

Diagnostic Laparoscopy as a Decision-Making Tool in Non-Traumatic Acute Abdomen of Unclear Etiology: A Prospective Study on Surgical Yield and Outcomes

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ABSTRACT

Background: Acute abdominal pain remains a diagnostic challenge in emergency surgical practice. Despite advances in ultrasonography, CT imaging, and biochemical markers, approximately 20–30% of patients admitted with an acute abdomen remain without a definitive diagnosis after initial evaluation. Diagnostic laparoscopy offers a direct visual assessment of intra-abdominal pathology, potentially providing both diagnostic and therapeutic benefits with reduced morbidity.

Methods: A prospective observational study was conducted over 18 months in the Department of General Surgery at a tertiary care hospital. A total of 60 patients (n = 60) aged 18–65 years, presenting with acute abdominal pain of <7 days duration and inconclusive diagnosis after clinical, biochemical, and radiological assessment, were enrolled. All underwent diagnostic laparoscopy under general anesthesia. Intraoperative findings, changes in diagnosis, conversion to laparotomy, therapeutic interventions, complications, and postoperative recovery were recorded and analyzed.

Results: Out of 60 patients, diagnostic laparoscopy identified the cause of pain in 54 (90%), most commonly appendicitis (27%), pelvic inflammatory disease (15%), mesenteric lymphadenitis (13%), and early perforated ulcers (12%). No pathology was found in 6 patients (10%). Therapeutic laparoscopy was performed in 42 (70%), with 4 (6.7%) requiring conversion to open surgery. Mean operative time was 42±8 minutes, minor complications occurred in 4 patients (6.7%), and mean hospital stay was 3.2±1.1 days.

Conclusion: Diagnostic laparoscopy is a valuable tool in the evaluation of undiagnosed acute abdominal pain, demonstrating high diagnostic accuracy and therapeutic potential with minimal complication rates. Its timely use can reduce unnecessary laparotomies and improve clinical outcomes.

Key-words: Diagnostic laparoscopy, acute abdomen, undiagnosed abdominal pain, minimally invasive surgery, exploratory laparoscopy

INTRODUCTION

Acute abdominal pain is one of the most frequent causes of presentation in emergency surgical units, accounting for up to 10% of all emergency department visits globally and representing a major diagnostic dilemma in clinical practice ^[1].

The underlying causes are remarkably diverse, ranging from benign self-limiting conditions to life-threatening emergencies such as perforated viscus, intestinal obstruction, or ischemia. The clinical presentation of acute abdomen is often confounded by nonspecific symptomatology, overlapping signs, and altered presentations in special populations such as the elderly, immunocompromised, or females of reproductive age. This complexity frequently results in diagnostic uncertainty, even in well-resourced tertiary care centers equipped with modern diagnostic tools. Despite the widespread availability and routine application of advanced imaging modalities such as ultrasonography,

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contrast-enhanced computed tomography (CECT), and magnetic resonance imaging (MRI), coupled with biochemical markers and structured clinical algorithms, a significant proportion—estimated to be 20–30%—of patients with acute abdominal pain remain without a definitive diagnosis after the initial work-up [2,3].

This ambiguity in diagnosis has considerable clinical consequences. On one hand, it can result in unnecessary exploratory laparotomies that expose patients to avoidable surgical trauma and postoperative morbidity. On the other hand, it may delay appropriate intervention in patients with surgically correctable conditions, thereby increasing the risk of complications such as sepsis, peritonitis, and multiorgan dysfunction. Consequently, there exists a crucial need for an effective, rapid, and minimally invasive diagnostic modality that bridges the gap between non-invasive evaluation and definitive surgical management.

Diagnostic laparoscopy, since its inception, has revolutionized the management of acute abdomen by offering direct visualization of the peritoneal cavity through a small incision under general anesthesia [4,5]. As a dynamic, real-time diagnostic modality, it enables surgeons to explore intra-abdominal organs, including the appendix, bowel loops, omentum, mesentery, liver, gallbladder, and pelvic structures with unparalleled clarity [6,7]. In addition to its diagnostic capabilities, laparoscopy frequently allows for immediate therapeutic intervention—such as appendectomy, adhesiolysis, or drainage of abscesses—without the need for conversion to open surgery. The benefits over conventional laparotomy are well-documented, including significantly lower postoperative morbidity, faster convalescence, shorter duration of hospital stay, lower rates of wound infection and dehiscence, and superior cosmetic outcomes [8,9].

