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Original Research Article

Use of Diagnostic Laparoscopy for Individuals with Chronic Abdominal Pain of Unclear Diagnosis: A Cross-Sectional Study

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Abstract

Background and Objectives: Chronic abdominal pain poses a significant clinical hurdle in terms of accurate diagnosis. Within this context, laparoscopy, a minimally invasive procedure, offers potential benefits for both diagnostic and therapeutic purposes in individuals afflicted with chronic undiagnosed abdominal pain. Consequently, the principal aim of this study was to evaluate the utilization of laparoscopy as an investigative approach in the diagnosis and management of patients grappling with chronic abdominal pain.

Materials & Methods: This study encompassed a cohort of 100 individuals who presented with chronic abdominal pain. Comprehensive data regarding demographics, clinical characteristics, as well as medical and surgical backgrounds were documented. Specific information pertaining to the pain, encompassing its severity assessed through the visual analog scale (VAS) score, duration, location, and nature, was also recorded. Furthermore, routine and radiological investigations were conducted as part of the diagnostic process. Subsequently, the patients underwent diagnostic laparoscopy, employing either an open or closed technique under general anesthesia. To assess the postoperative outcomes, pain evaluation was performed using the VAS score.

Results: Among the participants, a notable majority experienced chronic abdominal pain. Fever was reported by 42.15% of the patients, and a history of lower segment cesarean section was identified in 5.31% of the cases. The surgical interventions most frequently conducted were adhesionlysis and appendectomy. Importantly, a statistically significant improvement in postoperative pain relief was observed.

Conclusion: Laparoscopy effectively diagnoses and relieves pain in chronic abdominal pain patients, emphasizing adhesions and inflamed appendix as significant factors. Larger studies are needed for validation, but laparoscopy remains a valuable diagnostic and management tool.

Keywords: Abdominal Pain, Laparoscopy, Appendectomy, Cesarean Section, India.

Introduction

Chronic abdominal pain refers to a persistent and recurring pain experienced for a duration exceeding 12 weeks. This prevalent clinical manifestation significantly impacts individuals both physically and psychologically. Within India, it ranks as the fourth most frequently encountered chronic pain syndrome among the general populace, accounting for approximately 13% of all admissions related to surgical interventions [1, 2].

Chronic abdominal pain can stem from various causes, encompassing both organic and functional origins. Among the organic disorders, notable culprits include intestinal adhesions, biliary issues, and appendicular complications. On the other hand, functional disorders comprise conditions such as irritable bowel disease, functional dyspepsia, and diverse motility disorders [3]. Despite comprehensive diagnostic examinations, a substantial proportion (40%) of patients experiencing chronic abdominal pain do not receive a specific diagnosis upon evaluation [4]. Consequently, many patients continue to remain undiagnosed even after excluding common disorders through meticulous investigations, thus posing a considerable diagnostic challenge for physicians [5].

Various methodologies, including magnetic resonance imaging (MRI), computed tomography scan (CT scan) and ultrasonography (USG), serve as valuable tools in investigating chronic abdominal

pain. However, it is important to note that these techniques offer only indirect evidence of the underlying disorder. Consequently, a considerable number of cases still remain inconclusive, posing a significant challenge for surgeons in accurately diagnosing the condition and determining the most suitable treatment approach [6]. The popularity of this treatment modality can be attributed to several factors. Firstly, it exhibits a high diagnostic yield, meaning it is effective in obtaining accurate diagnoses. Additionally, it is applicable and beneficial in both elective and emergency settings. Furthermore, it has been associated with reduced hospital stays, lower morbidity rates, and decreased expenditure, further contributing to its appeal and widespread utilization [7].

While diagnostic laparoscopy is increasingly gaining acceptance in surgical practice, its role in determining the diagnosis of nonspecific abdominal pain requires validation based on evidence. Currently, there is a scarcity of studies that establish the definitive role of diagnostic laparoscopy in patients experiencing chronic abdominal pain [8-12]. Consequently, further research is necessary to ascertain the efficacy and utility of diagnostic laparoscopy in this particular patient population.

