

ROLE OF LAPAROSCOPY IN DIAGNOSIS AND TREATMENT OF ACUTE ABDOMINAL PAIN

By

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ABSTRACT

Background: Abdominal pain is a common complaint in the surgical department. Emergency laparoscopy in patients with "acute abdomen" is a part of common surgical practice.

Objective: Evaluation of the role of laparoscopy in management of acute abdominal pain.

Patients and Methods: 100 patients with acute abdominal pain presented to the Department of Surgery, Al-Hussein and Al Minia Health Insurance Hospitals were included in the study during the period from April 2018 to April 2019. They were divided into two groups: known preoperative diagnosis (therapeutic n= 67 patients) and unknown (diagnostic and therapeutic n= 33 patients). Their ages ranged between 12 and 60 years old (35 patients were males and 65 patients were females). Laparoscopy was performed for all patients under general anesthesia.

Results: The definitive diagnosis was established in 99 % of cases. 64 % of those cases were managed successfully by use of laparoscopy and conversion rate was 33 %. Time required for each operation varied according to the procedure. Intraoperative morbidity was 7 %, post-operative complications were 11 % and the mortality of study was 1%.

Conclusion: Laparoscopic intervention for abdominal emergencies is safe, feasible and effective. It resulted in minor trauma, has a rapid postoperative recovery, and reduced morbidity. Laparoscopy can help to avoid unnecessary non- therapeutic laparotomies. It can also help to guide the operating surgeon for choosing the proper targeted incision.

Keywords: Acute abdomen, Emergency, Laparoscopy.

INTRODUCTION

The term "Acute abdomen" is generally used to describe any acute abdominal pain, with duration of less than one week that may require urgent or immediate intervention, including emergency surgery. Although acute abdominal pain is often caused by an intra-abdominal pathology, it may also be a manifestation of an extra- abdominal

disease, e.g thoracic or systemic pathology (*Mayumi et al., 2016*). Acute abdominal pain can present a diagnostic dilemma. Clinical examination often fails to yield a diagnosis in patients with acute abdomen, particularly when the symptoms and signs are compounded by obesity. Blood investigations may be diagnostic in some cases, but in most other scenarios they simply indicate the presence of an inflammatory process. Radiological

investigations may suggest a diagnosis, but may often provide false-negative results (*Dominguez et al., 2012*). Laparoscopy as a minimally invasive tool can accurately and quickly confirm the diagnosis and reduce both delay in diagnosis and non-therapeutic laparotomy rate. Above all with the improvement in the technology and skills there is an expanding potential for carrying out therapeutic procedures at the same setting. Laparoscopy can be considered in acute abdominal pain by diagnosis and treatment to determine the best incision just before laparotomy (*Hussein, 2014*). The rapidly increasing popularity of laparoscopy may be attributed to several factors including its applicability, high diagnostic yield, therapeutic management in the same sitting (in cases where on table diagnosis is possible), ability to manage most coexisting conditions, low patients morbidity and reduced hospital stay and expenditure (*Rubbia et al., 2015*).

Acute abdominal pain is a common presentation. It accounts for 5-25% of all emergency department visits annually. It may affect the very young, the very old, either sex, and all socioeconomic (*Grundmann et al., 2010*). However, some causes are frequent in the pediatric population (like appendicitis) or are strictly related to the gender (i.e. gynaecological causes). It is also important to consider special populations such as the elderly or oncologic patients (*Muhammad et al, 2016*).

The present work aimed to evaluate the role of laparoscopy in the diagnosis and management of acute abdominal pain to minimize unnecessary non therapeutic laparotomies supporting the role of

minimal access surgery in acute abdominal pain.

PATIENTS AND METHODS

The study was carried out at the Emergency Department, Al-Hussein University Hospital and Al Minia Health Insurance Hospital for 100 patients who underwent diagnostic and/or therapeutic laparoscopy of "Acute abdomen" between April 2018 and April 2019.

Inclusion criteria:

All patients with acute abdominal pain less than 7 days. Age between 12-60 years old, hemodynamically stable and controlled coagulopathy.

Exclusion Criteria:

Cases below 12 or above 60 years old, hemodynamic instability till stabilization of the case, uncontrolled coagulopathy, multiple previous laparotomies and elective abdominal or pelvic surgical procedures, patients with intestinal obstruction with diffuse abdominal distension, accidents and trauma patients, patient with any contraindication to pneumoperitoneum, and the elderly in which a surgical or anesthetic intervention outweighed the theoretic benefits of laparoscopy.

All patients underwent preoperative evaluation in the form of history taking , physical examination and investigations (coagulation profile, complete blood count, random blood sugar, serum amylase, liver and kidney functions tests, plain X-ray chest (erect), plain X-ray abdomen (erect and supine), pelviabdominal US and CT scan of the abdomen and pelvis.

After placement of the first port, a detailed examination of the peritoneal cavity is performed. Depending on the site of suspected pathology, all relevant structures were grossly examined for signs of inflammation (e.g. pus, inflammatory adhesions, phlegmon). If an obvious pathology was identified, a therapeutic procedure (laparoscopic or open) was undertaken in the same setting. After initial inspection, 5-mm and / or 10-mm additional ports were placed as necessary, depending upon the planned procedure. In general, ports were placed under direct vision and positioned to form an equilateral triangle or a diamond, taking

Statistical analysis

Data were collected, coded, revised and entered to the Statistical Package for Social Science (IBM SPSS) version 20. The data were presented as number and percentages for the qualitative data, mean, standard deviations and ranges for the quantitative data with parametric distribution and median with Inter Quartile Range (IQR) for the quantitative data with non parametric distribution.

into account the camera position and the distance from the operative target. Before the procedure was terminated, a meticulous abdominal examination was carried out to ensure adequate hemostasis. Ports were removed under direct vision to ensure that there was no bleeding or visceral herniation. All port sites larger than 5 mm were closed with absorbable sutures. The skin was then closed with subcuticular sutures.

