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"Integrating Insights for Unveiling Chronic Pain: Exploring Diagnostic Concordance of Laparoscopy with Clinical and Radiological Findings in Chronic Abdominal and Pelvic Pain Syndromes"

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Abstract

Background and Objective: Diagnostic laparoscopy has emerged as an invaluable tool in the evaluation of chronic abdominal/pelvic pain (CAPP), particularly when conventional laboratory and imaging modalities yield inconclusive results. CAPP is defined as persistent or recurrent discomfort lasting more than three months.

Aims: This study aims to investigate the correlation between diagnostic laparoscopic findings and clinical and radiological evaluations in patients with CAPP.

Materials and Methods: This retrospective inter-departmental study was conducted at Raipur Institute of Medical Sciences, Chhattisgarh, from January 2023 to January 2024, encompassing 48 patients admitted for CAPP. Exclusion criteria included patients with acute abdominal pain, uncorrectable coagulopathy, hypercapnia, and pregnant women. Thorough history-taking, physical examinations, and

baseline blood and radiological investigations were performed. Patients underwent diagnostic laparoscopy, where therapeutic interventions were applied based on identified aetiologies, all performed with informed consent. The study assessed the utility of laparoscopy in diagnosing and managing CAPP.

Results: The cohort included 48 patients, with a predominance of females (30 patients, 63%) compared to males (18 patients, 37%). The mean age of presentation was 36.26 ± 13.88 years for males and 35.68 ± 13.71 years for females, with peak incidence in the 31–40 age group. Abdominal and/or pelvic pain was the primary complaint in all cases (48 patients, 100%), with abdominal distension noted in 17 patients (35.41%). The mean duration of pain was 10.92 ± 5.88 months. Ultrasound examinations revealed normal findings in 18 patients (37.5%), while 15 patients (31.25%) exhibited dilated bowel loops and thickening. Computed tomography of the abdomen was performed in 11 patients (22.9%), revealing pathological findings in 10 patients (20.8%), including ascites, mesenteric fat thickening, lymphadenopathy, multiloculated collection, gallbladder mass, dilated bowel loops, and pleural effusion. Laparoscopy identified Koch's abdomen as the most common finding, followed by chronic/recurrent appendicitis. A definitive diagnosis was established in 43 patients, with 38 patients experiencing significant pain resolution post-laparoscopy.

Conclusion: Diagnostic laparoscopy is a complementary diagnostic modality that enhances the accuracy of diagnosis and management of CAPP. It provides definitive diagnoses and therapeutic options, facilitating timely intervention. Early laparoscopic intervention can effectively mitigate diagnostic challenges and optimise patient outcomes.

Keywords- chronic abdominal pain, exploratory laparotomy, diagnostic laparotomy, bowel obstruction, tubercular abdomen.

Introduction

Chronic abdominal/pelvic pain (CAPP) is characterized by continuous or intermittent discomfort lasting more than three months, with a broad range of potential aetiologies affecting the genitourinary, gastrointestinal, and gynaecological systems. A definitive correlation with a specific anatomical structure or underlying pathology is not always identifiable. Patients may present with additional

symptoms that vary based on the underlying cause. Common organic conditions associated with CAPP include intestinal adhesions—particularly in individuals with a history of abdominal surgeries—abdominal tuberculosis, mesenteric lymphadenopathy (potentially due to infections such as colitis, gastroenteritis, or enteric fever), biliary disorders, appendiceal issues, and hernias. Functional conditions frequently encountered encompass irritable bowel syndrome, functional dyspepsia, and various motility disorders. Major gynaecological causes include endometriosis, pelvic inflammatory disease (PID), uterine fibroids, ovarian cysts, adhesions, adenomyosis, vulvodynia, remanent ovarian syndrome, interstitial cystitis, and uterine or ovarian torsion etc.

