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Role of Laparoscopy in Diagnosis and Management of Acute Abdomen

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Abstract

Background: Acute abdomen is one of the most encountered presentations in daily surgical practice. Patients with acute pain abdomen present with a wide range of clinical signs and symptoms. Most of the time, signs and symptoms are subtle and are often overlapping. Missed or error in etiological diagnosis is common among acute abdomen patients, carrying devastating consequences for the prognosis. The aetiology varies from region to region, influenced by various socio-demographic characteristics.

Aim of Study: The aim of this study was to evaluate how diagnosis can be established using laparoscopy in case of acute abdomen and correlation between clinical findings as well as other investigations and laparoscopic findings and to evaluate therapeutic role of laparoscopy in acute abdomen and evaluating cases of acute abdomen.

Patients and Methods: The present prospective study was conducted at General Surgery Departments, Ain Shams University Hospitals and Al-Matria teaching hospital throughout September 2021 and August 2022. The study was carried out based on the ethical recommendations of the Ethics Unit, Faculty of Medicine, Ain Shams University, Cairo, Egypt. The surgical and clinical approaches were elucidated obviously for all patients, and the informed consents were assigned prior to study processing. The steps of the current study were implemented along with the guidelines of the Declaration of Helsinki.

Results: DL accomplished higher diagnostic accuracy than US and CT and changed the diagnosis and subsequent clinical decision of 9.33% of patients compared to CT. Laparoscopy has become a routine procedure in the management of acute abdominal diseases, with a conversion rate to open surgery in laparoscopic cholecystectomy being about 5%. DL has an important role to play in undiagnosed acute abdomen patients both diagnostically as well as therapeutically.

Conclusion: Diagnostic laparoscopy a feasible, effective, and safe diagnostic tool in patients with acute abdomen. It accomplished higher diagnostic accuracy in acute abdomen when compared with CT and US. Of note, DL changed the clinical decision in a considerable proportion of patients and improved their prognosis subsequently. Particularly, DL improved the management of acute abdomen patients, by making a definite diagnosis and access for immediate treatment. This reduced the perioperative complications, hospital stay, and readmission rates. It allowed early diagnosis and timely management of patients presented with acute abdomen in the emergency setting.

Key Words: *Laparoscopy – Acute Abdomen.*

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Introduction

ACUTE abdomen is one of the most encountered surgical emergencies. It is responsible for more than 8% of all emergency department visits, leading to at least 50% of all surgical admissions **[1]**. The underlying a etiologies of the acute abdomen are several. The most frequently encountered non-traumatic causes are appendicitis, bowel obstruction, strangulated or incarcerated hernia, and biliary tract pathologies **[2]**.

Accurate diagnosis of the underlying causes of acute abdomen is of paramount importance. This is because acute abdominal pain may be the symptom of underlying life-threatening condition that necessitates timely and effective surgical intervention **[3]**. Where as diagnostic approaches have witnessed significant improvements, many diagnostic pitfalls remain with the diagnosis of acute abdomen. The differential diagnosis of acute abdomen is broad, carrying a high risk of misdiagnosis and unnecessary surgical procedures **[4]**.

In the emergency setting, diagnostic errors are estimated to affect 15 of every 100 patients seeking care for abdominal pain. Such diagnostic errors led to significant morbidity and mortality and impacted considerably the health facilities **[5,6]**.

Clinical evaluation of patients with the acute abdomen is the first step. However, it is accurate only in 50% to 76% of patients, delaying the appropriate diagnosis in a considerable proportion of patients. Even with the most experienced sur-

geon, one of every five cases could be missed diagnosed [7,8].

The use of advanced imaging techniques in the emergency setting has been increased. Throughout the past era, the employment of computed tomography (CT) in the assessment of acute abdomen witnessed more than a 100% rise rate. This is because the high accuracy and feasibility of CT in identifying of particular diseases [9,10]. Compared with conventional ultrasound, CT accomplished a sensitivity of 89% relative to 70% achieved by traditional ultrasound [11].

Exposure to ionizing radiation associated with CT had many repercussions. The risk of cancer associated with 1 per 900 patients and the rate of fetal cancer is 1 per 1800 individual. This risk should be weighed against the direct diagnostic benefit of CT in the emergency setting [12]. This raised general surgeons' attention to find a more accurate and safer diagnostic approach for patients with acute abdomen.

