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Original Research Article

Role of Laparoscopy in Acute Emergencies of the Abdomen

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Conflict of interest: Nil

Abstract:

Background: Even though minimal invasive techniques (Laparoscopy) are prevalent in treating or diagnosing acute abdominal surgical emergencies or Non-specific Abdominal Pain (NSAP), but their adoption as a routine procedure has been slower compared to elective procedures. It is due to concerns about inadvertent injuries and longer operative times. Laparoscopy has proven to be a safe and effective diagnostic tool for patients with unexplained abdominal pain. For conditions like appendicitis, perforated peptic ulcers and Cholecystitis, minimally invasive surgery is now considered the preferred approach. In trauma cases, laparoscopy has demonstrated utility and may eliminate the need for laparotomy in certain situations.

Aim of the Study: To examine the diagnostic and therapeutic role of early laparoscopy in the management of acute abdominal surgical emergencies or Non-specific Abdominal Pain (NSAP).

Materials: The study involved 57 patients admitted with acute abdominal emergencies clinically presenting with pain in the abdomen supportive laboratory and radiological investigations. They were randomly divided in to two groups: Group A (29 patients): In this early Laparoscopy was done within 18 hours. In Group B (28 patients): clinical Observation and Lab reports follow up done for 48 hours followed by Laparoscopy after 48 hours in the patients with persistent situation. Data were collected on postoperative hospital stay, laparoscopy-related complications, hospital readmissions, final diagnoses, and response rates.

Results: The mean patient age was 28.14±09.20 years, with a male-to-female ratio of 1:85:1. 39/57 (68.42%) patients were aged between 20 and 35 years. The most common presenting symptoms were abdominal pain, nausea, and vomiting. Laparoscopic findings revealed appendicitis in 20/57 (35.08%), gynecological pathologies in 18/57 (31.57%) and intestinal obstruction due to bands and adhesions in (24.56%) patients, Blunt trauma to GIT, spleen and liver and penetrating trauma were noted in 05/57 (08.77%) patients. In Group 'A' patients had low radiation exposure than in Group B patients (p-0.021) which was significant noted. Diminishing VAS scores of pain on the 1st, 3rd and 7th days was noted in Group B (p-0.001) which was significant noted. Consumption of analgesics was significant in both the group A and B (p-0.001) and Nil analgesics ($p<0.01$), and nil-by-mouth status (p- 0.01). In Group A patients Hospital stay was shorter with p value less than 0.001, in comparison to Group B patients it was extended stay (p value <0.05) The overall definitive diagnosis was achieved in 27/29 (93.10%) of cases in Group A patients and 22/28 (78.57%) in Group B.

Conclusion: Early laparoscopy intervention proved to be significantly effective in managing acute emergencies of the abdomen. The procedure provided a superior diagnostic accuracy to the surgeon, facilitated early discharge, and reduced the chances of not indicated laparotomy procedures.

Keywords: Acute abdomen, Laparoscopy, complications, perforation, gastric ulcer and Appendicitis.

Introduction

Acute Emergencies of the Abdomen and NSAP are termed so when patients present with abdominal pain occurring from 6 hours to 07 days without specific cause being detected even after a thorough history, physical examination, and surgical profile. [1] Such situations are a challenge for General Surgeons, and they account for 13–40% of emergency surgical department admissions. [2] Diagnostic laparoscopy helps the surgeons to directly visualize abnormal abdominal contents resulting in pain and acute abdominal emergency which could not be detected by any other means. [3] The common emergency conditions of the abdomen that are managed with laparoscopy are: Appendicitis, Cholecystitis, and perforated peptic ulcers commonly. But that it could also be used in the management of trauma to the abdomen, small Bowel obstruction, intussusceptions, perforated diverticulitis, remains a topic of debate. [4] The regularly used method of "Wait and Watch" after hospitalization, later on regular active clinical observation, has been the method used all over the world in treating Acute emergencies of the abdomen. [5] In such situations the predictive value of confirmed clinical diagnosis was not more than 68% and may reach up to 90% in a very few cases. [6] But such measures would also have the risk that the patient would develop complications meanwhile such as: Peritonitis, hemorrhage, or infertility on one hand and on the other hand, laparotomy might be unnecessarily performed. [7] Artificial Intelligence questionnaires, abdominal ultrasound (US), CT abdomen, and early laparoscopy are the methods now followed potentially to improve the diagnosis chances. [8] Laparoscopy is very useful technique for bridging gap between clinical evaluation and major surgical exploration. [9] Laparoscopy in acute abdominal conditions is very useful as it reduces the chances of morbidity and mortality, reduced postoperative pain and promotes short hospital stay in addition to be a tool to confirm the final diagnosis. [10] Review of literature has showed that Laparoscopy in Acute emergencies of the abdomen was a valuable diagnostic tool with overall diagnostic rate of 99% for acute abdominal pain, 70% for chronic pain syndrome, 95% for focal liver disorders, 95% for abdominal masses, 95% for ascites and 80% for retroperitoneal disease. [11] In cases of abdominal trauma, the diagnostic accuracy of laparoscopy was reported as high as 91%, and at the same time it was proved to be unnecessary in 54% of patients. Introduction of diagnostic laparoscopy as a Hospital protocol along with biopsy, may improve the management of vague abdominal pain by facilitating a definitive diagnosis, enabling prompt treatment, reducing hospital stays and readmission rates, and ultimately lowering healthcare costs. [12] Two recent randomized controlled trials (RCTs) have evaluated the effectiveness of early laparoscopy compared to the traditional "wait and watch" approach in managing acute abdominal emergencies and NSAP. [13] Acute abdominal pain accounts for 01% of hospital admissions and 06% of emergency department visits. This study aims to assess the role of laparoscopy in acute abdominal emergencies within the tertiary care Hospital.

