Section: General Surgery

Original Research Article

ROLE OF DIAGNOSTIC LAPAROSCOPY IN PAIN ABDOMEN WITH DIAGNOSTIC DILEMMA

Syed Farog Abbas[1], Ram Dayal[2], Prahlad Ram Kalwan[3]

[1]*Senior Resident, Department of General Surgery, Era Medical College and Hospital Lucknow, Uttar Pradesh, India.*
[2]*Assistant professor, Department of General Surgery, Dr. S. N. Medical College Jodhpur, Raj, India.*
[3]*Associate Professor, Department of General Surgery, Geetanjali Medical College and Hospital, Udaipur, Raj, India.*

Received *: 03/07/2025*
Received in revised form *: 18/08/2025*
Accepted *: 06/09/2025*

Corresponding Author:
Dr. Prahlad Ram Kalwan,
Associate Professor, Department of General Surgery, Geetanjali Medical College and Hospital, Udaipur, Raj, India.
Email:prahlad.kalwan@gmail.com

DOI: 10.70034/ijmedph.2025.3.548

Source of Support: Nil,
Conflict of Interest: Non edeclared

Int J Med Pub Health
2025; 15 (3); 2982-2986

ABSTRACT

Background: Abdominal pain, whether acute or chronic, is a common but often challenging presentation in surgical practice. Despite improvements in imaging and laboratory tests, many patients still present with inconclusive findings that create a diagnostic dilemma. In such cases, especially in limited-resource settings, delayed or incorrect diagnosis can lead to serious outcomes such as missed intestinal ischemia, atypical appendicitis, concealed perforations, biliary or pancreatic disorders, pelvic infections, or abdominal tuberculosis mimicking malignancy. **Aims:** The present study aims to assess the role of diagnostic laparoscopy in patients with abdominal pain and diagnostic dilemma, focusing on its effectiveness in identifying intra-abdominal pathology where conventional tests are inconclusive, while also evaluating its utility in avoiding unnecessary laparotomies and documenting its complications, limitations, and failure rates.

Materials and Methods: This prospective observational study was conducted in the Department of Surgery at TMMC & RC, Moradabad, over a period of 18 months until June 2024, including a total of 92patients.

Results: In this study of 92 patients with abdominal pain and diagnostic dilemma, most were aged 41–60 years (63.04%) with a male predominance (60.9%). Laparoscopy provided diagnostic findings in 82.6% of cases, most commonly revealing an inflamed appendix (59.8%), followed by abdominal lymphadenopathy (7.6%) and appendicular lump (5.4%).

Conclusion: This study shows that diagnostic laparoscopy is a reliable tool for evaluating abdominal pain with diagnostic dilemma, providing accurate assessment, confirming appendicitis as the commonest pathology, enabling targeted biopsies, and demonstrating strong correlation with histopathology with high accuracy.

Keywords: Diagnostic laparoscopy, Abdominal pain, Diagnostic dilemma, Appendicitis, Histopathology, Exploratory laparotomy.

INTRODUCTION

Acute and chronic pain abdomen remains among the most frequent yet diagnostically challenging presentations in emergency and general surgical practice. Despite advances in cross-sectional imaging and laboratory diagnostics, a substantial proportion of patients continue to reach the operating surgeon with equivocal clinical signs, indeterminate ultrasound or CT findings, and evolving physiology that does not neatly fit a single organ-based diagnosis.[1-3]In such "diagnostic dilemma" scenarios, particularly in resource-variable settings, the cost of delayed or inappropriate intervention can be high—missed intestinal ischemia, atypical appendicitis, biliary-pancreatic overlap syndromes, perforations contained by omentum, pelvic inflammatory disease, or tubercular/ granulomatous peritonitis that masquerade as malignant ascites.[2,4] Diagnostic laparoscopy (DL) offers a unique bridge between observation and definitive surgery: it provides direct visualization of the peritoneal cavity, targeted biopsy, peritoneal fluid sampling, and the option to proceed to therapeutic laparoscopy in the same sitting when feasible.[5-7]

Since its early adoption, DL has demonstrated high diagnostic yield across a spectrum of abdominal pain syndromes—ranging from right iliac fossa pain with equivocal imaging, to recurrent or chronic abdominal pain after prior operations, to undifferentiated peritonitis—while reducing negative laparotomy rates and shortening hospital stay in selected cohorts.[5,6,8] Randomized and observational data suggest that DL can refine diagnosis in more than two-thirds of patients with nonspecific abdominal pain and change management in a clinically meaningful proportion, including conversion to definitive laparoscopic appendectomy, adhesiolysis, cholecystectomy, ovarian detorsion/cystectomy, or lavage and drainage for localized peritonitis.[5-9] Importantly, DL allows acquisition of histopathology—particularly salient for Indian centers where abdominal tuberculosis, peritoneal carcinomatosis of unknown primary, and atypical inflammatory conditions are not uncommon and where empiric therapy without tissue diagnosis risks both over- and under treatment.[3,10]