Emergency laparoscopy may be used to diagnose a wide variety of acute abdomen causes. It provides a direct view of the abnormal abdominal viscera, which other diagnostic tools could not identify. Diagnostic laparoscopy bridges the gap between clinical evaluation and major abdominal exploration. Therefore, it allows timely detection of the underlying pathology, which might lead to severe peritonitis and perforation due to delayed diagnosis [13].

Laparoscopy could be considered in acute abdomen by diagnosis and treatment to determine the beast incision before laparotomy. This allows carrying out both procedures at the same settings This has the advantages of reduced morbidity, minimized post-operative pain, accelerated recovery, and decreased mortality rate [14].

Laparoscopy reduces the rate of negative laparotomies. This unrequired operation is associated with a prolonged hospital stay, increased hospital costs, and morbidity rate of 5% to 22% [15,16]. Diagnostic laparoscopy offers accurate and rapid diagnosis and subsequent treatment of intra-abdominal pathologies. However, there is a controversy regarding whether diagnostic laparoscopy should be applied to patients in which doubt exists for diagnosing acute abdomen. This is because of the lack of adequate well-structured clinical studies that evaluate the role of diagnostic laparoscopy in the acute abdomen [17].

The choice between computed tomography and diagnostic laparoscopy has many considerations related to patient factors, anatomical variations, and surgeon's experience and beliefs [18]. This leads to the large heterogeneity of the existed literature regarding the accuracy of diagnostic laparoscopy in the setting of acute abdomen [19]. Recognizing such evidence will help general surgeonstimely employ the most accurate diagnostic tool in patients with acute abdomen.

Aim of the work:

To evaluate how diagnosis can be established using laparoscopy in case of acute abdomen and-correlation between clinical findings as well as other investigations and laparoscopic findings.

Patients and Methods

Ethical approval: The present prospective study was conducted at General Surgery Departments, Ain Shams University Hospitals and Al-Matria Teaching Hospital throughout September 2021 and August 2022. The study was carried out based on the ethical recommendations of the Ethics Unit, Faculty of Medicine, Ain Shams University, Cairo, Egypt. The surgical and clinical approaches were elucidated obviously for all patients, and the informed consents were assigned prior to study processing. The steps of the current study were implemented along with the guidelines of the Declaration of Helsinki [20].

Study design and sampling: This was a prospective single-arm diagnostic accuracy study. A total sample size of 75 patients was required. Sample size was calculated using STATA 14.2 software based on the following parameters: 80% power, 95% confidence interval, 0.05 level of significance, complication rate in diagnostic laparoscope 5% versus 22.9% in diagnostic laparoscopy in acute abdomen as reported in previous study [21], and odds ratio 5.6. Patients were enrolled using the convenience sampling method.

Inclusion and exclusion criteria: Patients who were presented with acute abdomen to the General Surgery departments and underwent all required investigations without reaching final diagnosis were included.

Inclusion criteria: All adult patients who are presented to the emergency department with diagnosis of acute abdomen with undetermined etiology, ASA score I, II and fit for anesthesia.

Exclusion criteria: Malignancy, pregnancy, unfit for anesthesia, COPD, heart failure, previous abdominal operations and medical causes of acute

abdomen (Diabetic ketoacidosis, Myocardial infarction, etc.).

Pre-operative evaluation:

All patients were subjected to the following:

Detailed medical history: Age, gender, weight, height, BMI, comorbidities, special habits of medical importance, obstetric history for females, medications for chronic illness, clinical presentation of acute abdomen, and ASA score calculation.

Thorough general and local clinical examination Investigations: Complete blood picture, bleeding Profile, kidney function test (creatinine and urea), liver function tests (ALT, AST, bilirubin and albumin), CRP and ESR.

Imaging: Erect abdomen X-ray: Air under diaphragm and intestinal obstruction, abdominal ultrasound: Exclusion of torsion ovarian cyst in females, CT abdomen with oral contrast: In suspected viscous perforation or malignancy and ECG: for patients above 40 years.

Study procedures:

Ultrasound: A standard ultrasound (Mindray DC-T6, Germany) with two probes, including a 7.5-MHz linear probe and a 3.5-MHz convex probe, was used A 7.5-MHz linear and 3.5-MHz convex probe of the standard ultrasound device (TOSHIBA/ Xario-Japanese) was used. Results of ultrasonography were interpreted by a staff radiologist.