Materials

Type of Study: A prospective randomized control study.

Institute of Study: Al Azhar Medical College, Thodupuzha, Kerala.

Period of Study: January 2021 to December 2023.

The present study included 57 patients attending a tertiary care Hospital with acute abdominal emergency conditions at Al Azhar Medical College, Thodupuzha, and Kerala. An ethics committee approval was undertaken before commencing he study. An ethics committee approved proforma and consent form were used for the study.

Inclusion Criteria: Patients of both genders aged between 18 and 70 years were included. Patients who presented with acute abdominal pain, abdominal trauma, and Gynecology conditions were included. Patients in whom the diagnosis could not be established with Ultra sound, CT Abdomen and clinical examination were included. Patients presenting with persistent symptoms of pain, guarding and for a duration of 06 hours to 07 days were included.

Exclusion Criteria: Patients with acute-on-chronic abdominal pain, pregnancy, already diagnosed with abdominal malignancies or chronic gastrointestinal disorders were excluded. Patients aged below 18 years and above 65 years were excluded. Patients with the following contraindications were excluded: Pneumo-peritoneum (due to co-morbidities like COPD or IHD, blood dyscrasias, severe coagulopathy). Patients with peritonitis, psychiatric disorders, and significant abdominal distension were excluded. Patients who were diagnosed with the acute diseases of abdomen were excluded. A detailed patient's demographic data, history taking, and clinical findings on abdominal examinations were recorded. Duration of pain and its severity were assessed using VAS sore on the 1st, 3rd and 7th days and classified as: Mild- scores 01 to 04, moderate- 05 to 08 and severe- 09 to 10. All the patients were subjected and radiological investigations were performed at admission to rule out the hidden causes of acute abdominal pain. Among the radiological investigations, Chest X-rays, abdominal X-rays (erect), and ultrasonography were preferred in the first instance followed by CT abdomen. Radiation doses (mSv) were estimated: 0.1 mSv for chest X-rays, 2 mSv for abdominal X-rays, 10 mSv for non-contrast CT scans, and 20 mSv for contrast-enhanced CT scans. Patients were classified using randomization number available on the internet as Group A and B.

Protocol in Group A: Patients who underwent surgery within 18 hours of admission. A thorough consent was taken explaining the therapeutic interventions and risks of conversion to open surgery. On laparoscopy abdominal cavity was inspected for fluid presence, adhesions, bowel abnormalities, or perforation and foreign bodies. Therapeutic intervention was performed based on laparoscopic findings. If no abnormality was detected, an appendectomy was conducted under the consideration that appendicitis might be the cause of severity of the pain.

Protocol in Group B: In these patients, daily clinical examination was undertaken. Surgical profile consisting of basic blood and biochemical tests were done every 2 days. All the data was correlated between clinical symptoms and signs and laboratory data. Discharge of the patients was done in those who showed resolution of the clinical improvement symptoms and normal laboratory data without a diagnosis. Whenever the patients complained of persistence of the symptoms or abnormal laboratory data after 48 hours were subjected to laparoscopic evaluation or laparotomy, even without confirmed diagnosis.