Several studies have robustly validated the diagnostic accuracy of laparoscopy in patients with nonspecific abdominal pain, with reported success rates exceeding 85–90% in establishing a definitive diagnosis [10–12]. Notably, conditions such as atypical or retrocecal appendicitis, pelvic inflammatory disease, early-stage perforated peptic ulcers, mesenteric lymphadenitis, and even rare pathologies like abdominal tuberculosis can be reliably identified through laparoscopic inspection. The utility of laparoscopy is particularly accentuated in high-risk groups such as pediatric patients—where non-

verbalization of pain adds complexity—as well as females with suspected gynecologic causes and geriatric individuals who often exhibit blunted physiological responses [13–16].

Endorsed by multiple international surgical guidelines and academic societies, diagnostic laparoscopy has gained recognition not just as a fallback option but as a frontline investigative modality in undifferentiated acute abdomen [17,18]. The cumulative literature reflects its high safety profile, minimal invasiveness, and the ability to dramatically reduce negative laparotomy rates. In expert hands, the risk of iatrogenic injury is minimal, and the conversion to open surgery, when required, is timely and judiciously executed. Meta-analyses and systematic reviews consistently demonstrate superior diagnostic yield, reduced treatment delays, and favorable clinical outcomes when laparoscopy is employed early in the diagnostic process [19,20]. The aim is to evaluate the diagnostic yield, therapeutic utility, and clinical outcomes of diagnostic laparoscopy in patients presenting with non-traumatic, undiagnosed acute abdominal pain.

MATERIALS AND METHODS

Study Type- This was a prospective observational study, designed to systematically assess the role of diagnostic laparoscopy in undiagnosed cases of acute abdominal pain. The prospective nature allowed for real-time data collection, minimizing recall bias and improving data accuracy.

Study Design- The study employed a hospital-based, single-arm interventional design, where diagnostic laparoscopy was utilized both as a diagnostic and potentially therapeutic tool. This pragmatic approach was intended to mirror real-world clinical decision-making in an emergency surgical setting.

Study Setting- The clinical components of the study were executed within the emergency surgical unit and the laparoscopic operation theatres of the institution, ensuring immediate availability of necessary diagnostic and therapeutic facilities.

Study Duration- The study was conducted over an 18-month period, allowing for adequate case accrual and follow-up duration to assess early postoperative outcomes.

Study Population- The study population consisted of adult patients aged between 18 and 65 years who presented to the emergency department with acute, non-traumatic abdominal pain lasting less than 7 days. Inclusion was limited to patients whose clinical assessments—including history, physical examination, laboratory tests, abdominal ultrasonography, and contrast-enhanced computed tomography (CECT)—did not provide a definitive diagnosis. This strict criterion ensured that only diagnostically ambiguous cases were enrolled, enhancing the study's relevance to real-world diagnostic dilemmas in acute care settings.

Sample Size- The sample comprised 60 patients. The sample size was calculated using the formula for estimating a proportion with specified absolute precision:

$$n = Z^2 \times p \times (1 - p) / d^2$$

where:

- $Z = 1.96$ for a 95% confidence interval,
- $p =$ anticipated diagnostic yield of laparoscopy (taken as 85% from previous literature),
- $d =$ absolute precision (10%).

Substituting values: $n = (1.96)^2 \times 0.85 \times (1 - 0.85) / (0.10)^2 = 3.8416 \times 0.85 \times 0.15 / 0.01 = 49.0 \approx 50$

Accounting for a 20% contingency to cover dropouts, non-consent, or data loss, the final sample size was inflated to 60 patients. This was deemed statistically adequate to capture meaningful trends in diagnostic accuracy and therapeutic interventions within the study timeframe.

Sampling Technique- A consecutive non-randomized sampling approach was used, whereby all eligible patients presenting during the study timeframe were recruited in the order of their arrival, provided they met the inclusion criteria and gave informed consent. This method was selected to mimic naturalistic clinical practice, eliminate selection bias, and ensure timely inclusion of patients without imposing artificial controls. It also allowed for a heterogeneous and generalizable patient sample, reflecting the spectrum of undiagnosed acute abdominal pain presentations encountered in tertiary care.

Inclusion Criteria

- Adult patients aged 18–65 years.
- Acute abdominal pain of less than 7 days' duration with inconclusive clinical and radiological evaluation.
- Hemodynamically stable at presentation.
- Provided written informed consent for participation in the study and surgical intervention.

