

Acute non-specific abdominal pain: Diagnostic laparoscopy or inpatient observation?

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Abstract

Introduction: There are significant divergences in the approach and management of acute non-specific abdominal pain. Opinions are divided between inpatient observation and diagnostic laparoscopy. The objective was to evaluate the rate of acute non-specific abdominal pain and the diagnostic value of laparoscopy as a substitute for inpatient observation in an emergency context.

Materials and Methods: This was a descriptive, prospective, and evaluative study conducted between February 2018 and October 2021. Our study included 337 patients who underwent laparoscopic surgery for non-traumatic acute abdominal emergencies.

Results: Among the 337 patients operated on for non-traumatic acute abdomen, laparoscopy was used for purely diagnostic purposes in 2.1% of cases, which were acute non-specific abdominal pains that we managed. The average age was 33 ± 11 years (range: 20–43 years). The average body mass index of our patients was 24.44. Patients were classified as ASA I in 85% of cases. Laparoscopy avoided 02 unnecessary laparotomies. The length of hospital stay was $2.25 \text{ days} \pm 01 \text{ day}$. The morbidity and mortality were zero.

Conclusion: Patients suffering from severe non-specific abdominal pain after complete conventional investigations should undergo diagnostic laparoscopy if symptoms persist.

Keywords: Acute abdomen; Diagnostic laparoscopy; Non-specific abdominal pain

1. Introduction

Acute non-specific abdominal pain is defined as acute abdominal pain that has been present for less than 7 days, with an uncertain diagnosis following the initial clinical examination and appropriate diagnostic tests [1-3]. These diagnostically challenging pains are a significant part of the emergency conditions that surgeons face daily during on-call duties. Despite thorough and advanced investigations, no definitive diagnosis is often established, even when the clinical presentation strongly suggests a surgical condition, leaving the surgeon in a state of uncertainty.

In an emergency context, this situation of doubt forces the surgeon to make a rapid decision: either to operate immediately or to place the patient under observation. Several studies have confirmed the feasibility and safety of diagnostic laparoscopy in this situation [4-6], with high diagnostic accuracy ranging from 87% to 100% [1, 7, 8], which can avoid non-therapeutic laparotomy in 36% to 95% of patients [9, 10].

Several randomized studies have demonstrated the benefits of early diagnostic laparoscopy over inpatient observation [10, 11], while other authors find this approach still debatable due to heterogeneous study results [9, 11]. For these

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latter authors, the diagnostic value of laparoscopy is closely linked to its therapeutic value. Diagnostic and therapeutic laparoscopy should be developed for most abdominal emergencies [12].

In this study, which focused on the role of laparoscopy in the management of non-traumatic acute abdominal emergencies, one of the objectives was to evaluate the rate of acute non-specific abdominal pain and the diagnostic value of laparoscopy as a substitute for inpatient observation in an emergency context.

2. Materials and Methods

2.1. Study Type

This was a descriptive, prospective, and evaluative study conducted between February 2018 and October 2021. Our study included 337 patients who underwent laparoscopic surgery for non-traumatic acute abdominal emergencies.

2.2. Study Population

We included in this study all adult patients aged 15 years and older presenting with non-traumatic acute surgical abdominal emergencies where laparoscopy was already recognized as the gold standard or had a high level of evidence, such as acute appendicitis and its complications (phlegmons, abscesses, and generalized peritonitis), acute lithiasic cholecystitis with symptom onset less than 7 days, peritonitis due to perforated peptic ulcer, acute intestinal obstructions due to adhesions, ectopic pregnancies (EP), ovarian cyst torsions, and acute non-specific abdominal pain.

We did not include patients classified as ASA IV, those in septic shock and hypovolemic shock, and traumatic emergencies in this study.

All patients underwent a standard preoperative workup including complete blood count (CBC), blood typing, prothrombin time (PT), urea, creatinine, blood glucose levels, chest X-ray (CXR), and ECG.

All patients underwent an abdominopelvic ultrasound.

Based on clinical indications, additional complementary tests, both biological and radiological (CT and/or MRI), were requested to support the diagnosis (depending on the pathology).

All patients had a preoperative anesthesia consultation with ASA classification.

3. Results

Among the 337 patients operated on for non-traumatic acute abdomen, 52.6% had simple or complicated acute appendicitis, 25.9% had acute lithiasic cholecystitis, 7.12% had adnexal torsions, 6.9% had ectopic pregnancies, 3% had perforated peptic ulcers, 2.37% had intestinal obstructions due to adhesions, and 2.1% had non-specific acute abdominal pain.