Follow-Up: All the Patients of both groups were monitored at 3, 6, and 12 months intervals. Patients with recurring symptoms and signs were included in the group A and managed conservatively or surgically, either on an outpatient basis or after readmission.

Statistical Analysis: Data were entered into a spreadsheet (Microsoft Excel) and analyzed using EPI6 Info statistical software. Descriptive statistics were employed for the analysis.

Results:

The present study was on studying the role of Laparoscopy in Acute emergencies of the abdomen in a tertiary care Hospital and 57 subjects with the diagnosis both clinically and on lab reports and Radiological investigations were confirmed. The 57 patients were divided in to two groups. Among the Group A, 29 patients 19 (65.51%) were males and 10 (34.48%) were females with a male to female ratio of 1.9:1.

The mean age in this group was 28.75±08.70 years in males and 29.20 ±05.18 years in females (p-0.437). Among the Group B, 28 patients 17 (60.71%) were males and 11 (39.28%) were females with a male to female ratio of 1.63:1. The mean age in males was 29.15±06.30 years and in females it was 28.35 ± 3.05 years (p-0.437). The overall mean age of the entire group was 28.14±09.20 years. The majority 47/57 (82.45%) of the patients with undiagnosed acute abdominal pain were aged between 20 and 35 years. with an overall 36/57 (63.15%) male predominance in the entire study (Table 1). In group A out of 29 patients 21/29 (72.41%) presented between 05 to 12 hours after the onset of symptoms. 08/29 (27.58%) of the patients reported to between 12 and 24 hours. In group B out of 28 patients 15/28 (53.57%) presented between two to five days and the remaining 13/28 (46.42%) patients presented between 05 and 07 days; (Table 1), (p- 0.001). The presentation of pain in the abdomen was generalized in 20/29 (68.96%) of the group A and 19/28 (67.85%) of the group B patients. Pain around the umbilicus was reported in 07/29 (24.13%) of the group A patients and 08/28 (28.57%) of the group B patients. In group A 02 (06.89%) of the patients and in Group B 02 (07.14%) of the patients presented with pain in the right iliac fosaa; (p- 0.001). Nausea (group A- 25/29- 86.20%; group B- 22/28 (78.57%)) and vomiting (group A- 21/29- 65.51%; group B- 16/28 (57.14%)) were the most common symptoms apart from abdominal pain. In group A 22/29 (75.86%) of patients reported fever and 18/28 (64.28%) of the group B patients; (p 0.001) reported fever. 05/29 (17.24%) of the group A patients reported chills and rigors and 08/28 (28.57%) of the group B patients (p-0.001) reported similarly. (Table 1) Loss of appetite was significantly more common in Group ‘A‘, 25/29 (86.20%) compared to Group B 23/28 (82.14%) (p-0.001).

Tachycardia (pulse >100/min) was observed in 20/29 (86.20%) of group A patients, and 18/29 (62.06%) of the group B. Hypotension (BP <90 mmHg) was found in 20/28 (71.50%) of group A patients; and 17/28 (60.71%) presented with hypotension (BP <90 mmHg) in group B. Abdominal tenderness was universal, with localized tenderness in 17/29 (58.62%) of group A patients and 16/28 (57.14%) of the group B patients. severe abdominal distension was reported in 03/29 (10.34%) patients and 01/28 (03.57%) of the group B patients. (Table 1) Rebound tenderness was noted in 07/29 (24.13%) of the group A patients and 04/28 (14.28%) of the group B patients. (Table 1) Leukocytosis was evident in both groups, with mean counts of 12,040±1086.89 cells/mm³ in Group A and 13,236±1977.27 cells/mm³ in Group B patients. (Table 1)

Table 1: Showing the age distribution, symptomatology, Lab reports of the different acute emergencies of the abdomen in the study groups A and B (n- group A-29, Group B- 28)

Observations	Group A- 29		Group B- 28		p- value
	Male-19- 65.51%	Female-10 34.48%	Male-17 60.71%	Female-11 39.28%	
Age distribution					
0 to 10	01	00	01	00	
11 to 20	04	02	04	03	0.01
21 to 30	06	03	05	03	
31 to 40	03	02	03	01	
41 to 50	02	02	02	01	
51 to 60	02	01	01	01	
61 to 70	01	00	01	01	
Mean age	**28.75±08.70**	**29.20 ±05.18**	**29.15±06.30**	**28.35 ± 3.05**	**0.437**
Time of reporting					
05 to 12 Hours- 21	15	06	--	--	