Accurate diagnosis is critical for determining the appropriate management strategy for pain resolution, underscoring the need for an interdisciplinary approach that effectively utilizes advanced diagnostic tools. Over the past two decades, the success of laparoscopy in establishing definitive diagnoses for abdominal disorders has solidified its role as a valuable technique in general surgery & gynaecology. Advances in instrumentation and surgical expertise have expanded the capabilities of diagnostic and therapeutic laparoscopy beyond mere visualization, allowing for the identification and management of conditions that may otherwise remain undiagnosed. This modality significantly reduces the rate of unnecessary laparotomies, making it a preferable option for patients with CAPP. As a minimally invasive, safe, and effective diagnostic tool, diagnostic laparoscopy can be performed expeditiously with minimal sequelae, enabling surgeons to address relevant pathologies in selected cases.

Aims

The primary aim of this study is to correlate the diagnostic laparoscopic findings with clinical and radiological evaluations in patients with chronic abdominal/pelvic pain (CAPP). Additionally, a negative laparoscopic examination may help avoid morbidity and unnecessary laparotomy in this patient population.

Methods and Materials

This inter-departmental retrospective study was conducted at Raipur Institute of Medical Sciences, Raipur, Chhattisgarh, over a one-year period from January 2023 to January 2024.

Inclusion Criteria: All patients presenting with CAPP were included in the study.

Exclusion Criteria: Patients who met the following criteria were excluded from the study:

1. Individuals with acute abdominal/pelvic pain.
2. Patients with uncorrectable coagulopathy or hypercapnia.
3. Pregnant females.

A total of 48 patients admitted to the surgical wards via SOPD, casualty, or transfers from other departments with complaints of CAPP during the study period were included. Upon admission, a detailed history and clinical examination focusing on the duration, location of pain, previous surgeries, and related issues were conducted. Baseline investigations, including complete blood count, urinalysis, fasting and post-prandial blood sugar, blood urea, serum creatinine, liver function tests, coagulation profile, serum electrolytes (Na, K, Cl, Ca), HIV, hepatitis B and C profiles, blood grouping, chest X-ray, and electrocardiogram, were performed. Abdominal radiographs, ultrasonography (USG), spinal skiagrams, and computed tomography (CT) scans of the abdomen in select cases were utilized to aid in diagnosis. Data were recorded on a predesigned pro forma.

Based on clinical assessments and imaging results, patients underwent diagnostic laparoscopy, with necessary surgical interventions performed as per identified aetiologies after obtaining informed written consent. Biopsies from suspicious sites (peritoneal lesions, omentum, and mesenteric lymph nodes) and peritoneal fluid samples for routine microscopy and culture sensitivity were obtained. Post-operatively, patients were kept nil per os for 24–48 hours and monitored for pulse, blood pressure, and temperature. Injectable antibiotics and analgesics were administered as needed, with Ryle’s tube and urinary catheter removed based on the patient's condition. Appropriate treatments commenced once diagnoses were established. Patients were followed up regularly post-discharge, and subjective assessments regarding pain relief were conducted through patient inquiries regarding changes in pain intensity.

This study focused on patients with CAPP and inconclusive clinical examinations, laboratory, and imaging studies. The findings and outcomes of laparoscopy were documented in a master chart and analysed. Outcome measures included the overall efficacy of diagnostic laparoscopy in identifying causes of CAPP, correlation with clinical and radiological findings, discrepancies between clinical and final diagnoses, post-operative complications, and pain response following the procedure.