Of the 7 cases (2.1%) of non-specific acute abdominal pain that we managed, 5 were women and 2 were men, with a mean age of 33 ± 11 years (range: 20-43 years). The mean body mass index of our patients was 24.44. Patients were classified as ASA I in 85% of cases.

For these 7 patients, we used diagnostic laparoscopy in all cases. Given the diagnostic uncertainty and the difficulties in repeating complementary tests (due to the unavailability of radiology services), we preferred diagnostic laparoscopy over hospital observation in five (5) patients, as the clinical data strongly suggested a surgical emergency.

However, for two female patients, the clinical presentation was less alarming. We monitored them for 72 hours and supplemented the radiological explorations with endoscopic investigations, which returned normal results. After 72 hours of observation and due to the persistence of symptoms, we opted for exploratory laparoscopy instead of laparotomy.

Laparoscopy allowed us to establish a precise diagnosis in 5 patients (71.42%) out of the 7 patients with non-specific acute abdominal pain. These diagnoses were made early and in a timely manner, before the complication phase. The clinical data for these patients suggested a surgical scenario, while the radiological explorations were normal.

Intraoperative laparoscopic exploration revealed acute appendicitis in 3 patients (42.85%), a ruptured right hemorrhagic ovarian cyst in 1 patient (14.28%), and an internal retrocecal hernia in 1 patient (14.28%).

In 2 patients (28.57%), the intraoperative exploration did not reveal any organic lesions.

The intraoperative data for these cases of non-specific acute abdominal pain are summarized in Table 1.

Table 1 Surgical pathologies

Preoperative diagnosis			Intraoperative diagnosis		
Pathologies	N	%	Pathologies	N	%
Non-specific acute abdominal pain.	07	2,1	Acute appendicitis	01	0.3
			Adnexal torsion	03	0.89
			Retrocecal internal hernia	01	0.3
			No etiology	02	0.6

The diagnostic accuracy of laparoscopy, including its diagnostic sensitivity, specificity, positive predictive value, and negative predictive value, was 100% in our study.

The average operative time was 34 ± 19 minutes, and the total anesthesia duration was 52 ± 22 minutes.

The overall hospitalization duration was 2.25 ± 1 days. Postoperative pain was minimal in all patients.

Morbidity and mortality rates were zero.

4. Discussion

There are significant divergences in the approach and management of acute nonspecific abdominal pain. Clinical observation and reevaluation of patients can be a safe option, as these patients do not have a high incidence of complications, and this approach is effective if the patients are correctly selected [2,13].

Current CT scan technology allows for an accurate diagnosis in 98% of cases [14]. Moreover, operating on patients with uncertain diagnoses can lead to a high rate of negative findings during surgical exploration [15]. However, observation could result in treatment delays, leading to higher morbidity and complication rates; the cost of hospital observation might also be higher [13,16].

The unavailability of radiological exams, particularly CT scans, in most emergency departments, their cost, and the use of variable doses of radiation—which, when repeated, expose patients to significant and harmful irradiation—constitute another disadvantage of observation [17-19].

Thus, early diagnostic laparoscopy is more advantageous compared to active observation [15,20].

Laparoscopy, with its high diagnostic accuracy, allows for complete and direct visualization of intraperitoneal viscera, significantly reduces therapeutic errors, enables concomitant surgical treatment, improves postoperative conditions, and aids in managing specific patient categories such as obese individuals and pregnant women [15,21].

Furthermore, it has been suggested that laparoscopy reduces hospital stays and costs, promotes a faster return to work or normal activities, and enhances quality of life and cost-effectiveness when an early diagnosis is established [15,22]. Despite its advantages, laparoscopy remains an invasive procedure performed under general anesthesia, which carries a risk of morbidity and mortality. Studies have shown that only 51% of patients under clinical observation require secondary surgery [15,23]. Thus, performing early diagnostic laparoscopy on all patients with acute nonspecific abdominal pain would impose an unnecessary invasive procedure on 49% of patients, along with the associated morbidity and mortality risks [15,20,23,24].

Other studies have demonstrated that early laparoscopy does not significantly reduce the recurrence of symptoms in long-term follow-up patients [23,25]. Research comparing early laparoscopy with hospital observation has reported heterogeneous results [1,11,26]. For instance, Decadt (1999) [11] and Anand Thawait (2017) [3] found that diagnostic laparoscopy established a diagnosis in 81% of cases versus 36% for observation, reduced hospitalization duration (3.1 days versus 7.3 days for observation), and resulted in fewer repeat radiological examinations and thus less radiation exposure, fewer antibiotics and analgesics, and therefore lower costs [1,3,11,26,27]. On the other hand, neither Gaitán (2002) nor Morino (2006) confirmed these findings [25,28].