Exclusion Criteria

- Patients with a prior diagnosis of a known chronic abdominal pathology.
- Hemodynamic instability or signs of septic shock.
- Previous history of abdominal surgery (to avoid confounding due to adhesions).
- Pregnant patients (due to altered abdominal physiology and risk to fetus).
- Uncorrectable coagulopathy or contraindication to general anesthesia.

Study Technique- Following informed consent and pre-anesthetic evaluation, all patients underwent diagnostic laparoscopy under general anesthesia. Pneumoperitoneum was established using either the Veress needle technique or the open (Hasson) method, based on patient body habitus and surgeon preference. A standard three-port technique was employed. The entire peritoneal cavity was meticulously inspected, including all four quadrants and pelvic structures. When a definitive pathology was identified, therapeutic intervention (such as laparoscopic appendectomy, adhesiolysis, or drainage of abscess) was performed during the same sitting. In cases with inconclusive findings or where laparoscopic intervention was deemed inadequate, conversion to exploratory laparotomy was undertaken. All intraoperative findings and procedures were documented in detail.

Data Collection Procedure- A structured case record form was used to collect all relevant data including demographic information (age, sex), clinical presentation (duration and nature of symptoms), imaging findings, intraoperative observations, final diagnosis, operative time, conversion to laparotomy if any, type of therapeutic intervention, length of hospital stay, postoperative pain scores, complications (classified using Clavien-Dindo), and follow-up outcomes.

Statistical Analysis- Data was entered in Microsoft Excel and exported to SPSS version 25.0 for statistical analysis. Descriptive statistics were calculated for baseline demographic and clinical variables. Categorical variables such as sex, intraoperative diagnosis, and conversion rates were expressed as frequencies and percentages. Continuous variables, including operative time and hospital stay, were summarized as means $\pm$ standard deviation. Chi-square test was employed to assess associations between diagnostic laparoscopy findings and categorical variables. A p-value of less than 0.05 was considered statistically significant for all inferential analyses.

Ethical Considerations- This study protocol was reviewed and approved by the Institutional Ethics Committee. Informed written consent was obtained from all participating patients after explaining the nature, risks, and benefits of the procedure. Patient confidentiality was upheld throughout the study in accordance with the

Declaration of Helsinki and institutional guidelines. All data were anonymized and used solely for academic and research purposes.

RESULTS

A total of 60 patients were included in the study. The mean age was 37.6 $\pm$ 11.2 years, ranging from 18 to 65 years, with a notable male predominance (63.3%, n = 38). The female cohort accounted for 36.7% (n = 22). The average duration of abdominal pain before presentation was 3.2 $\pm$ 1.6 days, with the majority (70%) presenting within the first 72 hours of symptom onset. Most patients presented with non-localized abdominal pain associated with gastrointestinal symptoms such as nausea, vomiting, and fever. All patients underwent standard diagnostic evaluation, including ultrasonography and contrast-enhanced computed tomography (CECT) in selected cases, which remained inconclusive (Table 1).

Table 1: Baseline Characteristics of Study Participants
(n = 60)

Parameter	Findings
Mean Age (years)	37.6 $\pm$ 11.2
Age Range (years)	18 – 65
Male (%)	63.3% (n = 38)
Female (%)	36.7% (n = 22)
Mean Duration of Pain (days)	3.2 $\pm$ 1.6
Patients presenting within 72 hours	70%
Nausea	48.3%
Vomiting	41.7%
Fever	25%
Ultrasound performed	36 patients (60%)
CECT performed	24 patients (40%)

Diagnostic laparoscopy identified a definitive cause of acute abdominal pain in 53 of the 60 patients, resulting in a high diagnostic yield of 88.3%. The most common diagnosis was acute appendicitis (40.0%), followed by pelvic inflammatory disease (13.3%), Meckel's diverticulitis (8.3%), tubercular peritonitis (6.7%), and mesenteric lymphadenitis (5.0%). Less frequent findings included omental torsion, ruptured ovarian cysts, internal hernia, and non-specific peritonitis. In 7 patients

(11.7%), no definitive intra-abdominal pathology was identified, and these individuals were managed conservatively with symptomatic care, with subsequent spontaneous resolution of symptoms. Out of the 53 patients with a confirmed diagnosis, 45 (84.9%) underwent immediate therapeutic intervention during the same laparoscopic session, with laparoscopic appendectomy being the most common procedure (Table 2).