Fig. (1): Ultrasound e blind-ending, non-compressible luminal structure consistent with an inflamed appendix. Hypoechoic adjacent collection following perforation.

Computed Tomography: CT scan was performed using 1500mL of oral contrast medium (2% diatrizoatemeglumine [Gastrografin; Bristol-Myers Squibb, Wallington, CT]) for bowel opacification 90-120 minutes prior to scanning. The CT scan was performed with the patient in the supine position, following an intravenous injection of 90mL of iodinated contrast medium at a rate of 3mL/ second and a scan delay of approximately 50 seconds. Results of CT scans were interpreted by a staff radiologist.

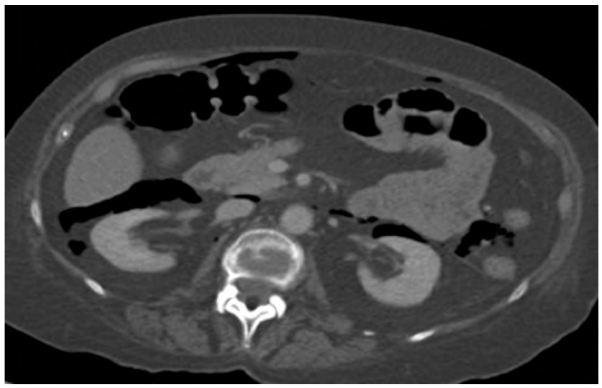

Fig. (2): Axial CT demonstrating free intraperitoneal gas indicative of perforation.

Fig. (3): Coronal CT demonstrating small bowel obstruction.

Diagnostic laparoscopy: DL was done under general anesthesia in the supine position. Patients received preoperative prophylactic antibiotics, second to third generation cephalosporins. With open (Hasson) technique and close technique by a nontraumatic trocar or veress needle, 10mm metal trocars for the camera were inserted, usually periumbilical. Then a laparoscopic exploration of the abdomen was done. Additional trocars were inserted according to the pathology.

Nontraumatic intestinal graspers were used to deal with the intestine and omentum. Observation of any fluid and aspiration was done. Searching for the cause was carried out based on probable diagnosis and intraoperative findings (nature of the fluid, aggregation of loops, or omental adhesions). If there was an obvious evident cause, exploration was completed, and DL was considered

successful. Dealing with the cause was done through either complete laparoscopically, laparoscopic assisted via planned incision, or total conversion to open surgery. In case of unclear cause, a midline exploratory incision was done according to the most probable diagnosis. The peritoneal toilet was done by suction irrigation; 5mm laparoscopic suction cannula was used. Irrigation was done by a large amount of normal saline. Drains were inserted according to pathology.

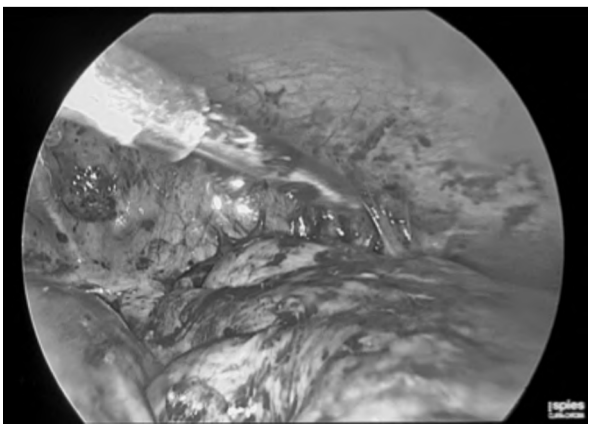

Fig. (4): A diagnostic laparoscopy showing a perforated appendix.

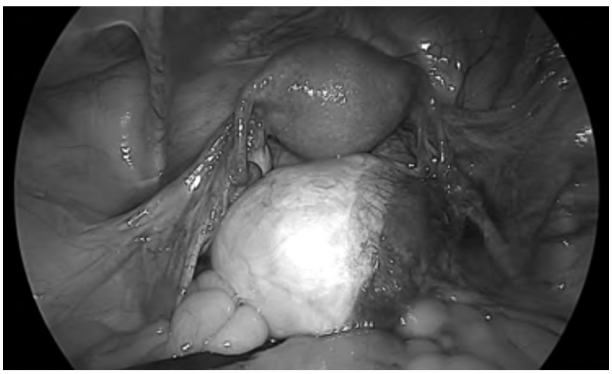

Fig. (5): A diagnostic laparoscopy showing a huge ovarian cyst.