Given the prevalence of chronic abdominal pain and the potential benefits associated with laparoscopy, the current study was conducted with the objective of identifying the underlying causes of chronic abdominal pain. Furthermore, the study aimed to evaluate the outcomes in terms of pain relief during follow-up after elective diagnostic laparoscopy in patients with chronic abdominal pain.

Material & Methods

This year long hospital-based observational cross-sectional study was conducted at the Department of Surgery, following ethical guidelines (13, 14). A total of 100 patients with undiagnosed chronic abdominal pain were included in the study. Eligible patients who met the selection criteria were provided with comprehensive information regarding the diagnostic laparoscopy procedure.

The study included patients aged 18 years or older, who had a history of chronic abdominal pain lasting for at least 8 weeks and remained undiagnosed in spite of undergoing biochemical and other radiological investigations such as USG, CT scan, and MRI. However, patients who had already been diagnosed with chronic abdominal pain, lost to follow-up, were pregnant, or were deemed unfit for general anesthesia were excluded from the study.

Demographic information, including age and gender, was collected from the participants. Detailed interviews were conducted to gather their medical and surgical history, as well as information regarding their presenting complaints. Symptoms such as diarrhea, fever, burning sensations, constipation, and difficulties with urination were documented. Clinical examinations were performed, and additional details regarding the severity of pain using the visual analog scale (VAS) score, duration of pain, location of pain, and nature of pain were recorded. All these findings were documented on a pre-designed and validated proforma. Furthermore, various laboratory investigations, including hemoglobin, total WBC counts, random blood glucoses, thrombocyte counts, liver function tests, urinalysis, serum creatinine values, and radiological examinations such as MRI, CT and USG were conducted as part of the study.

After the preanesthetic checkup, the selected individuals underwent diagnostic laparoscopy. The procedure was performed by a single surgeon, either using an open or closed technique, under general anesthesia. Patients were instructed to fast for 12 hours before surgery. Initially, the port was placed at the umbilical point using an open technique. In cases where there were scars or a history of previous surgery, the initial port placement was done at Palmer's point using an open technique. Additional ports were inserted as necessary. The abdominal cavity was thoroughly examined in each case, and interventions such as adhesionlysis, appendicectomy, peritoneal biopsy, lymph node biopsy, or peritoneal fluid aspiration were performed at the discretion of the operating surgeon. The examination of the abdominal structures was conducted in a sequential manner, starting from the pelvis and progressing to the upper abdomen. The internal genitalia, all parts of GIT from rectum upwards, liver, and spleen were visualized and examined. By utilizing bowel grasping forceps, the entire length of the small bowel was directly visualized and examined. The final diagnosis was established based on the biopsy examination reports. Subsequently, patients received appropriate treatment based on the findings from the laparoscopy. The general anesthesia protocol remained consistent for all patients, and they were followed up for pain assessment.

Pain assessment was conducted using the Visual Analog Scale (VAS), which ranged from 0 to 10. Prior to the surgery, the VAS scale was explained to the patients during their preoperative visit, with 0 representing no pain and 10 representing the maximum intensity of pain. Pain levels were assessed at the time of enrollment and during postoperative follow-ups, specifically fortnightly up to the day 60.

RESULTS

The study population had a mean age of 38.59 ± 13.67 years, with a significant female predominance. The majority of the patients fell within the age group of 18-30. A large proportion of

the patients were married and educated. Among the clinical features observed, fever was the most common. A history of lower segment cesarean section was present in 5.31% of the patients (Table 1).

Table 1: Clinico-demograhic variables observed in study population

Clinico-demographic Variable	Frequency	%
Age (in years)		
18-29	38	38.00
30-39	25	25.00
40-50	20	20.00
50-60	5	5.00
60-70	11	11.00
Gender		
Males	35	35.00
Females	65	65.00
Marital status		
Unmarried	15	15.00
Married	85	85.00
Education		
Studying	22	22.00
Primary school	4	4.00
Secondary school	18	18.00
Graduation	54	54.00
Postgraduation	2	2.00
Symptomatic presentation		
Febrile	45	80.36
Diarrhea	5	8.93
Constipation	4	7.14
Burning while micturition	2	3.57
History		
Previous C Section	5	5.00
Hypertension	3	3.00
Hysterectomy	4	4.00
C Section + Tubectomy	3	3.00
Only Tubectomy	4	4.00
Laproscopic adhesionolysis	3	3.00
Open appendicectomy	2	2.00
Right hemicolonectomy	2	2.00
Tuberculosis	2	2.00
Inignificant	72	72.00
Per Abdomen examination		
Tenderness in Lower abdomen	46	46.00
Generalized tenderness	43	43.00
Tenderness over Suprapubic region	4	4.00
Tenderness in Lower abdomen	3	3.00
Umbilical region tenderness	4	4.00

