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Diagnostic Laparoscopy in Chronic Abdominal Pain with Inconclusive Evaluation: A Prospective Observational Study

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Abstract: ***Background**: Chronic abdominal pain (CAP) persisting for more than three months poses a significant diagnostic challenge in surgical practice. Despite advances in imaging and endoscopic techniques, a considerable proportion of patients remain without a definitive diagnosis after conventional evaluation. Diagnostic laparoscopy offers direct visualization of the abdominal cavity and allows simultaneous therapeutic intervention, potentially improving diagnostic accuracy and patient outcomes. **Objectives**: To evaluate the diagnostic and therapeutic role of laparoscopy in patients with chronic abdominal pain of inconclusive etiology and to assess postoperative outcomes and pain relief. **Methods**: This prospective observational study was conducted in the Department of General Surgery at a tertiary care teaching hospital from November 2023 to August 2025. Patients presenting with chronic abdominal pain (>3 months) with inconclusive clinical and radiological evaluation were included. All patients underwent diagnostic laparoscopy under general anesthesia with systematic inspection of the abdominal and pelvic cavities. Therapeutic procedures were performed when indicated. Postoperative complications, operative duration, hospital stay, and pain relief at 1 and 3 months were assessed using descriptive statistical analysis. **Results**: A total of 37 patients were studied, with a female predominance (64.86%) and a mean age in the younger adult group. Postoperative adhesions were the most common laparoscopic finding (43.26%), followed by recurrent appendicitis (13.51%) and abdominal tuberculosis (10.81%). Therapeutic interventions were performed in the majority, with adhesiolysis being the most frequent procedure (32.45%). Conversion to open laparotomy was required in 13.51% of cases. The mean operative time was 58.11 ± 27.40 minutes and mean hospital stay was 4.54 ± 1.35 days. Pain relief was reported in 83.8% of patients at 1 month and 67.6% at 3 months. Complications were minimal and mostly minor. **Conclusion**: Diagnostic laparoscopy is a safe and effective modality in evaluating chronic abdominal pain with inconclusive diagnosis, offering high diagnostic yield, therapeutic benefit, and significant pain relief with low morbidity.*

Keywords: Abdominal adhesions; Chronic abdominal pain; Diagnostic laparoscopy; Minimally invasive surgery; Pain relief

1. Introduction

Chronic abdominal pain (CAP) is a common yet challenging clinical problem encountered in surgical practice. It is generally defined as continuous or intermittent abdominal pain persisting for more than three months and often leads to repeated hospital visits, extensive investigations, and significant impairment of quality of life. Despite advances in diagnostic imaging and endoscopic techniques, a substantial proportion of patients with CAP remain without a definitive diagnosis after conventional evaluation. Studies have reported that up to 30–40% of patients continue to have unexplained abdominal pain even after thorough non-invasive workup, creating a diagnostic dilemma for clinicians and surgeons alike.[1,2]

Conventional diagnostic modalities such as ultrasonography, computed tomography (CT), endoscopy, and contrast studies, although useful, have inherent limitations in detecting subtle intra-abdominal pathologies like adhesions, early appendiceal disease, peritoneal tuberculosis, or minimal endometriosis. As a result, patients may undergo prolonged symptomatic treatment or unnecessary exploratory laparotomy, which is associated with significant morbidity, longer hospital stay, and increased healthcare costs.[3] Therefore, there is a need for a diagnostic approach that allows direct visualization of the abdominal cavity while minimizing patient morbidity.

Diagnostic laparoscopy has emerged as a valuable minimally invasive tool in the evaluation of chronic abdominal pain with inconclusive diagnosis. It enables direct inspection of intra-abdominal and pelvic organs, identification of otherwise occult pathology, and simultaneous therapeutic intervention when indicated. Several studies have demonstrated high diagnostic accuracy of laparoscopy in CAP, with diagnostic yields ranging from 70% to over 90%, and therapeutic benefit in a majority of patients.[4–6] Common findings reported include adhesions, chronic appendicitis, abdominal tuberculosis, and gynecological causes, many of which are not reliably detected on imaging studies.

