effective procedure in the evaluation of patients with chronic abdominal pain in a rural area. It also provides an opportunity to perform the therapeutic procedure in the same setting thereby reducing the overall cost of treatment.

KEYWORDS: Abdominal Pain; Diagnostic Laparoscopy; Rural Area

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Introduction

Abdominal symptoms are a frequent cause of surgical consultation. Pain is the most common of all abdominal symptoms which may be due to inflammatory, infective, obstructive, neoplastic, or ischemic pathology. The

underlying cause may be acute/sudden in onset, sub-acute indicating evolving disorder, or chronic long-standing suggesting functional or degenerative condition.

Chronic abdominal pain is a vague pain in the abdomen which may be recurrent for more than three months. In India, it represents the fourth most common chronic pain syndrome seen in general population. On an average, 13% of surgical hospitalization is done for chronic abdominal pain.¹ Patients with chronic illness

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often need to adjust themselves with regards to their aspiration, lifestyle, and employment due to chronic nature of the disease. In long run, it may lead to poor quality of life and significant depression and anxiety in such patients.² More than 40% of patients presenting with chronic abdominal pain had no specific etiological diagnosis at the end of their diagnostic workup.³

In case of diagnostic uncertainty, laparoscopy avoids unnecessary laparotomy and also provides diagnosis for planned surgical treatment.^{4,5} With recent advances in optics, improvement in instrumentation, availability of better energy sources, and greater experiences with therapeutic laparoscopy, diagnostic laparoscopy is no longer limited to just visualization. Though diagnostic laparoscopy is an invasive procedure, it has both diagnostic as well as therapeutic advantages and the formation of adhesion which is one of the causes of chronic abdominal pain is less as compared to laparotomy.

In India, the overall cost of treatment is of concern, particularly in rural areas. Diagnostic laparoscopy may be useful in reducing the cost of treatment as it can reduce the expenses on potentially hazardous investigations and repeated hospitalization. It is useful in the exclusion of serious conditions where the pain goes undiagnosed.

As the use of laparoscopy in chronic abdominal pain is controversial, we are conducting this study to evaluate the feasibility and usefulness of diagnostic laparoscopy in patients with chronic abdominal pain in a rural area.

Methods

A hospital-based prospective study was conducted in the Department of Surgery, Shri Vasantrao Naik Government Medical College, Yavatmal, India, a tertiary care center in the rural area from January 1, 2016 to June 30, 2017. The sample size came to be as 49 with formulae which is roundly taken as 50. No

effect of confounding variable on sample loss was seen. A total of 50 patients with a history of chronic abdominal pain of more than three months with normal or inconclusive laboratory and radiology [ultrasonography, computed tomography (CT)] investigations were included.

Patients with acute abdominal pain, pregnancy, known abdominal malignancy, patients on antipsychotic drugs, those with inability to tolerate pneumoperitoneum or general anesthesia, immunocompromised patients, and patients under the age of 15 years were excluded.

Institutional ethical committee approval was taken before starting the study. Informed consent was taken from all patients, detailed histories were recorded, and a thorough clinical examination was performed. The findings were recorded in prescribed proforma. The collected data included demographics, underlying diseases, medications used, history of genetic or mental illnesses if any, past history of operation, duration and location of pain, patient's abdominal examination, and previous diagnostic studies performed. Hematological and biochemical investigations including complete blood count (CBC), erythrocyte sedimentation rate (ESR), random blood sugar, blood urea nitrogen (BUN), serum creatinine, urine routine, and microscopy were performed. Stool for ova, cyst, and occult blood, chest X-ray, and electrocardiography (ECG) were done when indicated. All patients were planned for a diagnostic laparoscopy procedure. Intra-operative findings and operative interventions undertaken as per pathology encountered were documented. A single dose of third-generation cephalosporin was given at the time of induction of anesthesia.

This study had only categorical variables. The pain was assessed using Visual Analogue Scale (VAS) score ranging from 0 as "no pain" to 10 as "severe pain". The assessment of pain was done at the time of enrolment and

post-operative follow-up visit on day 7, 30, 60, and 90. Identification and management of complications were done if occurred.