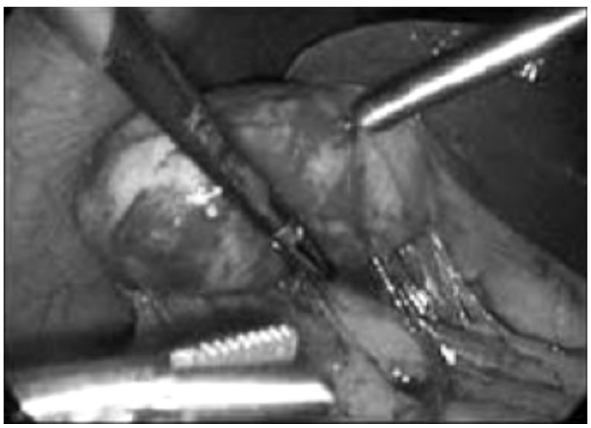

Fig. (6): A diagnostic laparoscopy showing acute cholecystitis.

Post-operative evaluation and follow-up: A throughout follow-up evaluation for six weeks was performed. This included a comprehensive clinical examination, laboratory investigation, and radiological assessment for early detection and management of post-operative complications.

Study outcomes: Time from admission to surgery, intraoperative complications, conversion to Open surgery, post-operative complications, post-operative Pain, post-operative hospital stays and 30-day mortality rate.

Statistical analysis: Normally- distributed data were exemplified in the form of Mean ± SD. Categorical variables will be elucidated as number and percentage. Receiver operating characteristic (ROC) curve and area under ROC curve (AUC) was used to evaluate the diagnostic ability of diagnostic laparoscope in detection of the underlying cause of acute abdomen. The optimal cut off points was calculated to maximize sensitivity and specificity. Positive predictive value (+PV), negative predictive value (–PV), positive likelihood ratio (+LR), and negative likelihood ratio (–LR) were calculated. All tests were considered significant when $p<0.05$. Statistical analysis was performed using SPSS software version 25 for Windows (SPSS Inc., Chicago, IL, USA) and Med.

Calc software version 20 **[22,23]**. The figures were renovated using Graph Pad Prism (Graph Pad Software, Inc, San Diego) software version 8 (followed by Dunnett).

Results

Table (1): Bassline Demographic characteristics.

Variables	Number (%)/ Mean ± SD
Age (Years)	38.1±7.9
Gender:	
Male	30 (40%)
Female	45 (60%)
BMI (Kg/m^2):	29.2±9.3
Comorbidities:	
Diabetes	42 (56%)
Hypertension	18 (24%)
Smoking	13 (17.33%)
Renal Dysfunction	7 (9.33%)
Live dysfunction	4 (5.33%)
Cardiovascular disorders	3 (4%)

BMI = Body Mass Index.
SD = Standard Deviation.

Table (2): Clinical and laboratory findings.

Variables	Number (%)/ Mean ± SD
Clinical presentation:	
Pain	75 (100%)
Vomiting	36 (48%)
Fever	29 (38.66%)
Constipation	16 (21.33%)
Diarrhea	9 (12%)
Distension	5 (6.66%)
Laboratory findings:	
WBCs count (x1000/mm^3)	12.5±4.8
Neutrophil count (%)	75.9±12.6
Hemoglobin concentration	10.8±1.6
Platelet count (x1000/mm^3)	412±70
ASA score:	
I	55 (73.33%)
II	12 (16%)
III	8 (10.66%)

ASA = American Society of Anesthesiology.
SD = Standard Deviation.

Table (3): Ultrasound Findings of acute abdomen.

Variables	Number (%)/ Mean ± SD
Acute Appendicitis	33 (44%)
Acute Cholecystitis	10 (12%)
Acute perforated bowel:	
Duodenal perforation	14 (20%)
Gastric Perforation	6 (8%)
Mesenteric ischemia	3 (4%)
Gall bladder perforation	2 (2.66%)
Acute Diverticulitis	1 (1.33%)
Normal Findings	6 (8%)

SD = Standard Deviation.