In addition to its diagnostic advantages, laparoscopy plays an important role in reducing the rate of negative laparotomies and improving postoperative recovery and pain outcomes. Evidence suggests that patients undergoing diagnostic laparoscopy for CAP experience significant pain relief and improved quality of life on follow-up, with low complication and conversion rates.[3,5,6] In view of these benefits, the present study was undertaken to evaluate the diagnostic and therapeutic role of laparoscopy in patients presenting with chronic abdominal pain of uncertain etiology, with particular emphasis on intra-operative findings, interventions performed, and postoperative pain relief.

2. Materials and Methods

This hospital-based observational study was conducted in the Department of General Surgery at a tertiary care teaching hospital during November 2023 to August 2025 after obtaining approval from the Institutional Ethics Committee. Patients presenting with chronic abdominal pain lasting more than three months, in whom routine clinical evaluation and non-invasive investigations failed to establish a definitive diagnosis, were included in the study. All patients underwent detailed history taking and thorough clinical examination, followed by relevant laboratory investigations and imaging studies such as ultrasonography, computed tomography, and endoscopic evaluations as indicated. Patients with acute abdominal conditions, proven malignancy, severe cardiopulmonary illness unfit for general anesthesia, or refusal to provide informed consent were excluded from the study.

After obtaining written informed consent, all eligible patients underwent diagnostic laparoscopy under general anesthesia using standard laparoscopic equipment and techniques. Pneumoperitoneum was created using either the closed (Veress needle) or open (Hasson's) technique, based on surgeon preference and prior surgical history. A systematic inspection of the abdominal and pelvic cavities was performed, including the liver, gallbladder, stomach, small and large bowel, appendix, peritoneum, pelvis, and paracolic gutters. Intra-operative findings were documented in detail. Whenever feasible, therapeutic procedures such as adhesiolysis, appendectomy, biopsy, or other necessary interventions were performed during the same sitting. Conversion to open laparotomy was carried out when indicated.

Postoperatively, patients were monitored for intra-operative and postoperative complications, duration of hospital stay, and need for additional interventions. Follow-up was conducted at 1 month and 3 months after surgery to assess pain relief and clinical improvement. Pain outcomes were categorized based on patient-reported relief. Data were entered into a structured proforma and analyzed using appropriate descriptive statistical methods. Results were expressed as frequencies, percentages, and mean values, and findings were compared with previously published studies wherever applicable.

3. Results

A total of 37 patients with chronic abdominal pain and inconclusive preoperative evaluation were included in the study. The majority of patients belonged to the 26–35 years age group (40.54%), followed by those aged 16–25 years (24.32%), indicating a relatively young study population. Females constituted a higher proportion of cases (64.86%) compared to males (35.14%). The most common pain location was the periumbilical region (40.50%), followed by diffuse abdominal pain (32.40%), lower abdominal pain (16.20%), and upper abdominal pain (10.80%). The duration of pain ranged widely, with most patients experiencing symptoms for 11–20 months (32.43%) or 21–30 months (32.43%). A history of previous abdominal surgery was present in 43.24% of patients, with tubectomy (43.75%) and lower segment cesarean section (25.00%) being the most common prior procedures.

Table 1: Baseline Characteristics of Study Participants (N = 37)

Parameter	Category	Frequency (n)	Percentage (%)
Age Group (years)	16–25	9	24.32
	26–35	15	40.54
	36–45	5	13.51
	46–55	6	16.22
	>55	2	5.41
Gender	Female	24	64.86
	Male	13	35.14
Location of Pain	Periumbilical	15	40.5
	Diffuse abdomen	12	32.4
	Lower abdomen	6	16.2
	Upper abdomen	4	10.8
Duration of Pain	0–10 months	10	27.03
	11–20 months	12	32.43
	21–30 months	12	32.43
	>30 months	3	8.11
History of Previous Abdominal Surgery	Present	16	43.24
	Absent	21	56.76
Type of Previous Surgery *(n = 16)*	Tubectomy	7	43.75
	LSCS	4	25
	Appendectomy	2	12.5
	Exploratory laparotomy	1	6.25
	Hysterectomy	1	6.25
	Laparoscopic cholecystectomy	1	6.25

Diagnostic laparoscopy identified a definite intra-abdominal pathology in the majority of patients (Table 2). Post-operative adhesions were the most common intra-operative finding, observed in 16 patients (43.26%), followed by recurrent appendicitis in 5 patients (13.51%) and abdominal tuberculosis in 4 patients (10.81%). A normal laparoscopic study was noted in 6 patients (16.22%). Less frequent findings included chronic cholecystitis, endometriosis, mesenteric lymphadenitis, right ovarian cyst, right inguinal hernia, and pelvic inflammatory disease, each accounting for 2.7% of cases.