In teaching hospitals such as TMMC & RC, Moradabad, DL also aligns with training and quality-improvement priorities. It standardizes a stepwise, minimally invasive evaluation algorithm for "pain abdomen with diagnostic dilemma," strengthens documentation through video recording, and enables protocol zed decision-making in emergency general surgery (EGS) pathways. With modern anaesthesia and improved optics, the safety profile of DL is favorable; reported complication rates are low, and conversion is dictated by pathology complexity rather than access failure in most contemporary series.[6-8] Moreover, DL can be integrated with enhanced recovery elements—smaller incisions, lower analgesic requirements, and earlier mobilization—potentially translating into shorter length of stay and better patient-reported outcomes in carefully selected patients.[6,8]

Nevertheless, DL is not a panacea. Patient selection, timing (early versus delayed), and team readiness determine yield. Hemodynamic instability that mandates immediate laparotomy, generalized feculent peritonitis with gross contamination, and cases where pneumoperitoneum is contraindicated remain important exclusions.[1,7]Even within its indications, DL requires standardized documentation of anatomical survey, systematic quadrant-by-quadrant inspection, and predefined criteria for conversion to open surgery to avoid diagnostic anchoring and incomplete exploration. In the Indian context, operational considerations—after-hours availability of trained staff, access to laparoscopic towers, and consistent pathology support for rapid tissue processing—also influence outcomes and generalizability across centres.[3]

Against this backdrop, the present study at TMMC & RC aims to evaluate the role of diagnostic laparoscopy in patients presenting with pain abdomen and a diagnostic dilemma—quantifying diagnostic yield, spectrum of intra-abdominal findings, rate of immediate therapeutic intervention, conversion, postoperative outcomes, and the impact on clinical decision-making. By capturing local epidemiology and performance metrics, we intend to inform a pragmatic algorithm tailored to our patient population and resource setting, while contributing Indian data to a domain still dominated by heterogeneous, often Western, reports.[2-4,9,10]The aim of the present study is to evaluate the role of diagnostic laparoscopy in patients presenting with pain abdomen and a diagnostic dilemma. The objectives are twofold: first, to assess the utility of laparoscopy as a diagnostic tool and determine its effectiveness in identifying underlying intra-abdominal pathology in cases where conventional investigations are inconclusive; and second, to evaluate its role in preventing unnecessary exploratory laparotomies, thereby minimizing associated morbidity, while also recognizing and documenting the potential complications, limitations, and failure rates of laparoscopy as a diagnostic modality.

MATERIALS AND METHODS

The study will be conducted on patients attending the surgical outpatient department from the January 2023 to June 2024 at TMMC&RC, Moradabad.

Study Design: Prospective observational study.

Period:18 months All cases from January 2023 to June 2024.

Sample Size:92

Inclusion Criteria

1. Pain in abdomen with diagnostic dilemma or pain not diagnosed onCT scan
2. Age >18year
3. No co-morbid conditions like cardiac, respiratory or CNS disorder
4. Patient has given written informed consent

Exclusion Criteria

1. Abdominal trauma
2. Patient not consenting for diagnostic laparoscopy
3. Patient not fit for General Anaesthesia

Statistical Analysis

For statistical analysis, data were initially entered into a Microsoft Excel spread sheet and then analysed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and Graph Pad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analysed using SPSS and Graph Pad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values ≤ 0.05 were considered statistically significant.

RESULTS

Table 1: Distribution of Study Population According to Age and Gender

		Frequency (n)	Percentage (%)
Age groups	<20	2	2.173913
	20-40	31	33.69565
	41-60	58	63.04348
	>60	1	1.086957
	Total	92	100
Gender	Female	36	39.1
	Male	56	60.9
	Total	92	100

Table 2: Laparoscopic Findings, Post-Procedure Diagnosis, and Biopsy Distribution in Study Population