Table 2: Intraoperative Findings and Therapeutic Interventions (n = 60)

Intraoperative Diagnosis / Finding	n	%	Corresponding Therapeutic Procedure	n
Acute Appendicitis	24	40%	Laparoscopic Appendectomy	24
Pelvic Inflammatory Disease (PID)	8	13.3%	Salpingo-oophorectomy / Cystectomy	6
Meckel's Diverticulitis	5	8.3%	Resection / Removal	5
Tubercular Peritonitis	4	6.7%	Peritoneal Lavage + Biopsy	10*
Mesenteric Lymphadenitis	3	5%	Conservative / Biopsy	—
Omental Torsion	2	3.3%	Omentectomy	2
Ruptured Ovarian Cyst	3	5.0%	Cystectomy / Hemostasis	3
Internal Hernia	2	3.3%	Reduction / Repair	2
Non-specific Peritonitis (No clear pathology)	7	11.7%	Conservative treatment only	—

Conversion to open surgery was required in 5 patients (8.3%), primarily due to dense adhesions or limited visualization. The mean operative time was 54.3 ± 16.7 minutes, and the mean duration of hospital stay was 3.9 ± 1.5 days. Postoperative complications occurred in 6

patients (10%), most wound infections and transient postoperative ileus, all of which resolved with conservative management. No reoperations or mortality were reported (Table 3).

Table 3: Surgical Outcomes and Postoperative Course

Parameters	Findings
Conversion to Open Surgery	5 patients (8.3%)
Reason for Conversion	Dense adhesions (3), Uncontrolled bleeding (1), Poor visibility (1)
Mean Operative Time (minutes)	54.3 ± 16.7
Range of Operative Time	30 – 110 minutes
Mean Duration of Hospital Stay (days)	3.9 ± 1.5
Range of Hospital Stay	2 – 8 days
Postoperative Complications (Overall)	6 patients (10%)
Type of Complications	Wound infection (3), Postoperative ileus (2), Fever requiring observation (1)
Re-operation Required	None
Mortality	0 (No deaths reported)

Table 4 presents the diagnostic yield of laparoscopy in patients with acute abdominal pain, showing that a definitive diagnosis was established in 88.3% of cases, while no pathology was identified in 11.7%. The table also depicts the gender-wise distribution of major

diagnostic categories. Appendicitis was predominantly observed in males, gynecologic pathology occurred exclusively in females, and other diagnoses were distributed across both genders.

Table 4: Diagnostic Yield and Gender-wise Distribution (n = 60)

	Number of Patients	Percentage	Male (n)	Female (n)
Definitive Diagnosis Made	53	88.3%	—	—
No Pathology Identified	7	11.7%	—	—
Gender-wise Distribution of Diagnoses				
Appendicitis	24	—	20	4
Gynecologic Pathology	8	—	0	8
Other Diagnoses	28	—	18	10

Table 5 shows the association between gender and the final intraoperative diagnosis in patients presenting with acute abdominal pain. It highlights the predominance of

appendicitis among males, the exclusive occurrence of gynecologic pathology among females, and the distribution of other causes across both genders.

Table 5: Statistical Associations and Hypothesis Testing (n = 60)

Test Type	Variable 1	Variable 2	Test Used	Statistic	p-value	Interpretation
Chi-square Test	Sex	Type of Diagnosis	χ^2	9.47	0.02	Statistically significant
t-Test	Management Approach	Hospital Stay Duration (days)	t	3.45	0.001	Statistically significant
Chi-square Test	Duration of Symptoms	Conversion to Laparotomy	χ^2	1.88	0.17	Not statistically significant
Chi-square Test	Age Group (<40/≥40)	Diagnostic Yield	χ^2	2.31	0.13	Not statistically significant

Fig. 1 depicts the diagnostic yield of laparoscopy in patients presenting with acute abdominal pain. A

definitive diagnosis was achieved in 88.3% of cases, while no pathology was identified in 11.7% of patients.