All surgeries were performed under general anesthesia. Ryle's tube was put in and patients were catheterized. In cases of previous upper midline incision or suspected intra-abdominal adhesion, the Veress needle was passed through the abdominal wall in an area with no scars, mostly in the left upper quadrant of the abdomen. Pneumoperitoneum was created with Veress needle at the rate of 1-2.5 l/min at the beginning of procedures and intra-abdominal pressure was kept at 10-12 mmHg during the procedure. We used a single 10-mm umbilical trocar as a camera port and two 5-mm lateral trocars during the procedure. Diagnostic laparoscopy was performed (step-wise diagnostic inspection of the liver, gallbladder, and anterior surface of the stomach, large bowel, small bowel, appendix, gynecological organs, and peritoneal surfaces); pathology was identified and treated as per standard protocol. In a female patient, the uterus, adnexa, and pouch of Douglas were inspected. Once the procedure was completed, 5-mm trocar was removed under vision, pneumoperitoneum was released, and 10-mm trocar was removed.

10-mm umbilical wound was closed with non-absorbable suture and all 5-mm wounds in a single layer were closed with absorbable suture.

Statistical analysis: Mean and standard deviation (SD) were calculated for all the parametric variables. Proportions were derived for all the qualitative variables. Chi-square and Paired t tests were applied for comparison of qualitative and quantitative variables between the two groups, respectively. P-value < 0.05 was taken as significant. Statistical analysis was done using SPSS software (version 20, IBM Corporation, Armonk, NY, USA)

Results

The majority of the patients (36%) were in the

age group of 21-30 years followed by 26% in the age group of 31-40 years, 18% in the age group of 41-50 years, 14% in the age group of 18-20 years, and 6% in the age group of 51-60 years (Figure 1).

The mean age of the patients was 32.80 ± 11.46 years. Women were affected more frequently than men (male to female ratio = 1:1.94).

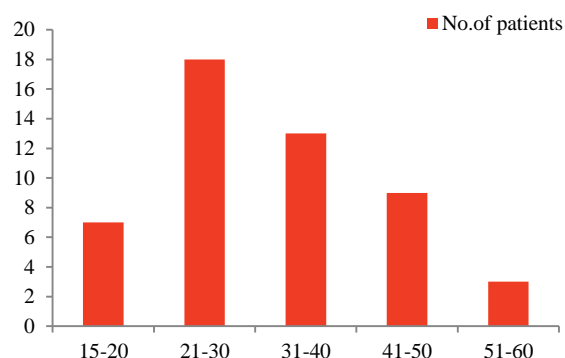


Figure 1. Distribution of patients according to age group

The most common symptoms were pain (100%) followed by loss of weight (48%), fever (32%), abdominal distension (14%), vomiting (10%), constipation (8%), and diarrhea (8%).

The duration of pain was considered from the time the patient first started having symptoms to the time patient presented to the hospital. Seventeen patients (34%) presented > 4-5 months after suffering from pain and 12 patients (24%) and 13 patients (26%) had pain in the abdomen for > 5-6 months and > 6 months, respectively. Eight patients (16%) had pain in the abdomen for > 3-4 months.

Fifteen patients (30%) had pain in the periumbilical region (30%) followed by 12 patients (24%) who had pain in the right lower quadrant. Ten patients (20%) and 8 patients (16%) had pain in the right upper quadrant and left upper quadrant, respectively. Five patients (10%) had pain in the left lower quadrant of the abdomen.

Twenty-nine patients (58%) were using

analgesics prescribed by local general practitioner, 13 patients (26%) were using over the counter drugs available in pharmacy, and 8 patients (16%) were using ayurvedic medicine given by quack to relieve abdominal pain.

The most common diagnosis for chronic abdominal pain was chronic recurrent appendicitis seen in 15 patients (30%) followed by Koch's abdomen seen in 13 patients (26%). The adhesion was seen in 12 patients (24%), sub-acute intestinal obstruction (SAIO) in 4 patients, ovarian cyst in 2 patients, and hernia in 1 patient. No pathology could be detected in 3 patients.

Intraoperatively, patients with chronic appendicitis had adhesion in the right iliac fossa and/or thickened appendix/appendicolith; patients with Koch's abdomen (Figure 2) had tubercle over the visceral surface, omentum, and/or peritoneum from which biopsy was taken.