Results

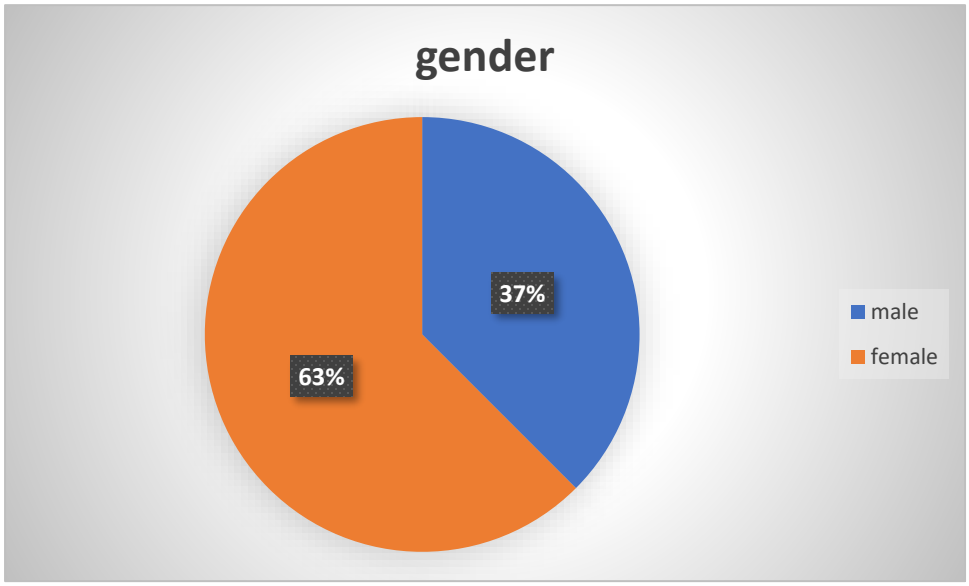
This Interdepartmental Retrospective Analytical Single-Centre Study was conducted in the Department of Surgery and Obstetrics-Gynaecology at Raipur Institute of Medical Sciences, Raipur, Chhattisgarh, from January 2022 to January 2024. The results are as follows:

The peak incidence of chronic abdominal/pelvic pain (CAPP) was observed in the age group of 31–40 years, comprising 14 patients (29.17%). The youngest patient was 14 years old, while the oldest was 65

years old. The mean age of presentation was 35.95 ± 13.65 years. The incidence of CAPP was higher in females (30 patients, 63%) compared to males (18 patients, 37%) [Graph No. 1]. The mean age of presentation for males was 36.26 ± 13.88 years, and for females, it was 35.68 ± 13.71 years. (Table 1)

Table 1- Age and Gender Distribution

Age Group (in years)	Male	Female	Total	Percentage (%)
< 21	1	0	1	2.08
21-30	2	7	9	18.75
31-40	5	9	14	29.17
41-50	6	7	13	27.08
51-60	4	6	10	20.83
>60	0	1	1	2.08
Total	18	30	48	----



Graph No-1 [Gender Distribution]

Abdominal pain was the chief complaint in all cases (48/48, 100%), followed by abdominal distension (17/48, 35.41%), fever (13/48, 27.08%), nausea and vomiting (10 patients, 20.08%), with 6 patients (12.5%) experiencing nausea alone. Anorexia or weight loss was noted in 8 patients (16.67%). (Table 2)

Table 2- Symptomatology Of the Cases

Symptomatology	Number of Cases	Percentage (%)
CAPP	48	100
Abdominal Distension	17	35.41
Fever	13	27.08
Nausea+ Vomiting	10	20.08
Nausea Alone	6	12.5
Anorexia	8	16.67

The duration of pain varied, with most patients (29, 60.42%) experiencing pain for 7 to 12 months. Other durations included 3–6 months (8 patients, 16.67%), 13–18 months (8 patients, 16.67%), 19–24 months (1 patient, 2.08%), and over 2 years (2 patients, 4.17%). The average duration of pain was 10.92 ± 5.88 months. (Table 3)