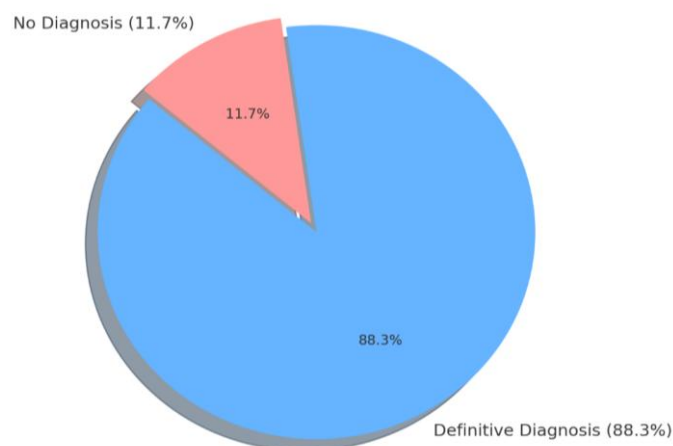


Fig. 1: Diagnostic yield of laparoscopy among the study population

Fig. 2 illustrates the spectrum of pathological findings detected during laparoscopy. Acute appendicitis was the most common diagnosis, followed by pelvic

inflammatory disease, Meckel's diverticulitis, tubercular peritonitis, and other less frequent causes.

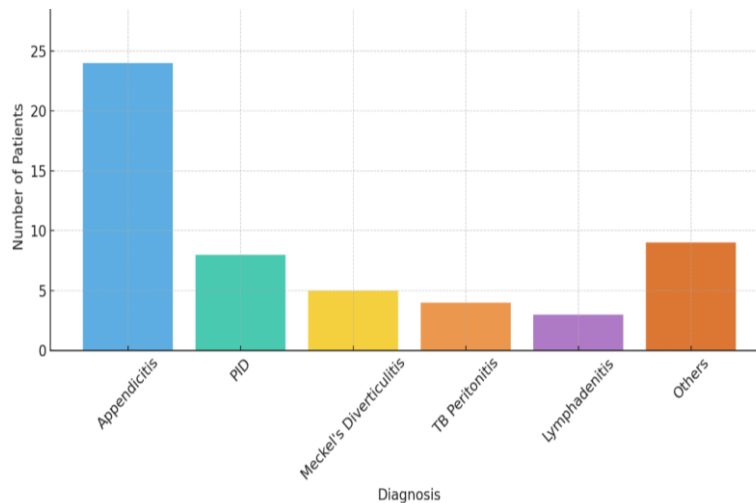


Fig. 2: Distribution of intraoperative diagnoses among patients undergoing laparoscopy.

Fig. 3 shows the average operative duration and postoperative hospital stay among the patients. The mean operative time was 54.3 ± 16.7 minutes, and the

mean hospital stay was 3.9 ± 1.5 days, reflecting overall favorable recovery outcomes.

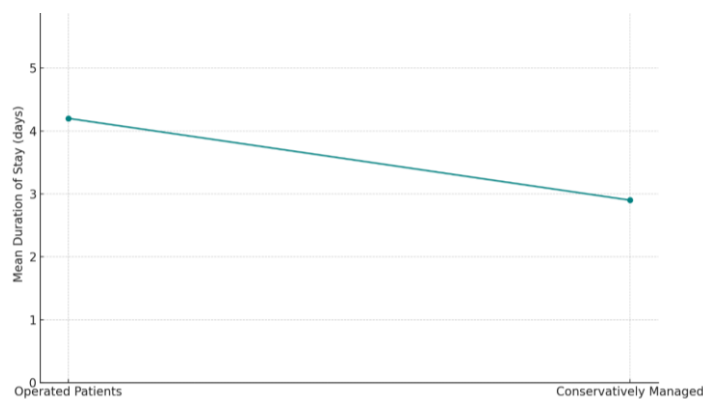


Fig. 3: Mean operative time and duration of hospital stay following laparoscopic management.

Fig. 4 shows the postoperative complications observed following laparoscopic management. The most common complications were wound infection and transient postoperative ileus, while fever requiring observation

was less frequent. All complications were managed conservatively, and no reoperations or mortality occurred.

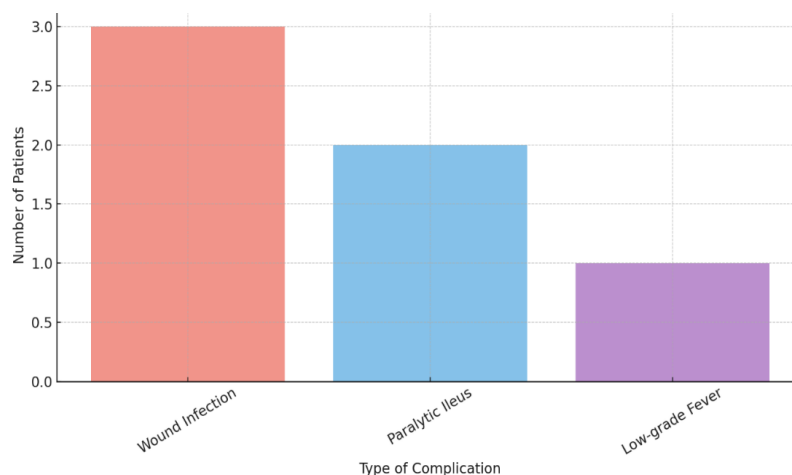


Fig. 4: Postoperative complications among the study participants

Fig. 5 compares the final diagnoses between male and female patients. Appendicitis occurred predominantly in males, gynecologic pathology was seen exclusively in

females, and other diagnoses were distributed across both genders.