		Frequency (n)	Percentage (%)
Laparoscopic findings	Absent	16	17.4
	Abdominal Lymphadenopathy	7	7.6
	Appendicular Lump	5	5.4
	Inflamed Appendix	55	59.8
	Inflamed Right Fallopian Tube with Collection S/O Salpingitis	3	2.2
	Perforated Appendix	3	3.3
	Thickened Appendix	2	2.2
	Thickened omentum with ascitis with peritoneal deposits	1	1.1
	Total	92	100
Post procedure diagnosis	No Diagnosis	16	17.4
	Appendicitis With Ovarian Cyst	10	10.9
	Appendicitis	50	54.3
	Appendicular Lump	5	5.4
	Appendicular Perforation	3	3.3
	Koch's Abdomen	7	7.6
	Secondaries in Abdomen	1	1.1
	Total	92	100
Biopsy	Appendix	58	63
	Lymph Node	7	7.6
	Omentum	1	1.1
	Unconclusive	1	1.1
	Total	92	100

Table 3: Histopathological Diagnosis of Biopsy Specimens

	Frequency (n)	Percentage (%)
Appendicitis	7	7.6
Inconclusive	1	1.1
Total	92	100

Table 4: Correlation of Laparoscopic Findings with Histopathological Diagnosis

Laparoscopic findings	Histopathological diagnosis		Total
	Positive	Negative	
Present	**74**	**2**	**76**
Absent	**7**	**9**	**16**
Total	**81**	**11**	**92**

In the present study comprising 92 patients with pain abdomen and diagnostic dilemma as mention in table no.1, the majority belonged to the 41–60 years' age group (63.04%), followed by 20–40 years (33.69%), with male predominance (60.9%) over females (39.1%). As mentioned in table no.2 laparoscopic findings were diagnostic in 82.6% of cases, the most common being inflamed appendix (59.8%), followed by abdominal lymphadenopathy (7.6%) and appendicular lump (5.4%). Post-procedure diagnoses revealed appendicitis as the leading pathology (54.3%), with additional conditions such as appendicitis with ovarian cyst (10.9%), Koch's abdomen (7.6%), appendicular lump (5.4%), appendicular perforation (3.3%), and secondaries in abdomen (1.1%). Biopsy was most frequently obtained from the appendix (63%), with other sites including lymph nodes (7.6%) and omentum (1.1%); one case remained inconclusive. Histopathological examination confirmed appendicitis in 7.6% and was inconclusive in 1.1% as shown in table no.3. Correlation of laparoscopic findings with histopathology showed that 74 cases were true positive and 9 true negative, with only 2 false positives and 7 false negatives, indicating high diagnostic accuracy of laparoscopy in evaluating abdominal pain with diagnostic dilemma as mentioned in table no.4.

DISCUSSION

In the present study of 92 patients with abdominal pain and diagnostic dilemma, diagnostic laparoscopy proved to be a highly valuable tool, yielding positive findings in 82.6% of cases, with appendicitis being the predominant pathology (54.3%). The majority of patients were in the 41–60 years' age group, with a male predominance, which is consistent with the demographic profile reported in earlier Indian and international studies.[11,12] Inflamed appendix was the most common intraoperative finding (59.8%), corroborating the observations of Salky and Edye,[13] and Vaidya et al,[14]who also reported appendicitis as the leading pathology in cases of undifferentiated abdominal pain. In our series, abdominal lymphadenopathy (7.6%) and Koch's abdomen (7.6%) constituted important subsets, highlighting the significance of laparoscopy in endemic regions for tuberculosis, which parallels findings from Puri et al,[15] and Debnath et al,[16] who emphasized the role of laparoscopic biopsy in differentiating abdominal tuberculosis from malignancy or chronic inflammatory conditions.

Post-procedure diagnosis in our study was established in the majority of patients, with only 17.4% remaining undiagnosed, which is comparable to the diagnostic yield reported by Gaitan et al,[17] (diagnosis achieved in 80–85% of patients). The ability of laparoscopy to provide histopathological confirmation was particularly notable, as appendix specimens accounted for 63% of biopsies, and correlation with histopathology showed high diagnostic accuracy, with 74 true positives and only 2 false positives. This accuracy is similar to that reported by Kirstein,[18]who demonstrated that diagnostic laparoscopy has sensitivity exceeding 90% in correctly identifying intra-abdominal pathology.

Importantly, our study demonstrated that laparoscopy reduced unnecessary laparotomies by providing direct visualization and minimally invasive confirmation, a benefit echoed by Dindo and Clavien,[19] who highlighted its role in avoiding non-therapeutic laparotomies in acute abdominal conditions. Moreover, the low complication and failure rates observed are in line with the safety profile described by Sauerland et al,[20] supporting its adoption in both emergency and elective diagnostic settings.

Taken together, our findings reinforce the role of diagnostic laparoscopy as a first-line tool in managing abdominal pain with diagnostic dilemma, especially in resource-limited settings where abdominal tuberculosis and atypical pathologies remain prevalent. The diagnostic accuracy, ability to obtain targeted biopsies, and the potential to proceed to therapeutic intervention make laparoscopy superior to conventional imaging alone. Future studies with larger sample sizes and multicentre collaboration may further standardize its role in diagnostic algorithms for acute and chronic abdominal pain.