Table (4): Computed tomographic findings of acute abdomen.

Variables	Number (%)/ Mean ± SD
Acute Appendicitis	35 (46.66%)
Acute Cholecystitis	8 (10.66%)
Acute perforated bowel:	
Duodenal perforation	16 (21.33%)
Gastric Perforation	6 (8%)
Mesenteric ischemia	3 (4%)
Gall bladder perforation	2 (2.66%)
Acute Diverticulitis	2 (2.66%)
Normal Findings	3 (4%)

Table (5): Diagnostic laparoscopy findings of acute abdomen.

Variables	Number (%)/ Mean ± SD
Acute Appendicitis	34 (45.33%)
Acute Cholecystitis	9 (12%)
Acute perforated bowel:	
Duodenal perforation	18 (24%)
Gastric Perforation	7 (9.33%)
Mesenteric ischemia	3 (4%)
Gall bladder perforation	2 (2.66%)
Acute Diverticulitis	2 (2.66%)
Normal Findings	0 (0%)

Table (6): Intraoperative Diagnosis of acute abdomen.

Variables	Number (%)/ Mean ± SD
Acute Appendicitis	31 (41.33%)
Acute Cholecystitis	8 (10.66%)
Acute perforated bowel:	
Duodenal perforation	20 (26.66%)
Gastric Perforation	8 (10.66%)
Mesenteric ischemia	3 (4%)
Gall bladder perforation	3 (4%)
Acute Diverticulitis	2 (2.66%)
Normal Findings	0 (0%)

Table (7): The accuracy of Ultrasound, CT, and DL for diagnosis of patients with acute abdomen.

	Sensitivity	95% CI	Specificity	95% CI	+LR	–LR	+PV	–PV	AUC	p-value
Ultrasound	81.82	70.4 - 90.2	33.33	7.5 - 70.1	1.23	0.55	12.0	94.3	0.576	0.38
CT	90.91	81.3 - 96.6	77.78	40.0 - 97.2	4.09	0.12	31.2	98.7	0.843	<0.001
DL	96.97	89.5 - 99.6	86.67	29.9 - 92.5	2.91	0.045	24.4	99.5	0.818	<0.001

+PV = Positive predictive value. –PV = Negative predictive value. +LR = Positive likelihood ratio. –LR = Negative likelihood ratio.

Table (8): Pairwise comparison of ROC curves for the diagnosis of Acute abdomen.

Diagnostic Tool	*p*-value	95% CI
DL versus US	<0.001	0.063 to 0.159
DL versus CT	0.80	–0.174 to 0.225
CT versus US	0.0037	0.087 to 0.44

DL = Diagnostic Laparoscopy.
US = Ultrasound.
CT = Computed Tomography.

Table (9): Intraoperative-related data.

Variables	Number (%)/ Mean± SD
Time from admission to surgery (Minutes)	68±10.8
Intraoperative complications:	
Bowel Injury	3 (4%)
Liver Injury	2 (2.66%)
CBD injury	1 (1.3%)
Vascular Injury	1 (1.3%)
Anesthesia-related complications	5 (6.66%)
Estimated Blood loss (ml)	122.4±19.1
Conversion to Open surgery	11 (14.66%)

CBD = Common Bile Duct. SD = Standard Deviation.

Table (10): Post-operative-related data.

Variables	Number (%)/ Mean± SD
Post-operative complications:	
Fever	3 (4%)
Wound Infection	2 (2.66%)
Paralytic Ileus	2 (2.66%)
Leakage	1 (1.3%)
Port-Site Hernia	6 (8%)
Post-operative Pain:	
Mild	60 (80%)
Moderate	12 (16%)
Severe	3 (4%)
Post-operative hospital stays (Days)	2.6±0.9
30-day mortality rate	2 (2.66%)

SD = Standard Deviation.

Discussion

Acute abdomen is one of the most encountered presentations in daily surgical practice. Patients with acute pain abdomen present with a wide range of clinical signs and symptoms. Most of the time, signs and symptoms are subtle and are often overlapping. Missed or error in etiological diagnosis is common among acute abdomen patients, carrying devastating consequences for the prognosis. The aetiology varies from region to region, influenced by various socio-demographic characteristics **[24,25]**.