Therapeutic intervention was performed during laparoscopy whenever indicated. Adhesiolysis was the most commonly performed procedure (32.45%), followed by four-quadrant biopsies (16.22%) and appendectomy (13.51%). Conversion to open laparotomy was required in 5 patients (13.51%), primarily due to dense adhesions or bowel involvement. Additional procedures included peritoneal or omental biopsies, cholecystectomy, uterosacral ligament biopsy, lymph node biopsy, ovarian cyst aspiration with cystectomy, laparoscopic transabdominal preperitoneal (TAPP) repair, and initiation of CDC-recommended treatment for pelvic inflammatory disease.

Among the patients converted to open surgery, adhesiolysis with primary repair of bowel perforation and open adhesiolysis alone were each performed in 40% of cases, while resection and anastomosis was required in 20%. Intra-operative complications were uncommon, with 91.89% of patients experiencing no complications. Bowel perforation

occurred in 5.41%, and intra-operative bleeding was noted in 2.7% of cases.

Table 2: Laparoscopic Findings, Procedures, and Complications among Study Participants (N = 37)

Parameter	Category	Frequency (n)	Percentage (%)
Intra-operative Laparoscopic Findings	Post-operative adhesions	16	43.26
	Normal study	6	16.22
	Recurrent appendicitis	5	13.51
	Abdominal tuberculosis	4	10.81
	Chronic cholecystitis	1	2.7
	Endometriosis	1	2.7
	Mesenteric lymphadenitis	1	2.7
	Right ovarian cyst	1	2.7
	Right inguinal hernia	1	2.7
	Pelvic inflammatory disease	1	2.7
Procedures Performed During Laparoscopy	Adhesiolysis	12	32.45
	Four-quadrant biopsies	6	16.22
	Appendectomy	5	13.51
	Conversion to open	5	13.51
	Peritoneal / omental biopsy	3	8.11
	Cholecystectomy	1	2.7
	Uterosacral ligament biopsy	1	2.7
	Lymph node biopsy	1	2.7
	Ovarian cyst aspiration + cystectomy	1	2.7
	Laparoscopic TAPP	1	2.7
	CDC regimen for PID	1	2.7
Procedures Converted to Open Laparotomy *(n = 5)*	Adhesiolysis + primary repair of perforation	2	40
	Open adhesiolysis	2	40
	Resection and anastomosis	1	20
Intra-operative Complications	None	34	91.89
	Bowel perforation	2	5.41
	Bleeding	1	2.7

Postoperative recovery was uneventful in the majority of patients (Table 3). No postoperative complications were observed in 31 patients (83.78%). Minor complications included port-site infection in 3 patients (8.11%), fever in 2 patients (5.41%), and postoperative vomiting in 1 patient (2.7%). No major postoperative morbidity or mortality was recorded.

The mean operative duration was 58.11 ± 27.40 minutes, reflecting variability based on intra-operative findings and procedures performed. The mean postoperative hospital stay was 4.54 ± 1.35 days, indicating relatively short hospitalization following diagnostic and therapeutic laparoscopy. At 1-month follow-up, 31 patients (83.8%) reported significant relief from abdominal pain, while 6 patients (16.2%) had persistent symptoms. At 3 months, sustained pain relief was observed in 25 patients (67.6%). Persistent pain was reported by 8 patients (21.6%), and 4 patients (10.8%) were lost to follow-up.

Overall, diagnostic laparoscopy demonstrated favorable postoperative outcomes with a low complication rate and substantial short-term and intermediate-term pain relief in patients with chronic abdominal pain of uncertain etiology.