The characteristics of pain within the study population are outlined in Table 2. The majority of patients experienced pain for a duration ranging from 8 to 12 weeks. The mean duration of pain reported by patients was 10.71 ± 2.65 weeks. Regarding the type of pain, a significant number of patients described it as generalized and progressive.

Table 2: Distribution of study participants as per characteristics of pain

Characteristic of pain	Frequency	%
Duration (in weeks)		
8 to 12	65	65.00
13 to 16	33	33.00
>16 weeks	2	2.00
Site of pain		
Generalized	49	49.00

Lower abdominal	40	40.00
Upper abdominal	6	6.00
Around umbilicus	5	5.00
Type of pain		
Intermediate	18	18.00
Moderate	2	2.00
Severe	5	5.00
Progressive	64	64.00
Dragging	9	9.00
Pricking	2	2.00
Severity of pain		
Mild	2	2.94
Moderate	31	45.59
Severe	22	32.35
Progressive	13	19.12

Table 3 presents the clinico-biochemical profile of the study population. The blood urea levels of patients with chronic abdominal pain were slightly elevated. However, the remaining parameters were within the normal limits.

Table 3: Clinico-biochemical parameters in study participants

Variable	Mean ± SD
Pain VAS score at enrolment	7.65 ± 0.86
Weight (in kilograms)	63.20 ± 6.94
Pulse rate (beats per min)	76.82 ± 5.99
Systolic blood pressure (mm of Hg)	121.89 ± 10.53
Diastolic blood pressure (mm of Hg)	78.30 ± 8.11
Respiratory rate (number per min)	17.55 ± 1.91
Temperature (degree Celsius)	97.83 ± 1.07
Hemoglobin (g/dL)	12.17 ± 1.85
TLC (mm3)	8789.75 ± 3864.16
Platelet count (in lakhs)	2.91 ± 0.76
Random Bloood Sugar (mg/dL)	103.06 ± 15.22
Blood urea (mg/dL)	25.03 ± 10.01
Serum creatinine (mg/dL)	0.91 ± 0.27

Table 4 summarizes the radiological findings, and the type of surgery performed in the patients. USG findings were normal in most of the patients, while only few had normal CT findings. The most common surgical finding was adhesions, followed by an inflamed appendix. The most frequently performed surgical procedure was adhesionolysis, followed by appendectomy.

Table 4: Radiological findings and surgery in study participants

Study Findings	Frequency	%
Ultrasonography		
Normal	76	76.00
Mild hepatosplenic enlargement, free fluid	4	4.00
Mild splenic enlargement, mild ascites, minimum pleural effusion	3	3.00
Minimal bladder distension, no obvious fluid collected in umbilical region	4	4.00
Minimal free fluid in Douglas Pouch	3	3.00
Not performed	10	10.00
CT scan		
Normal	20	20.00
Not performed	80	80.00
Surgical findings		
Adhesions	31	31.00
Inflamation of appendix	29	29.00
Tuberculous lymph node	11	11.00
Adhesions with inflamation of appendix	8	8.00
Inflamation of appendix with mobile cecum	5	5.00
Ovarian cyst (Left)	4	4.00