Despite new diagnostic developments like ultrasonography and computed tomography, an acute abdominal condition sometimes presents a situation in which the surgeon opens the abdomen without a precise diagnosis. These cases cause a burden on hospitals and physicians. These limitations highlighted the need for feasible and accurate diagnostic tools for diagnosing patients with acute abdomen in the emergency setting **[26-28]**.

The laparoscopic approach has revolutionized the surgical practice. The benefits of accelerated recovery, reduced morbidity, and mortality achieved through a less invasive procedure are well established. However, there were limited clinical studies assess the accuracy of DL in patients with acute abdomen,making the literature inconclusive to draw firm evidence for current surgical practice **[29-31]**. Therefore, the present prospective study was conducted to reveal the role of DL in managing patients with acute abdomen and how this tool changed the diagnosis, treatment plan, and outcomes of patients subsequently. Such evidence could help general surgeons diagnose and treat patients with acute abdomen early.

In the present study, most patients presented with pain, vomiting and fever. This pattern of clinical presentation was concomitant with Morsy et al. **[21]**, study. They reported that abdominal pain was the most popular presentation, associated with fever and vomiting. Parallel to this finding, Thakur et al. **[28]**, reportedthat abdominal pain and tenderness were the most presenting manifestations of acute abdomen. Subsequently, the commonest cause of acute abdomen was acute appendicitis, gall bladder pathology, and perforated viscus.

Acute appendicitis was the most common underlying pathology, succeeded by acute perforated bowel and acute cholecystitis. Coexisted with this finding, Morsy et al. **[21]**, reported that acute appendicitis and acute cholecystitis were the most common underlying etiopathologies. This coincident with Naveen and Aggarwal et al. **[32]**, who reported a confirmed intra-operative diagnosis of acute appendicitis among 23% of patients.

In the current study, DL accomplished higher diagnostic accuracy than US and CT. The DL accurately diagnosed 90.6% of patients who presented with acute abdomen. The tool changed the etiological diagnosis of acute abdomen in 18.6% of patients compared to US. Compared with CT, the DL changed the diagnosis and subsequent clinical decision of 9.33% of patients. Bachar et al. **[33]**, reported a higher sensitivity and specificity

of DL compared to CT in diagnosing patients with complicated and uncomplicated appendicitis, reducing the risk of perforated appendicitis. In their study, the diagnostic accuracy of US was significantly low, with specificity nearly the same as clinical judgment.In this respect, Naveen and Aggarwal et al. **[32]**, reported an incidence of undiagnosed acute abdominal pain despite abdominopelvic CT among 13.33% of patients, which was diagnosed by DL.

The significant accuracy of DL for diagnosing patients with acute abdomen has been established in the literature. Yehia et al. **[34]**, reported a definitive discriminative ability of DL in 92.5% of patients who presented with acute abdomen, while UD showed positive findings in 35% of patients. Routine use of CT in assessing patients with suspected acute abdomen exposes them to unnecessary radiation and contrast material, which may endanger the patient, delay definitive therapy, and add to health expenditure. Golash et al. **[35]**, found that the definitive diagnosis of acute abdomen was made in 90% of patients after DL. Laparoscopy changed the clinical diagnosis in 31.4% of cases.

Majewski, **[36]**, stated that DL indicate the need for intervention in 96% of cases with a diagnostic accuracy of 90% and changes in the treatment plan in 14% of patients. Morsy et al. **[21]**, highlighted theultimate role of DL, avoiding the unnecessary laparotomy in 6% of cases with a diagnostic accuracy of acute appendicitis of 85.71%. Furthermore, Mohammed Ali et al. **[37]**, reported a definitive diagnosis of 99% of patients with DL, avoiding the risks of unnecessary laparotomies in four cases. de Rungs-Brown et al. **[26]**, reported a clinical correlation with findings in the DL of 96.1 %.

Diagnostic Laparoscopy is useful for making a definitive clinical diagnosis whenever there is a diagnostic dilemma. It is an effective technique for bridging the gap between clinical evaluation and major surgical exploration. Laparoscopy reveals either no abnormality or discovers a disease requiring no surgery for proper management, thus avoiding an unnecessary burden of nontherapeutic laparotomies. Furthermore, DL prevents severe peritonitis, which may result from a delay in diagnosis. DL important role to play in undiagnosed acute abdomen patients both diagnostically as well as therapeutically **[15]**.