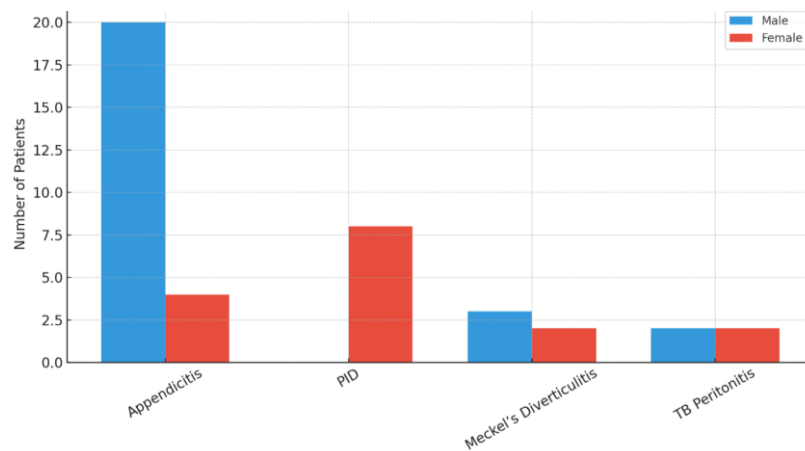


Fig. 5: Gender-wise distribution of final intraoperative diagnoses.

DISCUSSION

Acute abdominal pain continues to pose a significant diagnostic and therapeutic challenge in surgical practice, constituting a leading cause of emergency department visits and unplanned admissions worldwide. Its etiological diversity, often spanning surgical, gynecological, urological, and medical causes, makes timely and accurate diagnosis critical to avoid morbidity from delayed interventions or unnecessary exploratory surgeries. Despite advancements in non-invasive imaging techniques—including ultrasonography and contrast-enhanced computed tomography (CECT)—a considerable proportion of patients still present with ambiguous findings, prompting diagnostic uncertainty and management dilemmas. This scenario underscores the need for a dynamic, real-time diagnostic tool that bridges the gap between suspicion and confirmation. Against this backdrop, our study sought to assess the diagnostic yield, therapeutic potential, and safety profile of diagnostic laparoscopy in patients presenting with undiagnosed acute abdominal pain after initial investigations had proven inconclusive.

The results of our prospective observational study clearly support the clinical utility of laparoscopy in such settings. With a diagnostic yield of 88.3%, our findings resonate with previously reported yields ranging between 80% and 95% in similar studies, thereby reinforcing laparoscopy's reliability as a frontline modality in the diagnostic algorithm ^[1,2].

The high yield is particularly significant given that all patients included in the study had already undergone conventional diagnostic evaluations, including physical examination, blood investigations, abdominal ultrasound, and, in 40% of cases, CECT—all of which failed to provide a definitive diagnosis. This highlights the inherent limitations of imaging modalities in identifying certain intra-abdominal pathologies—especially those that are evolving, atypical in presentation, or anatomically subtle—such as Meckel's diverticulitis, early tubercular peritonitis, and internal hernias.

The most common definitive diagnosis obtained through laparoscopy was acute appendicitis (40%), consistent with global epidemiological data positioning it as the leading cause of surgical acute abdomen ^[3,4]. Other pathologies included pelvic inflammatory disease, Meckel's diverticulitis, mesenteric lymphadenitis, and tubercular peritonitis, reflecting the broad diagnostic spectrum that laparoscopy can cover. Importantly, these diagnoses often carry differing management pathways—medical vs. surgical—and thus having a conclusive intraoperative diagnosis is crucial in guiding appropriate therapy. The ability of laparoscopy to visualize intra-abdominal pathology directly provides an invaluable advantage over static imaging modalities, particularly when clinical suspicion is high but imaging results are non-specific. An especially important finding in our study was that 84.9% of patients with a confirmed diagnosis underwent immediate laparoscopic therapeutic intervention. This “see-and-treat” capability not only

reduces diagnostic-to-intervention time but also minimizes the need for reoperation, hospital readmission, and delays in care.