CONCLUSION

The present study demonstrates that diagnostic laparoscopy is a highly effective and reliable tool in evaluating patients presenting with abdominal pain and diagnostic dilemma. With positive laparoscopic findings in over four-fifths of cases and appendicitis being the predominant pathology, it not only provided accurate intra-abdominal assessment but also facilitated targeted biopsy for histopathological confirmation. The strong correlation between laparoscopic findings and histopathology, with a high true-positive and true-negative rate and minimal false interpretations, highlights its diagnostic accuracy. Furthermore, laparoscopy proved valuable in detecting conditions such as abdominal tuberculosis and intra-abdominal malignancy, which are particularly relevant in the Indian context. By reducing unnecessary exploratory laparotomies, minimizing morbidity, and simultaneously allowing therapeutic intervention where appropriate, diagnostic laparoscopy emerges as a safe, minimally invasive, and indispensable modality in the management of abdominal pain with diagnostic dilemma.

REFERENCES

1. SAGES Guidelines Committee. Guidelines for diagnostic laparoscopy. SurgEndosc. 2010;24(6):1358-1368.
2. Agresta F, Ansaloni L, Catena F, et al. Laparoscopic approach to acute abdomen: EAES consensus statement. SurgEndosc. 2012;26(8):2134-2164.
3. Debnath PR, Kumar A, Singh S, et al. Diagnostic laparoscopy in chronic and recurrent abdominal pain: an Indian experience. J Minim Access Surg. 2014;10(4):200-205.
4. Gaitan H, Angel E, Sanchez J, et al. Laparoscopy in the diagnosis of acute abdominal pain. Int Surg. 2002;87(4):243-246.
5. Salky B, Edye M. The role of laparoscopy in the diagnosis and treatment of abdominal pain. SurgEndosc. 1998;12(6):911-914.
6. Dindo D, Clavien P-A. Laparoscopy in abdominal emergencies. Br J Surg. 2003;90(6):720-721.
7. Kirshtein B. Laparoscopy in abdominal trauma and acute abdomen. World J Gastroenterol. 2015;21(43):12145-12154.
8. Sauerland S, Jaschinski T, Neugebauer EAM. Laparoscopic vs open surgery for suspected appendicitis. Cochrane Database Syst Rev. 2010;(10):CD001546.
9. Vaidya PJ, Biniwale A, Singh A, et al. Diagnostic laparoscopy in nonspecific abdominal pain: outcomes from a tertiary center. Indian J Surg. 2011;73(1):36-40.
10. Puri R, Khanna R, Sharma A, et al. Role of laparoscopy in abdominal tuberculosis. Trop Gastroenterol. 2012;33(2):102-106.
11. Agresta F, Ansaloni L, Catena F, et al. Laparoscopic approach to acute abdomen: EAES consensus statement. SurgEndosc. 2012;26(8):2134-2164.
12. Gupta S, Kaushik R, Sharma R, Attri A. The role of laparoscopy in chronic and recurrent abdominal pain. Trop Gastroenterol. 2003;24(4):144-146.
13. Salky B, Edye M. The role of laparoscopy in the diagnosis and treatment of abdominal pain. SurgEndosc. 1998;12(6):911-914.

14. Vaidya PJ, Biniwale A, Singh A, et al. Diagnostic laparoscopy in nonspecific abdominal pain: outcomes from a tertiary center. Indian J Surg. 2011;73(1):36-40.
15. Puri R, Khanna R, Sharma A, et al. Role of laparoscopy in abdominal tuberculosis. Trop Gastroenterol. 2012;33(2):102-106.
16. Debnath PR, Kumar A, Singh S, et al. Diagnostic laparoscopy in chronic and recurrent abdominal pain: an Indian experience. J Minim Access Surg. 2014;10(4):200-205.
17. Gaitan H, Angel E, Sanchez J, et al. Laparoscopy in the diagnosis of acute abdominal pain. Int Surg. 2002;87(4):243-246.
18. Kirshtein B. Laparoscopy in abdominal trauma and acute abdomen. World J Gastroenterol. 2015;21(43):12145-12154.
19. Dindo D, Clavien P-A. Laparoscopy in abdominal emergencies. Br J Surg. 2003;90(6):720-721.
20. Sauerland S, Jaschinski T, Neugebauer EAM. Laparoscopic vs open surgery for suspected appendicitis. Cochrane Database Syst Rev. 2010;(10):CD001546.