Although attempts have been made to develop consensus recommendations and diagnostic algorithms, no evidence-based clinical guidelines for acute nonspecific abdominal pain have been developed or validated to date [7,29]. However, all medical societies agree that diagnostic laparoscopy is technically feasible and preferable to exploratory laparotomy. The recommendations from medical societies regarding acute nonspecific abdominal pain are as follows:

For Italian medical societies [30,31]:

- Diagnostic laparoscopy is technically feasible and can be safely applied to selected patients suffering from acute nonspecific abdominal pain after a complete diagnostic workup (Grade A recommendation) [30].
- Diagnostic laparoscopy is recommended for all cases of acute abdominal pain located in the right iliac fossa and is considered both a diagnostic and therapeutic procedure (Level Ia - Grade A) [31].
- The application of diagnostic laparoscopy before appendectomy is strongly recommended in cases of acute abdominal pain lasting less than 7 days when the diagnosis remains uncertain. It has lower complication rates compared to laparotomy and offers high diagnostic accuracy (70–99%) [31].

For the American Society of Endoscopic Surgery (SAGES) [2]

- Diagnostic laparoscopy is technically feasible and can be safely applied in appropriately selected patients presenting with non-specific acute abdominal pain (Grade B).
- The procedure should be avoided in patients with hemodynamic instability and may have a limited role in patients with significant abdominal distension or a clear indication for laparotomy (Grade C).
- The procedure should be considered in patients without a specific diagnosis after appropriate clinical examination and imaging studies (Grade C).
- Based on available evidence, an invasive procedure cannot be recommended before other non-invasive diagnostic options have been exhausted.
- Diagnostic laparoscopy may be superior to observation for non-specific abdominal pain; however, available evidence is mixed, making it difficult to formulate a firm recommendation.
- Furthermore, diagnostic laparoscopy may be preferable to exploratory laparotomy in appropriately selected patients with an indication for surgical intervention provided that laparoscopic expertise is available (Grade C).

In our series, the rate of non-specific acute abdominal pain was 2.1% (7 patients). Despite thorough clinical examination and comprehensive paraclinical assessment including laboratory tests and radiological imaging (abdominopelvic ultrasound and CT scan, sometimes supplemented with endoscopic examinations and stool parasitology), diagnostic uncertainty persisted in these patients.

Faced with diagnostic uncertainty and considering the challenges of repeating complementary examinations (lack of radiology service availability), we opted for diagnostic laparoscopy over hospital observation in five (5) patients, as the clinical data strongly suggested a surgical emergency.

However, in two patients, the clinical presentation was less alarming. We monitored them for 72 hours and supplemented radiological investigations with endoscopic examinations, which returned normal results. After 72 hours of observation and with persistent symptoms, we chose exploratory laparoscopy instead of laparotomy.

Laparoscopy allowed us to establish a precise diagnosis in 5 out of 7 patients (71.42%) with non-specific acute abdominal pain. These diagnoses were made early and timely, before the onset of complications. Clinical data in these cases suggested a surgical scenario, despite normal radiological findings. Specifically, intraoperative laparoscopic exploration revealed acute appendicitis in 3 patients (42.85%), a ruptured right ovarian hemorrhagic cyst (14.28%), and a retrocecal internal hernia in one patient (14.28%).

In 2 patients (28.57%), intraoperative exploration did not identify any organic lesions, thereby avoiding two unnecessary negative laparotomies.

5. Conclusion

Ultimately, it appears that patients suffering from severe non-specific abdominal pain after comprehensive conventional investigations should undergo diagnostic laparoscopy if symptoms persist. Other patients with moderate severity of pain may undergo diagnostic laparoscopy after a period of observation (24-48 hours).

The severity of symptoms determines the need for emergency surgery. If symptoms are severe enough to warrant surgical exploration, it should be done laparoscopically. The rationale lies more in the therapeutic option than in the diagnostic value of laparoscopic surgery. Additionally, in cases where conversion was necessary, postoperative outcomes compared to primarily open cases were nearly similar. Thus, the advantages of a laparoscopic approach outweigh its potential negative effects. Based on these data, it seems justified to lower the "threshold for laparoscopic exploration" rather than opting for an open approach. However, it seems prudent to monitor patients (for a few hours) with minor abdominal pain where symptoms may become more specific over time or simply resolve in some cases.

Compliance with ethical standards

Statement of ethical approval

The data and files of patients presented in this manuscript are available at the Department of General Surgery of the University Hospital of Ain Taya.

Statement of informed consent

All patients consent to their inclusion in this work and the publication of the results.

Author Contributions

All authors contributed to this work.

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Availability of Data and Materials

The data (Patient records, information sheets for each patient) are available and entered in Excel and Word formats

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