12 to 24 hours- 08	04	04	--	--	0.001
02 to 05 days- 15	--	--	09	06	
05 to 07 days- 13	--	--	08	05	
Pain in the Abdomen-39					
Generalized	10	10	10	09	0.001
Around the umbilicus	04	03	04	04	
Right iliac fossa					
Other symptoms					
Nausea	15	10	12	08	0.001
Vomiting	12	09	10	06	
Fever	14	08	12	06	
Chills and Rigors	03	02	04	04	
Loss of appetite	15	10	13	10	
Tachycardia	10	10	10	08	
Hypotension	10	10	10	07	
Abdominal tenderness	12	05	08	08	
Abdominal distension	02	01	01	00	
Rebound tenderness	04	03	03	01	
Laboratory reports Mean Leukocytosis	12,040±1086.89 cells/mm³		13,236±1977.27 cells/mm³		
Overall male prevalence	65.51%		60.71%		
overall mean age of the entire group	28.14±09.20 years				

Regarding imaging, follow-up X-rays were required in only 10.34% (03/29) of Group A patients, while 82.14% of Group B patients needed follow-up X-rays, with 02/28 (07.14%) patients requiring more than three films. This led to significantly higher radiation exposure in Group B due to repeated imaging to confirm diagnoses or guide management ($p<0.01$). Ultrasound of the abdomen was performed initially for all patients in both groups. In Group A, only 06/29 (20.68%) required follow-up ultrasounds (once, twice, or thrice), whereas all patients in Group B (100%) underwent more than three follow-up ultrasounds ($p<0.01$). CT scans were necessary for 13/29 (44.82%) of the Group A patients prior to laparoscopy to confirm a diagnosis. In contrast, to group A, 26/28 (92.85%) patients of Group B required CT scan abdomen; ($p<0.01$). Early diagnostic laparoscopy in Group A was performed at an average of 11.28 ± 4.35 hours after admission, with the procedure lasting an average of 46.76 ± 29.74 minutes. In 37.93% (11/29 patients) of Group A required Blood or colloid transfusions but no patient in group B required blood or colloid transfusions. (Table 2) Blood or colloid transfusion was required in 36% of patients in Group A, whereas no such requirement was observed in Group B. The average time to perform early diagnostic laparoscopy after admission in Group A was 11.28 ± 4.35 hours, with the procedure lasting an average of 46.76 ± 29.74 minutes. In Group B it was 103 to 04 days with the procedure lasting an average of 51.28 ± 05.35 minutes. (Table 2)

Table 2: Showing the Radiological investigations its frequency and time lapse before laparoscopy in acute emergencies of the abdomen in the study (n- group A-29, Group B- 28)

Radiological investigations	Variables	Group A	Group B
X-ray	Initial X-ray	03- 10.34%	23- 82.14%
	1 to 3	0	03- 10.57%
	>3	0	02-07.14%
USG finding	Normal	01- 03.44%	03-10.71%
	Free fluid	06- 20.68 %	08- 28.57%
	Organomegaly	04- 13.79%	05- 17.85%
	Dilated Gut loop	06- 20.68%	04-14.28%
	Lymphnodes	08- 27.58%	07-25%
	Lump	05- 17.24%	08- 28.57
USG frequency	Initial	29-100%	28-100%
	1 to 3	0	05- 17.85%
	>3	0	03- 10.71%
CT abdomen		03- 10.34%	09- 32.14%
Average time lapse		11.28 ± 4.35 hours	03 to 04 days
Operation time n minutes		46.76 ± 29.74	51.28±5.35

VAS scores of group A and B showed 09 and 10 on scales that is highest pain scores on day one in both groups. Later on Group 'A' patients experienced less pain compared to Group B patients which was statistically significantly; (p less than 0.05). On elaboration on the day 1, the mean pain score in Group A was 7.16 ± 0.23, while Group B patients reported higher score of 8.05 ± 0.16. By the time the patients reached the day 7, Group A's mean pain score had decreased to 0.56 ± 0.12, significantly lower than Group B's score of 2.04 ± 0.55 (p<0.01), (Table-3).