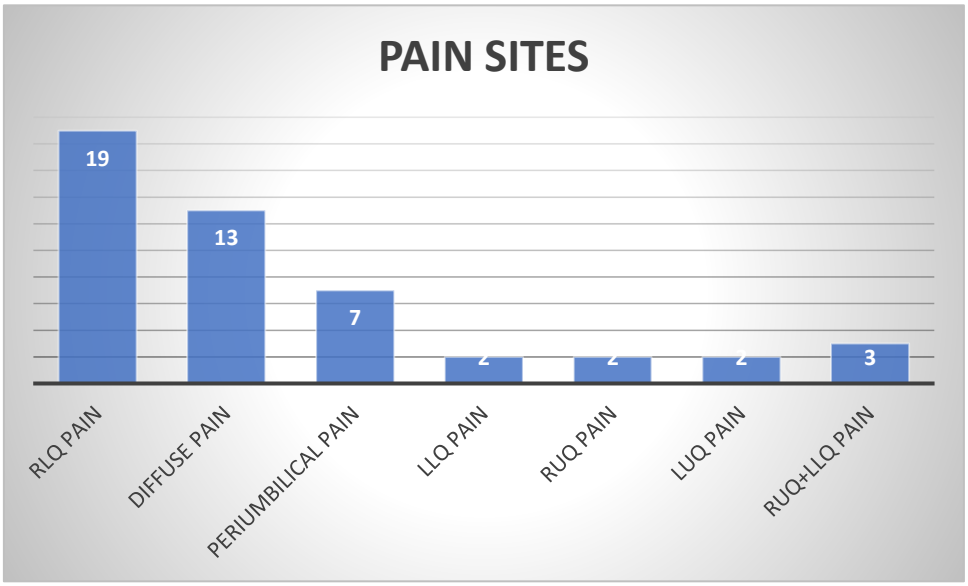
Table 3- Duration of CAPP

Duration Of CAPP (in months)	Number of Cases	Percentages (%)
3-6	8	16.67

7-12	29	60.42
13-18	8	16.67
19-24	1	2.08
>24	2	4.16

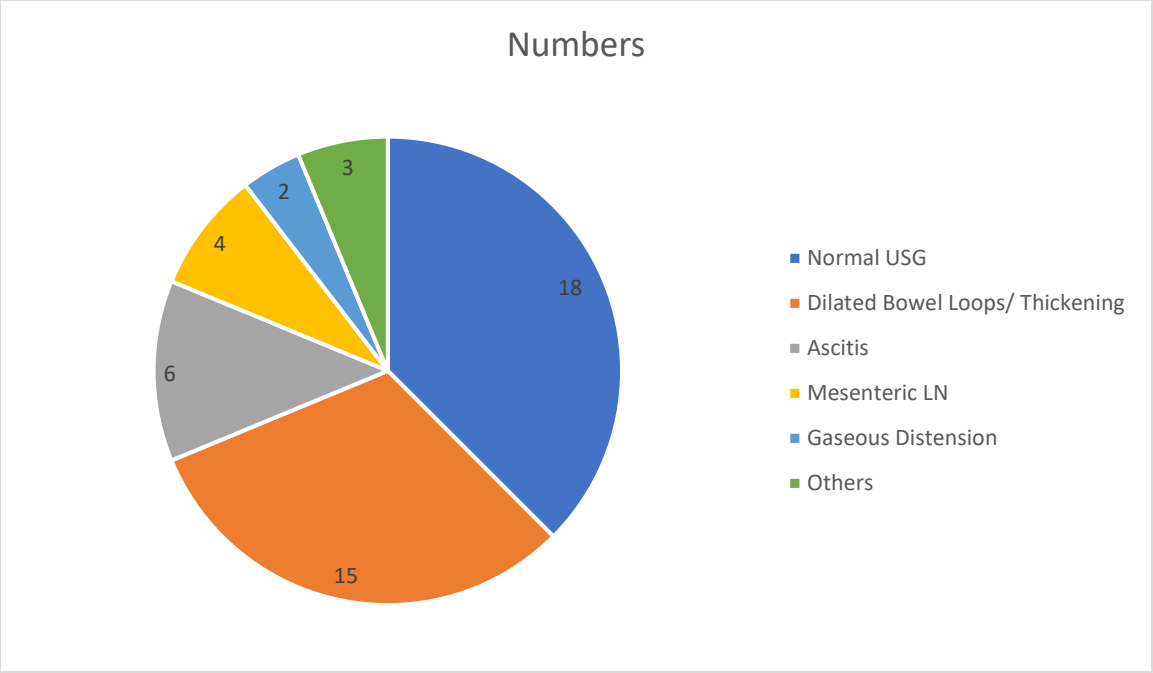
Presentation of pain was predominantly in the right lower quadrant (19 patients, 39.58%), followed by diffuse pain (13 patients, 27.08%), periumbilical pain (7 patients, 14.58%), with 2 patients each reporting left lower quadrant, right upper quadrant, and left upper quadrant pain, and 3 cases presenting with pain in RLQ+LLQ. [Graph No. 2].