Laparoscopy has become a routine procedure in the management of acute abdominal diseases. It is considered an excellent therapeutic and additional diagnostic tool in selected cases. In the present study, Laparoscopy succeeded in the definitive management of 85.33% of patients, in which 14.66% necessitated the conversion to open surgery. Navez et al. **[38]**, concluded that the conversion rate to open surgery in laparoscopic cholecystectomy is about 10%. The incidence of conversion is 9.5% if surgery is performed within 2 days from the onset of symptoms and rises to 16.1 % if surgery is done within 4 days **[39]**.

Early diagnostic Laparoscopy provides better visualization, better cosmesis and less radiation exposure. Short hospital stay, fewer repeated investigations, decreased antibiotic and analgesic requirements, early oral feed and ambulation form the basis of decreased costs with early diagnostic Laparoscopy **[18]**. Thawait et al. **[40]**, reported that early laparoscopy is valuable in the management of acute nonspecific abdominal pain. It provides significantly high diagnostic accuracy. It permits early patient discharge and minimizes the incidence of unnecessary laparotomy.

Laparoscopy is very sensitive for the diagnosis of appendicitis, whether acute or chronic and not only detects appendicitis but also avoids negative appendicectomy **[41]**. Yehia et al. **[34]**, reported thatthe emergency laparoscopy is a diagnostic and therapeutic option in the majority of acute abdominal pain conditions to minimize unnecessary laparotomies **[34]**. In the present study, laparoscopic surgery was associated with minimal intraoperative and post-operative complications. This was parallel with Mbadiwe et al. **[42]**, who reported a significantly lower complication rate with Laparoscopy in comparison to the open approach.

Thereaux et al. **[43]**, reported a low risk of redo surgery among Laparoscopy operated patients and a reduction in mean hospital stays. In this concern, Mohammed Ali et al. **[37]**, reported an intraoperative complications rate of 7%, post-operative complications rate of 11% and mortality rate of 1%. Nandyala and Coelho **[27]**, reported the diagnostic accuracy of DL in diagnosing young adult females presented with acute abdomen, particularly with equivocal data. Diagnostic Laparoscopy offers a superior overview of the abdominal cavity with minimal trauma to the patient. If further surgery is needed, it may take the form of either a laparoscopic procedure or open surgery. Laparoscopic findings guide the incision for open surgery. The complications associated with Laparoscopy are few and can be minimized further by using the mini-laparotomy technique. Diagnostic Laparoscopy has the advantage of therapeutic interventions like laparoscopic appendicectomy, laparoscopic

adhesiolysis, and laparoscopic peptic perforation repair performed simultaneously with the minimal investigation and high diagnostic and therapeutic accuracy **[44]**.

Subramaniam, **[45]**, reported that DL gives all benefits of minimally invasive surgery. Not much pain, a shorter period of hospitalization, small scars, low infection rates and most importantly, accurate diagnosis and the correct treatment of most intra-abdominal conditions.

Conditions amenable to therapeutic laparoscopy include appendicitis, perforated peptic ulcer, diverticulitis, small bowel obstruction, acute cholecystitis, diaphragmatic rupture and splenic or hepatic injury. Laparoscopy in cases of perforated viscus allowed detection of the site of perforation. It offered a minimally invasive therapeutic tool for the treatment of these cases as in perforated duodenal ulcer repair **[38, 46-48]**.

Diagnostic Laparoscopy reduces overall hospital stay and post-operative complications, including pain and early return to work and avoids ugly scars. Another advantage of this diagnostic method is that it provides a prompt diagnosis, thus saving hospital stays. Costs are increased at the beginning, but they are ultimately decreased by the shorter hospitalization, omitting the costs of prolonged diagnostics, therapeutic delay, and potentially higher complication and mortality rates. Additionally, Laparoscopy as a diagnostic aid has the added advantage of no radiation exposure **[49-51]**.

Despite the potential advantages of DL, laparoscopy is an invasive procedure, and there is still controversy about whether this technique should be applied to all patients in the emergency setting. Laparoscopy should cautiously be considered whenever there is suspected difficulty in accessing the abdomen, such as in cases of organomegaly, adherence syndrome, or bowel distension. Furthermore, laparoscopy requires infrastructure and trained manpower which may not be available everywhere **[52,44]**.