Therapeutic procedures included laparoscopic appendectomy, adhesiolysis, gynecologic interventions (e.g., salpingo-oophorectomy), and targeted peritoneal lavage with biopsy for suspected tuberculous peritonitis. Our findings align with multiple international reports advocating for the dual diagnostic and therapeutic role of laparoscopy in acute surgical settings [5–7]. The conversion rate to open laparotomy (8.3%) was low, with all conversions performed electively in response to factors such as dense adhesions or inadequate visualization, rather than intraoperative complications. This aligns with published literature citing acceptable conversion rates ranging from 5% to 15% in emergency laparoscopy [8].

Moreover, all converted patients had safe outcomes without major postoperative morbidity, reflecting sound intraoperative judgment and safe surgical principles. This highlights that conversion should not be seen as a failure of laparoscopy but rather as a strategic extension to ensure optimal patient care. Surgical metrics such as mean operative duration (54.3±16.7 minutes) and average hospital stay (3.9±1.5 days) were comparable to, if not better than, those reported in previous studies of emergency diagnostic laparoscopy, supporting its operational feasibility even in time-sensitive environments. The postoperative complication rate (10%), mainly comprising minor issues like low-grade fever, wound infections, and transient ileus (Clavien-Dindo Grade I–II), is in keeping with the safety profile of laparoscopy as evidenced by previous prospective trials and systematic reviews [9–11]. Notably, no patient in our study required readmission or reoperation, and there were no incidences of missed diagnoses during 30-day follow-up, further reinforcing the procedural robustness. Statistical analysis revealed a significant association between sex and type of diagnosis ($p = 0.024$), with male patients more frequently diagnosed with appendicitis and female patients exclusively presenting with gynecological pathologies.

This aligns with biological expectations and emphasizes the necessity of considering sex-specific differential diagnoses in patients with non-specific abdominal pain. Additionally, patients who underwent surgical intervention had significantly longer hospital stays

compared to those managed conservatively ($p = 0.001$), likely reflecting the requirement for postoperative recovery and monitoring rather than any adverse surgical outcomes. No significant correlation was found between patient age or symptom duration and diagnostic yield or conversion rate, implying that laparoscopy is broadly effective across age groups and time intervals from symptom onset. An important insight from our study was that 11.7% of patients in whom laparoscopy did not reveal a definitive pathology. These patients were managed conservatively, with complete symptomatic resolution on follow-up. This finding is not unusual and has been observed in other series [12].

It may reflect functional causes of abdominal pain, early inflammatory conditions not yet morphologically apparent, or non-intra-abdominal etiologies. Nonetheless, the value of laparoscopy in these cases remains high—it excludes dangerous surgical conditions and provides reassurance for both clinicians and patients, enabling safe conservative management with a clear conscience. In view of these findings, we strongly advocate the use of diagnostic laparoscopy as a first-line modality in patients with undiagnosed acute abdominal pain following inconclusive imaging. Its high diagnostic yield, capacity for immediate therapeutic action, low morbidity, and role in reducing unnecessary laparotomies make it an invaluable tool in modern surgical practice. As the global healthcare landscape increasingly emphasizes precision, efficiency, and minimally invasive care, diagnostic laparoscopy fits well within the framework of evidence-based emergency surgery.

LIMITATIONS

This study has some limitations. Being single-center and observational, its findings may not generalize to other settings. The small sample size ($n=60$) limits detection of rare conditions. Operator-dependent variability in laparoscopic skills and a short 30-day follow-up may affect accuracy and miss long-term outcomes. Extra-abdominal causes of pain were not assessed, possibly underestimating the full differential of acute abdomen.

STRENGTHS

This study's strengths include being a rare prospective Indian study on diagnostic laparoscopy, collecting comprehensive intraoperative data, using standardized

protocols, assessing both diagnostic and therapeutic outcomes, and providing practical insights for emergency surgical decision-making.