Table 3: Showing the VAS score in the study groups from day 1 to 07 (n- group A-29, Group B- 28)

Days	Group A- Mean score:	Group B- Mean score:	P value
1st	07.16± 0.23	8.05 ± 0.16	0.001
2nd	06.25±0.55	07.55±1.50	0.001
3rd	05.701.05±	06.85±2.00	0.001
4th	04.20±0.85	05.45±1.20	0.001
5th	03.00±0.05	05.20± 1.00	0.001
6th	02.75±0.10	03.80±1.50	0.001
7th	0.56 ± 0.12	2.04 ± 0.55	0.001

Laparoscopy in Group A was 100% effective in identifying pathology. The most frequent diagnosis was Appendicitis in 10 (34.48%) patients, followed by Adhesive bands in 06 (20.68%) patients was noted. Other common pathologies included were torsion of ovary in 04 (13.79%) and in 03 (10.34%) patients PID was noted.

Among the rare pathologies identified were intussusceptions, hemorrhagic ovarian cyst, Meckel's diverticulum, partial intestinal obstruction, with each condition observed in one patient and post-cholecystectomy syndrome in two patients was noted, (Table-4). Laparoscopy in Group B was 100% effective in identifying pathology. The most frequent diagnosis was Appendicitis in 10 (35.71%) patients, followed by Adhesive bands in 04 (14.28%) patients was noted.

Other common pathologies included were torsion of ovary in 01 (03.57%) and in 03 (10.71%) patients PID was noted. Among the rare pathologies identified were intussusceptions was noted in 01 (03.57%), hemorrhagic ovarian cyst in 01 (03.57%), Meckel's diverticulum in 01 (03.57%), partial intestinal obstruction in none, and post-cholecystectomy syndrome in 03 (10.57%) patients was noted, (Table-4).

Table 4: Showing the various pathology findings noted on Laparoscopy (n- group A-29, Group B- 28)

Laparoscopy findings	Group A- 29 N; %	Group B- 28 N; %	P value
Appendicitis	10- 34.48%	10- 35.71%	0.001
Adhesive bands	06-20.68%	04- 14.28%	
Ovarian torsion	04- 13.79%	01- 03.57%	
pelvic inflammatory disease	03- 10.34%	03- 10.71%	
Intussusceptions	01- 03.44%	01- 03.57%	
Meckel's diverticulum	01- 03.44%	01- 03.57%	
Partial intestinal obstruction	01- 03.44%	00- 0%	
Hemorrhagic ovarian cyst	01- 03.44%	00- 0%	
Post Cholecystectomy syndrome	02-06.89%	03- 10.71%	

Group A patients required fewer days of injectable antibiotics (mean: 4.10 ± 2.25 days) compared to Group B (07.90 ± 4.15 days, p<0.001). They also needed fewer days of injectable analgesics (mean: 04.10 ± 3.75 days in Group A vs. 07.39 ± 4.34 days in Group II, p<0.001).

Enteral feeding was initiated earlier in Group A (NBM duration: 32.16 ± 11.05 hours) compared to Group B (104.55 ± 36.23 hours, p<0.001). Group B patients experienced significantly longer hospital stays (09.80 ± 4.20 days) than Group A (04.80 ± 2.05 days, p<0.001), (Table 5). Early laparoscopic intervention in Group A resulted in certain complications, including scar pain in 04/29 (13.79%), bleeding in 02/29 (06.89%), and wound infection in 01 (03.44%).

In Group B patients the complications were scar pain in 07/29 (25%), bleeding in 05/29 (17.85%), and wound infection in 01 (03.57%). However, the recurrence of symptoms was notably higher in Group B at 3, 6, and 12 months, with the highest recurrence rates observed at 3 months. (Table 5)

Table 5: Showing the post laparoscopy observations in the study (n- group A-29, Group B- 28)

Mean time requiring Injectables	Group A	Group B	P value
Antibiotics in days	04.10 ± 2.25	7.90 ± 4.15	0.001
Analgesics in days	04.10 ± 3.75	7.39 ± 4.34	0.001
Enteral feeding in Hours (NBM)	32.16 ± 11.05	104.55 ± 36.23	0.001
Hospital Stay	09.80±4.20	04.80 ± 2.05	0.001
Complications Scar pain Bleeding Wound infection Recurrence	 04- 13.79% 02- 06.89% 01- 03.44% 00- 00	 07- 25% 05- 17.85% 01- 03.57% 06- 21.42%	 0.001

Discussion

Vague abdominal pain accounts for 13% to 40% of all surgical emergencies and poses a significant diagnostic challenge. [14] Despite extensive investigations, reaching an accurate diagnosis remains elusive for many patients. [15] This issue creates substantial difficulties for patients, healthcare systems, and clinicians alike. In cases of acute emergencies of the abdomen and non-specific abdominal pain (NSAP), identifying the root cause can be exceptionally challenging, often requiring numerous tests and, in some instances, surgical exploration for proper diagnosis and management. [16] Diagnostic laparoscopy offers a promising solution in such cases by providing direct visualization of the abdominal cavity and its organs. It also allows surgeons to collect tissue samples and perform therapeutic interventions.