A previous surgical history was noted in 13 patients (27.08%), while 35 patients (72.92%) had no surgical history; all patients presenting with postoperative adhesions had a prior surgical history.



GRAPH NO-2 [Site of Pain]

On ultrasonography (USG), 18 patients (37.5%) showed normal findings, while 15 patients (31.25%) had dilated bowel loops and bowel thickening, 6 (12.5%) had ascites, 4 (8.33%) had mesenteric lymphadenopathy, and 2 (4.17%) patients presented with gaseous distension. (Graph 3)

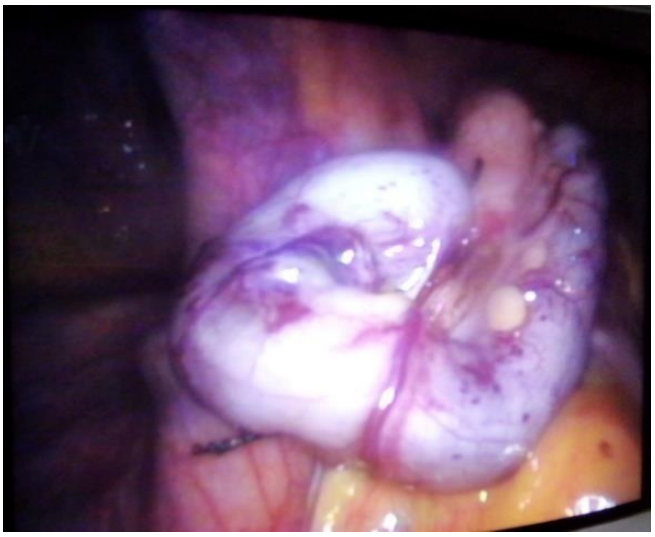


Graph no. 3- USG Findings in the study

Among the 18 patients with normal USG findings, 5 had no abnormalities detected during diagnostic laparoscopy, while 13 exhibited new findings, including 4 suggestive of Koch's abdomen (Figure 2), 4 consistent with chronic/recurrent appendicitis (Fig 1), 3 indicatives of pelvic inflammatory disease (PID), 1 showing postoperative adhesion (Fig 3), and 1 suggestive of chronic hepatitis.

Of the 30 patients (62.5%) with positive USG findings, 12 (25%) had similar findings during laparoscopy, while 6 (12.5%) had entirely new findings, and 12