Liver abscess	1	1.00
Malrotation of GIT	3	3.00
Omental adherence to fimbrial end, high cecum, inflamation of appendix	1	1.00
Ovarian cyst (Right)	1	1.00
Ovarian haemorrhagic cyst (Right)	2	2.00
Umbilical sinus tract	1	1.00
Volvulus of liver flexure (left)	3	3.00
Type of surgery		
Adhesionolysis	31	31.00
Appendicectomy	28	28.00
Adhesionolysis with appendicectomy	12	12.00
Lymph nodal biopsy	11	11.00
Ovarian cystectomy	6	6.00
Appendicectomy with cecopexy	4	4.00
Ladd's band Excision with ileo-transverse colonic anastomosis	2	2.00
Laparoscopic colopexy	1	1.00
Abscess drain	3	3.00
Excision of sinus tract	2	2.00

Table 5 presents the pain assessment data during the follow-up period. On day 15, moderate pain was reported by about 50% of patients. Absence of pain was reported by most of patients on days 30, 45, and 60, respectively. The mean VAS score gradually decreased. This reduction in pain scores was found to be statistically significant.

Table 5: VAS score in post-operative period

VAS score	15 days	1 month	45 days	2 months
0 (No Pain)	14	54	80	89
0–3 (Mild)	36	33	16	9
4–6 (Moderate)	47	13	4	2
>6 (Severe)	3	0	0	0

Discussion

Chronic abdominal pain is a persistent issue that necessitates prompt investigation and appropriate management. Therefore, the objective of this study was to assess the effectiveness of laparoscopy as a diagnostic tool and treatment approach in patients experiencing chronic abdominal pain. There was a higher prevalence of chronic abdominal pain among females. This gender disparity can be attributed to the various gynecological procedures that women undergo during pregnancy, such as uterine cesarean sections, hysterectomy, tubal ligation, and tubectomy. Similar patterns of sex distribution have been reported in other studies documented in the literature [2, 4, 15]. Furthermore, one-third of the patients in this study fell within the age range of 18 to 30 years, suggesting that chronic abdominal pain predominantly affects younger individuals [11, 15].

The physical examination of patients with chronic abdominal pain can vary based on the location of pain and the chronicity of the patient's symptoms [16]. During abdominal examination, lower abdomen tenderness (localized) and generalized tenderness were the most commonly observed symptoms. It is worth noting that generalized tenderness poses a greater diagnostic challenge for surgeons compared to localized tenderness [17]. The patients' vital signs and biochemical profiles were within the normal range. Despite undergoing USG and CT scans, these imaging modalities did not provide a diagnosis for chronic abdominal pain. However, laparoscopic findings revealed that a significant number of patients had adhesions and inflamed appendix. Adhesions can restrict the mobility or distensibility of abdominal organs, particularly the bowel, leading to chronic abdominal pain [18]. In contrast to the findings of the present study, previous studies conducted by Salky et al. [19] and Sachin et al. [20] also identified abdominal adhesions as a common underlying pathology in cases of chronic abdominal pain. However, a study conducted by Naniwadekar et al. [2] reported abdominal Koch's (referred to as abdominal tuberculosis) as the most frequent cause of chronic abdominal pain, excluding gynecological cases. In the present study, adhesionolysis was found to be the most frequently performed surgical procedure, followed by appendectomy. Similarly, a study conducted by Sayed et al. [21] reported that 43.6% of patients underwent adhesionolysis. In another study by Husain et al. [6], patients with chronic abdominal pain achieved a 19% cure rate with laparoscopic appendectomy and a 17.3% cure rate with adhesionolysis after a 6-month follow-up period. Additionally, a study by El-labban et al. [22] demonstrated that laparoscopic adhesionolysis resulted in a positive outcome in more than 50% of patients. In conclusion, laparoscopy is a safe, efficient, and effective diagnostic modality for investigating chronic abdominal pain. However, the

success and effectiveness of laparoscopy are influenced by the skill, training, and coordination of the surgeons performing the procedure [23].

Conclusion

In conclusion, laparoscopy proves to be a valuable approach in providing a definitive diagnosis for patients with undiagnosed chronic abdominal pain, facilitating therapeutic interventions. Adhesions and inflamed appendix are identified as significant contributors to chronic abdominal pain. The procedure often leads to pain relief in many patients, underscoring the efficacy of laparoscopy as a diagnostic modality in managing chronic abdominal pain. However, it is important to note that this study was conducted at a single center with a small sample size. Further studies with larger sample sizes are needed to validate and corroborate the current findings.

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