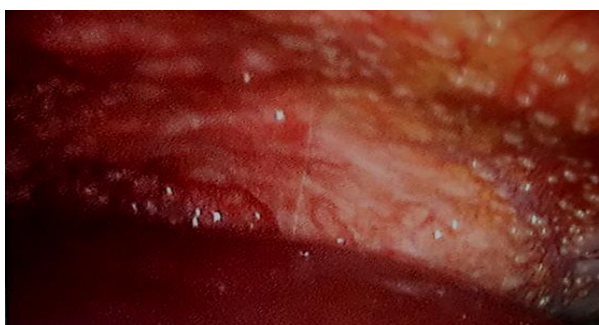


Figure 2. Tubercles on parietal peritoneum

Among 12 patients with adhesion (Figure 3), only 10 patients had scarred abdomen due to previous abdominal surgery.



Figure 3. Adhesion to the anterior abdominal wall

In patients with SAIO, 2 patients had the band and 2 patients had adhesion as a cause of obstruction.

The therapeutic procedures were carried out simultaneously in 68% of patients (n = 34) - appendectomy (n = 15), adhesiolysis (n = 14), band release (n = 2), ovarian cystectomy (n = 2), and transabdominal pre-peritoneal (TAPP) hernia repair (n = 1). The patients with Koch's abdomen were managed with Anti-Koch's treatment- short form (AKT) (Table 1).

Table 1. Laparoscopic findings of patients (n = 50) and treatment provided

Laparoscopy findings	Treatment	n (%)
Appendicitis	Appendectomy	15 (30)
Koch's abdomen	Anti-Koch's treatment	13 (26)
Adhesions	Adhesiolysis	12 (24)
SAIO	Band release (n = 2)/ adhesiolysis (n = 2)	4 (8)
Ovarian cyst	Laparoscopic cystectomy	2 (4)
Hernia	TAPP hernia repair	1 (2)
Normal	No intervention	3 (6)

SAIO: Sub-acute intestinal obstruction; TAPP: Transabdominal pre-peritoneal

Intraoperative findings were correlated with histological findings and found to be 100% accurate for chronic appendicitis and 84.6% accurate for tuberculosis (TB) as 2 patients with rolled-up omentum and thickened peritoneum were found to be negative on histopathology.

Forty-seven patients (94%) had resolution of pain when followed up to 3 months and in three patients, there was no change in pain. The post-operative pain relief was assessed by VAS score. The mean VAS score at presentation was 5.60 ± 3.10 (Table 2).

The VAS score reduced significantly at day 30 (1.15 ± 0.98) and day 90 (0.84 ± 0.32). Statistically significant improvement in VAS score was seen at follow-up visit as per paired 't' test ($P < 0.001$).

No major complications were reported. Only three cases had umbilical port site minor infection which was treated with antibiotics.

Table 2. Comparison of post-operative pain relief during follow-up visit of patients

	Preoperative	Postoperative interval			
	(n = 50)	Day 7 (n = 50)	Day 30 (n = 50)	Day 60 (n = 50)	Day 90 (n = 50)
VAS score (mean ± SD)	5.60 ± 3.10	2.01 ± 1.90	1.15 ± 0.98	1.24 ± 0.86	0.84 ± 0.32
P*	< 0.0500**	< 0.0500**	< 0.0500**	< 0.0001**	< 0.0001**

*Paired 't' test applied for the comparison of Visual Analogue Scale (VAS) score preoperatively with each postoperative interval; ** Significant

VAS: Visual Analogue Scale; SD: Standard deviation

There were no conversions to open surgery. The average duration of operative time (diagnostic and therapeutic) was 52.16 ± 9.80 minutes. The average hospital stay was 2-3 days in most of the patients.

Discussion

Chronic abdominal pain conditions represent a major group of cases presenting to general surgeon. Despite of numerous diagnostic works when diagnosis remains uncertain, it imposes more challenges to treating specialists and remains a frustrating experience for both patient and the specialist. This study aimed to evaluate the role of laparoscopy in patient with chronic abdominal pain.

Laparoscopy is an excellent diagnostic modality available in the armamentarium of the surgeon but it is often underutilized due to risk inherent to surgical procedure. Nowadays, with advances in optics and technology, shortcoming during initial phase of laparoscopy has been overcome. Though associated with initial long learning curve, with increasing expertise in laparoscopy, the safety of procedure is well established. It helps in making diagnosis by direct visualization and providing biopsy sample. The present study was conducted to evaluate the role of laparoscopy in patients with chronic abdominal pain.