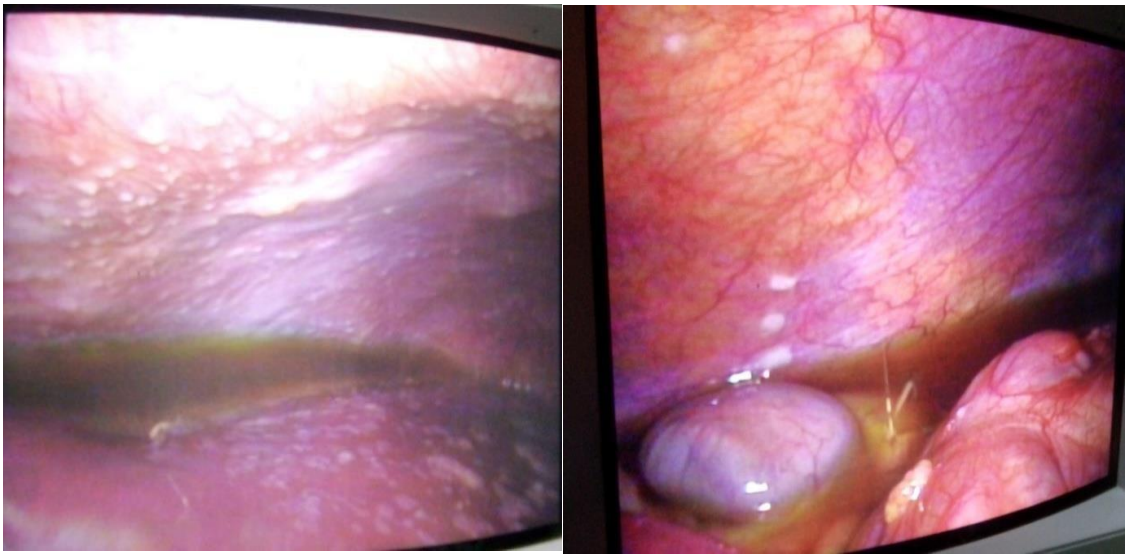
(25%) had additional new findings. The efficacy of USG in diagnosing CAPP was thus assessed at 50%.



1(a)

1(b)

Fig.1(a and b): Inflamed Appendix Seen During Laparoscopy.



2 (a) 2(b)

Fig.2(a and b): Peritoneal Tubercles with Ascites (Koch's Abdomen).

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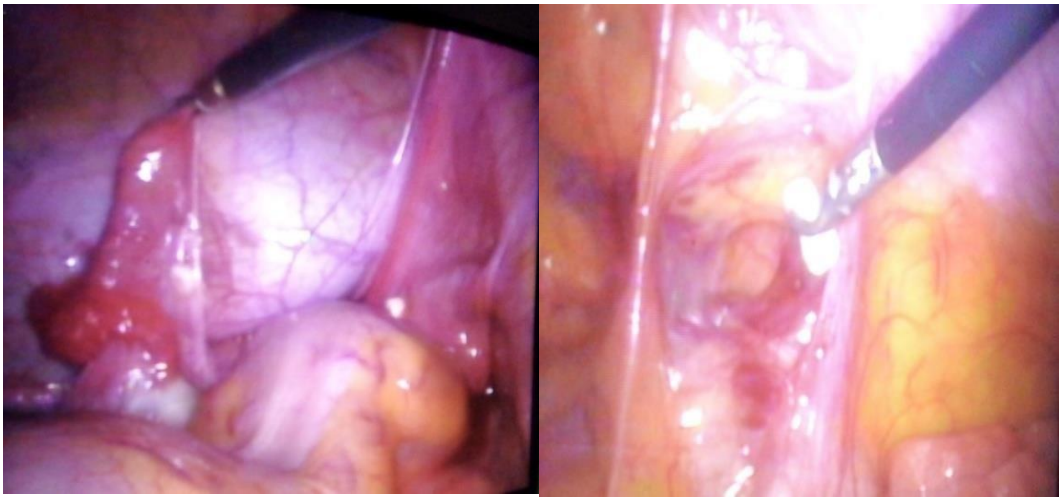

3 (a) 3 (b)

Fig.3(a and b): Pelvic Adhesions Around Misplaced Tubal Ring.

X-ray abdomen (erect view) and chest X-ray were performed for all patients. Dilated bowel loops were noted in 4 patients, minimal right pleural effusion in 3 patients, minimal bilateral effusion in 2, and both effusions alongside dilated bowel loops in 2 patients. No significant findings were reported in chest X-rays.