These capabilities can be achieved with minimal patient morbidity and negligible scarring. The present study was on studying the role of Laparoscopy in Acute emergencies of the abdomen in a tertiary care Hospital and 57 subjects with the diagnosis both clinically and on lab reports and Radiological investigations were confirmed. The 57 patients were divided in to two groups.

Among the Group A, 29 patients 19 (65.51%) were males and 10 (34.48%) were females with a male to female ratio of 1.9:1. The mean age in this group was 28.75±08.70 years in males and 29.20 ±05.18 years in females (p-0.437). Among the Group B, 28 patients 17 (60.71%) were males and 11 (39.28%) were females with a male to female ratio of 1.63:1. The mean age in males was 29.15±06.30 years and in females it was 28.35 ± 3.05 years (p-0.437). The overall mean age of the entire group was 28.14±09.20 years.

The majority 47/57 (82.45%) of the patients with undiagnosed acute abdominal pain were aged between 20 and 35 years. with an overall 36/57 (63.15%) male predominance in the entire study (Table 1). However, the role of diagnostic laparoscopy remains debated. While some studies advocate strongly for its use in managing NSAP, others express skepticism. This dichotomy underscores the need for further clarity regarding its application and benefits. Laparoscopy in Group A was 100% effective in identifying pathology. The most frequent diagnosis was Appendicitis in 10 (34.48%) patients, followed by Adhesive bands in 06 (20.68%) patients was noted. Other common pathologies included were torsion of ovary in 04 (13.79%) and in 03 (10.34%) patients PID was noted. Among the rare pathologies identified were intussusceptions, hemorrhagic ovarian cyst, Meckel's diverticulum, partial intestinal obstruction, with each condition observed in one patient and post-cholecystectomy syndrome in two patients was noted, (Table-4).

Laparoscopy in Group B was 100% effective in identifying pathology. The most frequent diagnosis was Appendicitis in 10 (35.71%) patients, followed by Adhesive bands in 04 (14.28%) patients was noted. Other common pathologies included were torsion of ovary in 01 (03.57%) and in 03 (10.71%) patients PID was noted. Among the rare pathologies identified were intussusceptions was noted in 01 (03.57%), hemorrhagic ovarian cyst in 01 (03.57%), Meckel's diverticulum in 01 (03.57%), partial intestinal obstruction in none, and post-cholecystectomy syndrome in 03 (10.57%) patients was noted, (Table-4). This prevalence aligns with the reported range of appendix-related vague pain in other research, which varies from 33% to 73%. [17 to 20] However, our findings indicated a lower incidence of pelvic inflammatory disease (PID) and tuberculosis than previously reported. Laparoscopy proved highly effective in diagnosing the acute emergencies of the abdomen and NSAP in this study, with positive findings in 95.1% of cases.

Similar success rates have been reported in other studies. For instance, Ou et al. [21] observed definitive diagnoses in 98.7% of cases, and Majewski W [22] reported a diagnostic success rate of 87.3% using laparoscopy. These findings collectively strengthen the case for using laparoscopy in managing acute NSAP. There were no cases which required conversion from laparoscopy to open abdomen surgery in this study. This rate is better than those reported in the literature, such as the 2.7% conversion rate reported by Waclawiczek et al. [23] and findings from Onders et al. and other recent studies, which indicate laparotomy could be avoided in up to 96% of similar cases. The nil conversion rates in the present study may stem from the relatively early stage of emergency laparoscopy adoption in the tertiary care Hospital.

Limitations of the study: It was conducted at a single center, which limits the generalizing nature to larger studies. Additionally, the relatively small sample size constrains the robustness of the findings. Future multicenter studies with larger sample sizes are necessary to validate and expand upon these conclusions.

Conclusions:

Laparoscopy holds great potential in diagnosing and managing acute emergencies of the abdomen and NSAP, demonstrating high accuracy and therapeutic utility. However, broader adoption and enhanced capabilities are essential for optimizing its use and reducing reliance on laparotomy.

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