In the present study, majority of the patients (36%) were in the age group of 21-30 years and the mean age of the patients was 32.80 ± 11.46 years. Women were affected more frequently than men (male to female ratio = 1:1.94). Similarly, in the study of Dnyanmote et al., majority of patients belonged to the age group of 21-30 years with

male to female ratio of 1:1.58.⁶ Majority of patients (31.7%) in the study of Swamy were between 19 to 30 years with significant female preponderance (66.7%),⁷ which is comparable to our study.

In the present study, the most common laparoscopic finding for chronic abdominal pain was chronic recurrent appendicitis seen in 15 patients (30%) and the resolution of pain was seen after appendectomy in all these patients with 100% histology accuracy. Dnyanmote et al. reported appendicitis as a most common laparoscopic finding seen in 24 patients (32%),⁶ which is similar to our study. Vaishnav and Patel⁸ and Prasad et al.⁹ reported 100% pain relief in all patients diagnosed and treated with laparoscopy and all histology reports were found to be chronic appendicitis which is comparable with our study. Similarly, in the study of Swamy, inflammation of appendix was the most prevalent surgical finding seen in 31% of patients and significant reduction in pain was seen after appendectomy,⁷ which is comparable with our study.

However, on contrary, the studies conducted by Dua et al.,¹⁰ Samaan et al.,¹¹ and Rathod et al.¹² reported adhesion as the most common laparoscopic finding in patients with chronic abdominal pain. After adhesiolysis, significant reduction in chronic abdominal pain was reported in all of these studies.

These differences in laparoscopic findings in various studies may be attributed to difference in sample size, patients included in the study, and geographical variation. But it is worth noting that in all of these studies, diagnostic laparoscopy was useful in making

diagnosis and significant reduction in pain was observed after therapeutic interventions which justifies the role of diagnostic laparoscopy in chronic abdominal pain.

In our study, Koch's abdomen and adhesion were the other common laparoscopic findings seen in 13 patients (26%) and 12 patients (24%), respectively. Similarly, in the study of Dnyanmote et al., Koch's abdomen and adhesion each were seen in 18 patients (24%).⁶

Abdominal TB and malignancy are close differential in terms of clinical presentation as loss of appetite, loss of weight, and abdominal pain. Laparoscopy and biopsy are accurate in differentiating this potentially treatable disease from potentially fatal malignancy. Even the negative laparoscopic exploration in such type of patients can be regarded as 'useful outcome'.

Incidence of TB is very high in India and many patients are treated empirically with AKT without evidence of disease. The diagnosis of isolated peritoneal TB is difficult as the size of tubercles is usually less than 5 mm, which are not detected on ultrasonography or CT scan. In such a scenario, laparoscopy not only visualizes every corner of abdominal cavity but also provides specimen for definite histopathological diagnosis.

In the present study, histological accuracy to diagnose abdominal TB was seen in 84.6% of patients but all 13 patients responded well to AKT with resolution of pain after 2 months of treatment, which is comparable to the study of Abdelaal et al. who described 100% sensitivity and specificity of gross laparoscopic appearance in diagnosing peritoneal TB; however, histopathological confirmation was seen in 93% of cases.¹³

In the present study, an adhesion was cause of chronic abdominal pain in 24% of cases (12 patients). In 2 patients, adhesion was causing SAIO. In all of these 14 patients, adhesiolysis resolved the chronic abdominal pain. Similarly, Paajanen et al. reported

adhesion as the most important cause of chronic abdominal pain during diagnostic laparoscopy and adhesion-related abdominal pain was abolished or diminished in 90% of cases over a period of 15-year follow-up.¹⁴

In the present study, the etiology of chronic abdominal pain could be established in 94% of cases and a definitive therapeutic procedure was performed in 68% of cases. The resolution of chronic abdominal pain has been seen in 47 patients (94% of cases) over a period of 3-month follow-up.

Zhao et al. concluded that the diagnosis of chronic abdominal pain of unknown origin could be achieved in 65% to 94% of patients with laparoscopy;¹⁵ similarly in the present study, the diagnostic accuracy of laparoscopy was seen in 94% of cases. In study of Zhao et al., therapeutic utility of laparoscopy based upon pain relief, patient satisfaction, and quality of life ranged from 63% to 94%. In the present study, therapeutic utility of laparoscopy was seen in 68% of patients and resolution of chronic abdominal pain was seen in 94% of patients which is comparable with the study of Zhao et al. Similarly, Swamy also reported resolution of abdominal pain in 88.4% of patients over a period of 60 days,⁷ which is comparable with our study.