CT scans of the abdomen were conducted on 11 patients (22.9%), revealing pathological findings in 10 patients (20.8%) which included ascites, mesenteric fat thickening, lymphadenopathy, multiloculated collections, gallbladder mass, dilated bowel loops, bowel thickening, and pleural effusion; only 1 CT scan returned normal. In 5 patients, CT scans presented changes compared to findings from USG, demonstrating their superior capability in identifying intestinal dilatation and retroperitoneal/mesenteric lymphadenopathy.

Surgical interventions involved the use of three ports in most patients (30 patients, 62.5%), followed by two ports in 17 patients (35.42%) and four ports in 1 case.

From the 48 patients evaluated for CAPP, diagnostic findings included 10 suggestive of Koch's abdomen, 6 indicating chronic/recurrent appendicitis, 7 indicatives of postoperative adhesions, 3 suggesting malignancy (2 cases of suspected gallbladder fossa malignancy and 1 case of suspected colon cancer),

9 cases of PID, and 7 patients with ovarian cysts. Five patients exhibited no abnormalities during laparoscopy. (Table 4)

Table 4 Operative Findings During Laparoscopy

Operative Finding	Number	Percentage
Abdominal Koch's	10	20.83
Chronic/Recurrent Appendicitis	6	12.5
Post Operative Adhesions	7	14.58
Malignancy	3	6.25
Pid	9	18.75
Ovarian Cyst (Endometriosis)	7	14.58
Chronic Hepatitis	1	2.08
No Abnormality Detected	5	10.42

Overall, positive findings during diagnostic laparoscopy were evident in 43 patients (89.6%). After correlating clinical, radiological, and laparoscopic findings, the most common diagnosis in our study was abdominal Koch's, identified in 10 patients (20.83%), followed by chronic/recurrent appendicitis in 6 patients (12.5%), postoperative adhesions in 7 patients (14.58%), malignancy with metastasis in 3 patients (6.25%), and PID in 9 patients (18.75%), with ovarian cysts also observed in 7 patients (14.58%). Two patients exhibited no abnormalities during laparoscopy, and histopathological reports were negative.

Postoperative complications were noted in only 3 patients (2 with fever and 1 with a surgical site infection). No major complications occurred, and all complications were successfully managed conservatively, allowing for full recovery.

Of the 48 patients, 3 discontinued follow-ups due to referrals for adjuvant therapy. Among the remaining 45 patients, 38 (84.4%) demonstrated resolution of pain upon follow-up, while no change was observed in 7 patients (15.6%) after laparoscopy.

Discussion

Chronic abdominal/pelvic pain (CAPP) presents a significant diagnostic and therapeutic challenge across all age groups. Symptoms and signs are often insufficient, ambiguous, and misleading, complicating conclusive diagnosis. Despite extensive investigations to rule out common ailments, many patients remain undiagnosed, posing a considerable challenge to surgeons. The most frequently encountered organic conditions include intestinal adhesions, [2,3] appendicitis,[4] and biliary issues, [5,6] while functional disorders encompass irritable bowel syndrome,[7] functional dyspepsia,[8] and various motility disorders.[9] Additionally, abdominal wall pain is prevalent and frequently misinterpreted as visceral pain. [10,11]

Diagnostic laparoscopy allows surgeons to visualize the intricate surface anatomy of intra-abdominal organs with greater detail than any other imaging modality. However, it has inherent limitations, including the inability to visualize deep parenchymal organs, retroperitoneal spaces, and the inner surfaces of hollow organs, as well as the inability to palpate these structures during the procedure.[12] In our study, all patients with CAPP underwent laparoscopic evaluation after exhaustive exclusion of organic causes through detailed history-taking, comprehensive clinical examinations, laboratory tests, and radiographic evaluations.

The findings of this study confirm that laparoscopic evaluation can safely identify abnormalities in this challenging patient population, improving outcomes in most cases. A notable advantage for both surgeons and patients are that if no serious intra-abdominal pathology is identified, the placebo effect of laparoscopy may contribute to significant pain relief.[13] Additionally, early diagnostic laparoscopy may reduce delays in reaching a definitive diagnosis and initiating appropriate treatment.