Table 3: Postoperative Outcomes, Operative Parameters, and Pain Relief Following Diagnostic Laparoscopy (N = 37)

Outcome Domain	Parameter / Category	Frequency (n)	Percentage (%) / Mean ± SD
Postoperative Complications	No complication	31	83.78
	Fever	2	5.41
	Port-site infection	3	8.11
	Vomiting	1	2.7
Operative Parameters	Duration of procedure (minutes)	—	58.11 ± 27.40
	Postoperative hospital stay (days)	—	4.54 ± 1.35
Pain Relief Status – 1 Month	Positive pain relief	31	83.8
	No pain relief	6	16.2
	Lost to follow-up	0	0
Pain Relief Status – 3 Months	Positive pain relief	25	67.6
	No pain relief	8	21.6
	Lost to follow-up	4	10.8

4. Discussion

Chronic abdominal pain (CAP) with an uncertain diagnosis remains a complex clinical entity that frequently challenges surgeons despite advances in imaging and endoscopic techniques. In the present study, diagnostic laparoscopy demonstrated a high diagnostic yield, supporting its role as an effective modality in patients with persistent symptoms and

inconclusive non-invasive investigations. The predominance of young adults and female patients observed in this study is consistent with prior reports, which suggest that CAP is more common in women, particularly those of reproductive age.[4,5] The nonspecific nature of pain location and prolonged symptom duration noted in most patients further explains why conventional diagnostic approaches often fail to identify the underlying pathology.[7]

Post-operative adhesions constituted the most common laparoscopic finding in this study, particularly among patients with a history of previous abdominal surgery. This finding is in agreement with multiple studies that have identified adhesions as a major cause of chronic abdominal pain and a frequent contributor to negative imaging results.[2,3] Adhesions are notoriously difficult to detect on ultrasonography and CT scans, making laparoscopy the most reliable diagnostic tool for their identification. Other significant findings such as recurrent appendicitis and abdominal tuberculosis were also observed, highlighting the value of laparoscopy in diagnosing subtle inflammatory and infective conditions, especially in regions where tuberculosis remains endemic.[5,8,9] The relatively low rate of normal laparoscopic findings in the present study further reflects the diagnostic effectiveness of this approach.

An important advantage of diagnostic laparoscopy is its ability to facilitate simultaneous therapeutic intervention, thereby avoiding unnecessary exploratory laparotomy. In this study, adhesiolysis and appendectomy were the most commonly performed procedures, findings that are comparable with those reported by Salky and Edye, Anuradha Dnyanmote et al., and Jasmine Zhao et al..[2,10,11] Several authors have emphasized that the therapeutic component of laparoscopy significantly contributes to symptom relief and improved patient satisfaction.[3,12] Conversion to open laparotomy was required in a limited number of cases due to dense adhesions or bowel involvement, with conversion rates comparable to those reported in previous studies.[5,13] The acceptable operative duration and relatively short hospital stay observed in this study further underscore the minimally invasive nature and perioperative benefits of laparoscopy.

The safety profile of diagnostic laparoscopy in the present study was favorable, with a low incidence of intra-operative and postoperative complications, most of which were minor and manageable. These findings are consistent with earlier reports that have demonstrated low morbidity and negligible mortality associated with diagnostic laparoscopy in CAP.[4,5,9,14] Pain relief outcomes were particularly encouraging, with the majority of patients reporting significant improvement at one month and sustained benefit at three months. Similar short- and intermediate-term improvements in pain and quality of life following laparoscopic evaluation and intervention have been documented in multiple studies.[3,15] Collectively, these findings reinforce the role of diagnostic laparoscopy as a safe, effective, and minimally invasive modality that enhances diagnostic accuracy, reduces negative laparotomies, and improves clinical outcomes in patients with chronic abdominal pain of uncertain etiology.

5. Conclusion

Diagnostic laparoscopy is a safe, effective, and minimally invasive modality for the evaluation of chronic abdominal pain with uncertain diagnosis. It provides a high diagnostic yield, enables simultaneous therapeutic intervention, and helps reduce the rate of negative exploratory laparotomies. The procedure is associated with low morbidity, short hospital stay, and significant improvement in pain outcomes on follow-up. In patients with persistent symptoms and inconclusive non-invasive investigations, diagnostic laparoscopy should be considered an important tool in the diagnostic algorithm to improve clinical outcomes and quality of life.

Conflict of Interest: The authors declare that there is no conflict of interest regarding the publication of this study.

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