The rate of complication in diagnostic laparoscopy reported by Udwardia was 0.09%;¹⁶ similarly, no major complications were reported in the present study.

Overall, diagnostic laparoscopy is a safe and effective modality of investigation for chronic abdominal pain. The diagnostic ability of laparoscopy to point out or exclude major cause of chronic abdominal pain not only avoids further costlier investigation but also plays a vital role in reducing the fear of undiagnosed pain in the minds of patients. The therapeutic advantage of laparoscopy avoids the cost of further hospitalization and another exploration of abdomen. The diagnostic laparoscopy helps to improve outcome in

majority of patients with chronic abdominal pain by providing hint for the confirmation of diagnosis. This is a single-centre study with small sample size; hence, studies with larger sample size are required to validate the findings in the present study.

Conclusion

Diagnostic laparoscopy is a safe and effective procedure in the evaluation of patients with chronic abdominal pain in the rural areas. It also provides an opportunity to perform the therapeutic procedure in the same setting thereby reducing the cost of treatment.

Conflict of Interests

Authors have no conflict of interests.

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References

- Bellad AP. Role of diagnostic laparoscopy in chronic abdominal pain with uncertain diagnosis: A 1-year cross-sectional study. *World J Lap Surg.* 2019; 12(1): 9–14.
- Turner J, Kelly B. Emotional dimensions of chronic disease. *West J Med.* 2000; 172(2): 124-8.
- El-Labban GM, Hokkam EN. The efficacy of laparoscopy in the diagnosis and management of chronic abdominal pain. *J Minim Access Surg.* 2010; 6(4): 95-9.
- Berci G. Elective and emergent laparoscopy. *World J Surg.* 1993; 17(1): 8-15.
- Easter DW, Cuschieri A, Nathanson LK, Lavelle-Jones M. The utility of diagnostic laparoscopy for abdominal disorders. Audit of 120 patients. *Arch Surg.* 1992; 127(4): 379-83.
- Dnyanmote A, Srivastava N, Gope D, Tyagi A. Role of diagnostic laparoscopy in chronic abdominal pain. *Int Surg J.* 2020; 7(4): 1077-81.
- Swamy HVH. Diagnostic laparoscopy in chronic abdominal pain in uncertain diagnosis. *Int J Surg Sci.* 2022; 6(1): 214-8.
- Vaishnav U, Patel HS. Analysis of diagnostic laparoscopy in chronic right iliac fossa pain. *Int Surg J.* 2017; 4(4): 1259-62.
- Prasad S, Jain S, Prakash A, Gautam A, Gadodia M, Gupta A, et al. Evaluation of efficacy of laparoscopy in patients with chronic abdominal pain. *Int Surg J.* 2017; 4(6): 1856-60.
- Dua D, Aggarwal D, Aggarwal D. Role of laparoscopy in the management of chronic abdominal pain: A clinical study in north Indian teaching hospital. *International Journal of Surgery Science.* 2021; 5(1): 18-21.
- Samaan JS, Chang E, Hart NJ, Alicuben ET, Samaan F, Ghlandian A, et al. Efficacy of laparoscopy in diagnosis and treatment of chronic abdominal pain of unknown origin. *Am Surg.* 2019; 85(10): 1104-7.
- Rathod A, Agrawal A, Mehera B. Role of laparoscopy in chronic and recurrent abdominal pain-rural area experience. *Indian J Surg.* 2015; 77(Suppl 3): 1018-22.
- Abdelaal A, Alfkey R, Abdelaziem S, Abunada M, Alfaky A, Ibrahim WH, et al. Role of laparoscopic peritoneal biopsy in the diagnosis of peritoneal tuberculosis. A seven-year experience. *Chirurgia (Bucur).* 2014; 109(3): 330-4.
- Paajanen P, Fagerstrom A, Paajanen H. Laparoscopic adhesiolysis in chronic abdominal pain: 15-year follow-up study. *J Clin Gastroenterol.* 2018; 52(4): e32-e36.
- Zhao J, Samaan JS, Toubat O, Samakar K. Laparoscopy as a diagnostic and therapeutic modality for chronic abdominal pain of unknown etiology: A literature review. *J Surg Res.* 2020; 252: 222-30.
- Udwadia TE. Diagnostic laparoscopy. *Surg Endosc.* 2004; 18(1): 6-10.