In our study, the predominant causes of CAPP included abdominal tuberculosis (10 cases, 20.8%), chronic appendicitis (6 cases, 12.5%), gynaecological conditions, bands, adhesions, and abdominal malignancies. In many developing countries, including India, infectious diseases, particularly tuberculosis, represent a more common aetiology for chronic abdominal pain

than malignancy.

Among the patients evaluated, 18 exhibited normal findings on ultrasonography (USG). Of the 30 patients (62.5%) with positive USG findings, 12 (25%) had corresponding findings during laparoscopy, while 6 (12.5%) presented with entirely new findings, and 12 (25%) had new findings in addition to previously identified ones. This indicates a modest 50% efficacy of USG in diagnosing CAPP, reinforcing the superiority of diagnostic laparoscopy in identifying tubercles, nodules, minimal ascites, bands, and adhesions.

Our findings regarding abdominal tuberculosis align with previous studies conducted by Tulaskar et al.,[13] Rathod et al.,[14] Lal,[15] and Saxena.[16] Additionally, besides diagnostic laparoscopy and biopsies, therapeutic laparoscopic surgeries were performed in 28 patients. In cases diagnosed with abdominal tuberculosis (10 cases) and those suspected of malignancy (3 cases), biopsies were obtained, while appendectomy was performed in 15 patients. This is consistent with the recommendations from Rathod et al.,[14] Chaphekar et al.,[17] Saxena,[16] and Chao et al. [18], who concluded that diagnostic laparoscopy is beneficial for patients with chronic right iliac fossa pain, particularly considering concurrent appendectomy in young patients presenting with episodic, localized symptoms and systemic malaise.

Importantly, our study reported no cases that required conversion to laparotomy for therapeutic management. This is consistent with findings from studies by Salky and Edye,[19] Raymond et al.,[20] and Klingensmith et al. [21], all indicating a zero-conversion rate in their respective cohorts.

Of the 48 patients with CAPP in our study, a positive diagnosis was made in 46 patients (95.83%), comparable to the rates observed in studies by Arya et al.,[22] Karvande et al.,[23] Paajanen et al.,[24], and Saxena.[16] Furthermore, 38 patients (84.4%) reported resolution of pain during follow-up after laparoscopy, aligning with results from Kumar et al. [25] and Chaphekar et al. [17].

Complications related to laparoscopy or anaesthesia were minimal, with 6.25% morbidity reported, but no mortality. Most patients were discharged within 2 to 6 days post-procedure. Finding no abnormal pathology during laparoscopic exploration is a meaningful outcome, providing reassurance to patients and minimizing the need for further costly investigations and treatments.

This study ultimately highlights the significant positive role of laparoscopy in

managing chronic non-specific abdominal/pelvic pain, reinforcing its status as a crucial diagnostic and therapeutic tool in contemporary medical practice

Conclusion

In many patients presenting with chronic abdominal/pelvic pain (CAPP), conventional diagnostic investigations often yield inconclusive results, leaving many undiagnosed for extended periods. This uncertainty can lead to disease progression, increased morbidity, and complications, frequently resulting in emergency abdominal surgeries accompanied by inherent risks of morbidity and mortality. The absence of a definitive diagnosis contributes to unnecessary human suffering and the inefficient use of healthcare resources. Direct visualization of abdominal viscera through laparoscopic intervention, combined with histological analysis and ascitic fluid studies, has become essential for diagnosing chronic non-specific abdominal/pelvic pain syndromes effectively. Early intervention via laparoscopy not only facilitates prompt treatment initiation but also offers significant benefits for patients and cost savings for the healthcare system.

Our study underscores the vital role of diagnostic laparoscopy as a safe and effective adjunct to other diagnostic modalities in managing CAPP. By enhancing diagnostic accuracy, we can significantly improve patient outcomes while optimizing resource utilization in the healthcare landscape.

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