Conclusion:

Diagnostic laparoscopy a feasible, effective, and safe diagnostic tool in patients with acute abdomen. It accomplished higher diagnostic accuracy in acute abdomen when compared with CT and US. Of note, DL changed the clinical decision in a considerable proportion of patients and improved their prognosis subsequently. Particularly, DL improved the management of acute abdomen patients, by making a definite diagnosis and access for immediate treatment. This reduced the perioperative complications, hospital stay, and readmission rates. It allowed early diagnosis and timely management of patients presented with acute abdomen in the emergency setting.

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دور تنظير البطن فى تشخيص وعلاج البطن الحاد

يعد البطن الحاد واحداً من أكثر الحالات التى يتم التعامل معها فى الممارسة الجراحية اليومية. يقدم مرض البطن الحاد مجموعة واسعة من العلامات السريرية والأعراض، وفى معظم الأحيان تكون العلامات والأعراض طفيفة وتتداخل فى كثير من الأحيان. ومن المشاكل الشائعة بين مرضى البطن الحاد هى الإهمال أو الخطأ فى تشخيص السبب الرئيسى للحالة، والذى يحمل نتائج كارثية على نتائج العلاج والنتائج الصحية للمرضى. وتتفاوت الأسباب من منطقة إلى أخرى وذلك تحت تأثير الخصائص الديموغرافية المختلفة.

يهدف هذا العمل إلى تقييم كيفية تحديد التشخيص باستخدام اللاباروسكوب فى حالات البطن الحاد والارتباط بين العلامات السريرية والتحاليل الأخرى ونتائج اللارباوسكوب، وتقييم الدور العلاجى للاباروسكوب فى البطن الحاد وتقييم حالات البطن الحاد. تم إجراء هذه الدراسة الاستطلاعية فى قسم جراحة العامة بمستشفيات جامعة عين شمس ومستشفى التدريس بالمطرية خلال الفترة من سبتمبر ٢٠٢١ وأغسطس ٢٠٢٢. تم إجراء الدراسة وفقاً للتوصيات الأخلاقية لوحدة الأخلاقيات بكلية الطب بجامعة عين شمس فى القاهرة، مصر. تم توضيح النهج الجراحى والسريرى بوضوح لجميع المرضى، وتم توقيع الموافقات المطلوبة قبل بدء الدراسة. تم تنفيذ خطوات الدراسة الحالية وفقاً لإرشادات إعلام هلسنكى. أظهرت اللاباروسكوبيا (DL) دقة تشخيصية أعلى من الأشعة فوق الصوتية (US) والتصوير بالرنين المغناطيسى (CT) وقد غير التشخيص واتخاذ القرار السريرى اللاحق لدى ٩.٣٣٪ من المرضى مقارنة بالـ CT. أصبحت اللاباروسكوبيا إجراء روتينياً فى إدارة الأمراض البطنية الحادة، مع معدل تحويل إلى جراحة مفتوحة فى استئصال المرارة اللاباروسكوبية حوالى ٥٪. تلعب اللاباروسكوبيا دوراً هاماً فى مرضى البطن الحاد غير المشخصين سواء فى التشخيص أو العلاج . يعد التنظير التشخيصى للبطن أداة تشخيصية آمنة و فعالة وسهلة التنفيذ فى مرضى البطن الحاد. و قد حققت نسبة دقة تشخيصية أعلى فى حالات البطن الحاد بالمقارنة مع التصوير بالأشعة المقطعية والأمواج فوق الصوتية. ولاحظ أنه تغير فى قرار العلاج السريرى لنسبة كبيرة من المرضى وتحسنت تو قعاتهم نتيجة لهذا التغيير. علاوة على ذلك، أثبت التنظير التشخيصى فعاليته فى إدارة حالات البطن الحادة، من خلال تحديد التشخيص بدقة وتوفير العلاج اللازم على الفور. وتم تقليل مضاعفات ما بعد الجراحة وفترة الإقامة فى المستشفى ومعدلات إعادة الدخول. وسمح بالتشخيص المبكر والعلاج فى الو قت المناسب للمرضى الذين يعانون من البطن الحاد فى الإعداد الطارئ.