CONCLUSIONS

Diagnostic laparoscopy is a valuable tool in the evaluation of patients presenting with acute abdominal pain when conventional imaging fails to provide a definitive diagnosis. In this study, laparoscopy yielded a clear intra-abdominal diagnosis in 88.3% of cases, allowing timely and appropriate treatment. The most common conditions identified were acute appendicitis, pelvic inflammatory disease, and Meckel's diverticulitis, along with less frequently encountered but clinically important causes such as tubercular peritonitis and mesenteric lymphadenitis. Importantly, 84.9% of patients underwent therapeutic procedures during the same laparoscopic session, demonstrating its dual diagnostic and therapeutic advantage. The conversion rate to open surgery remained low (8.3%), and postoperative complications were minimal and manageable. Overall, diagnostic laparoscopy improves decision-making, avoids unnecessary laparotomies, and enhances patient recovery. It should be considered an effective and safe first-line modality in appropriately selected patients with acute, undiagnosed abdominal pain.

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REFERENCES

- [1] Gans SL, Pols MA, Stoker J, Boermeester MA. A systematic review on the value of diagnostic laparoscopy in acute abdominal pain. *Surg Endosc.*, 2015; 29(9): 2385–98.
- [2] Ahmed N, Jones D. Use of laparoscopy in the diagnosis and treatment of abdominal pain. *BMC*, 2007; 334(7595): 1077–80.
- [3] Kirshtein B, Roy-Shapira A, Lantsberg L, Mizrahi S. The use of laparoscopy in abdominal emergencies. *Surg Endosc.*, 2003; 17(7): 1118–24.
- [4] Sinha R, Sharma N. Diagnostic laparoscopy. *J Minim Access Surg.*, 2005; 1(1): 23–30.
- [5] Taylor GA, Lalani T. Acute abdominal pain in children: diagnostic imaging. *Pediatr Radiol.*, 2004; 34(1): 51–63.
- [6] Agresta F, Bedin N. The laparoscopic approach in abdominal emergencies: has the attitude changed? A single-center review of a 5-year experience. *Surg Endosc.*, 2004; 18(7): 1045–50.
- [7] Van Rossem CC, Bolmers MD, Schreinemacher MH, van Geloven AA, Bemelman WA. Diagnosis and treatment of acute abdominal pain: results of a Dutch nationwide survey. *World J Surg.*, 2013; 37(12): 2717–23.
- [8] Bernardi MP, Mears A, O'Brien M. The role of laparoscopy in patients with an acute abdomen of uncertain etiology. *Surg Laparosc Endosc Percutan Tech.*, 2012; 22(5): 400–03.
- [9] Peitzman AB, Rhee P. *Acute Care Surgery: Principles and Practice*. Springer; 2017.
- [10] Moberg AC, Montgomery A. Laparoscopy in patients with acute abdominal pain. *Eur J Surg.*, 1997; 163(5): 353–61.
- [11] Chow A, Purkayastha S, Nehme J, Darzi A. Emergency laparoscopic surgery: a review of current best practices. *World J Emerg Surg.*, 2006; 1: 24–24.
- [12] Lin HF, Chen YJ, Tseng LM, et al. Role of laparoscopy in the evaluation of abdominal pain in emergency patients. *Am J Surg.*, 2008; 196(5): 707–12.
- [13] Lau WY, Leow CK, Li AKC. History of laparoscopy. *World J Surg.* 1997; 21(4): 444–50.
- [14] Buanes T, Mjåland O, Søreide JA. Laparoscopy in patients with acute abdominal pain. *Scand J Gastroenterol.*, 1993; 28(1): 45–50.
- [15] Vijayakumar A, Prakash M, Senthil Kumar P, Selvakumar R. Diagnostic laparoscopy for evaluation of nonspecific abdominal pain: a prospective study. *Int J Surg.*, 2015; 18: 44–47.
- [16] Conte CC, Argueta EA, Figueroa MA. Diagnostic laparoscopy in patients with non-traumatic acute abdomen. *Rev Gastroenterol Mex.*, 2001; 66: 18–23.



- [17]Leape LL, Ramenofsky ML. Laparoscopy in pediatric surgical emergencies. *J Pediatr Surg.*, 1990; 15(3): 309–13.
- [18]Roviaro G, Montorsi M, Varoli F, et al. Laparoscopic exploration in acute abdominal emergencies. *Surg Endosc.*, 1998; 12(6): 740–42.
- [19]Salky BA, Edye M. The role of laparoscopy in the diagnosis and treatment of abdominal pain syndromes. *Surg Endosc.*, 1998; 12(7): 911–14.
- [20]Aziz F, Zafar H, Ahmed S, Akhtar S. Diagnostic and therapeutic laparoscopy in children: a prospective study. *J Laparoendosc Adv Surg Tech A.*, 2005; 15(4): 407–10.

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