An approval of the study was obtained from Al Azhar University Ethical Committee. Every patient signed an informed written consent for acceptance of the operation.

Independent t-test was used in the comparison between two groups with quantitative data and parametric distribution and Mann-Whitney test was used in the comparison between two groups with quantitative data and non parametric distribution.

The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant if $P < 0.05$

RESULTS

In this study 100 patients were included. Their ages ranged between 12 - 60 years old (mean = 39.5 years). 35 patients were males and 65 patients were

females who underwent diagnostic and/or therapeutic laparoscopy for "Acute abdomen" between April 2018 and April 2019 (**Table 1**).

Table (1): Comparison between group A and group B as regards gender, This table shows that there was no statistically significant difference in gender regarding studied group

Groups parameters		Group A (n= 67)		Group B (n= 33)		P value
		No	%	No	%	
Gender	Male	20	29.9%	15	45.5%	>0.05
	Female	47	70.1%	18	54.5%	

Patients were divided into 2 groups; A and B. Group A included 67 patients “with a definite clinical diagnosis” who underwent therapeutic laparoscopy, whereas group B included 33 patients “without a definite clinical diagnosis” who underwent diagnostic laparoscopy. In our study diagnostic laparoscopy confirmed the preoperative clinical diagnosis in 67 patients (100 %) and was

beneficial diagnostic tool in 32 patients (97 %). Of them, 64 patients (64 %) underwent successful therapeutic procedures with laparoscopy. Conversion to open surgery was done for 32 patients (32%) through targeted incision. Intraoperative morbidity occurred in 7 patients (7%) while postoperative morbidity occurred in 11 patients (11%) (Table 2).

Table (2): Comparison between group A and group B as regards morbidity and early postoperative complication

Parameters Groups		Group A (n= 67)		Group B (n= 33)		P value
		No	%	No	%	
Morbidity Intra- operative complications	Bowel Injury	3	4.5%	1	3.0%	>0.05
	Liver Injury	1	1.5%	0	0.0%	
	Anesthesia-related	1	1.5%	0	0.0%	
	(hypoxia/ hypercapnia)	0	0.0%	1	3.0%	
	CBD injury\ transection	1	1.5%	0	0.0%	
Early Post- operative complications	Fever	1	1.5%	2	6.1%	>0.05
	Wound infection	1	1.5%	3	9.1%	
	Ileus	1	1.5%	1	3.0%	
	Leakage of duodenal contents	1	1.5%	1	3.0%	

No missed pathology in our study. Only one patient died in our study (mortality = 1 %). In this study, the mean postoperative hospital stay after laparoscopy was 2.1 days and 4.55 days after open surgery (Table 3) this table

shows that there was statistically significant difference in Postoperative hospital stay (days) regarding studied group . Wound infections occurred in 4 % of patients.

Table (3): Comparison between group A and group B as regards Postoperative hospital stay (days) , conversion rates and mortality rate .

Paramaters \ Groups	Group A (n= 67)		Group B (n= 33)		P Value
Post-operative hospital stay(days) Mean ±SD	1.9 ± 2.0		2.9 ± 1.2		0.009
Conversion rates	No	%	No	%	0.013
	16	23.9%	16	48.5%	
30-day mortality rate	1	1.5%	0	0 %	>0.05

Group A included 67 patients “with a definite clinical diagnosis” who underwent therapeutic laparoscopy [laparoscopic appendectomy (45), laparoscopic cholecystectomy (22)]. These therapeutic procedures were successfully completed laparoscopically in 50 cases, laparoscopic drainage of pericholecystic abscess in one case, while 16 cases required conversion to open surgery. On the other hand, group B included 33 patients “without a definite clinical diagnosis” who underwent diagnostic laparoscopy. This group was further subdivided into 2 subgroups (B.1

and B.2). Subgroup B.1 included. 17 patients who underwent either a diagnostic laparoscopic procedure only (n=4) or a combined diagnostic-therapeutic laparoscopic procedure (n=13) and did not require conversion to open surgery. Subgroup B. 2 included 16 patients who required conversion from a laparoscopic to an open surgical procedure (Table 3) , this table shows that there was statistically significant difference in conversion rates regarding studied group through different abdominal incisions (Table 4).

Table (4): Different types of abdominal incisions used for conversion to open surgery in group B patients [subgroup B2 (n=16)]

Type of abdominal incision	No	%
Midline laparotomy	3	18.8%
Upper midline laparotomy (Above umbilicus)	1	6.3%
Lower midline laparotomy (Below umbilicus)	5	31.2%
Grid iron incision	5	31.2%
Low transverse (phannenstiel) incision	2	12.5%

Therefore, overall in our study, laparoscopy was diagnostic only in 20 cases [4 cases in subgroup B.1 and 16 cases in subgroup B. 2], therapeutic only in 51 cases [all cases in group A], and as both diagnostic and therapeutic in 13 cases [cases in subgroup B.1]. Unnecessary non-therapeutic laparotomies were avoided in 4 cases in group B. In

those 4 cases (in subgroup B.1), only a diagnostic laparoscopic procedure was undertaken without needing to perform any therapeutic procedure [acute pancreatitis (n=2), negative laparoscopy (n=2)]. Hence, those patients were spared the morbidity of unnecessary non-therapeutic midline laparotomies.

DISCUSSION

The diagnostic accuracy in our study (99 %) and therapeutic efficacy of laparoscopy in our study (64 %) are consistent with those reported in previous studies.

According to the international literature, the diagnostic accuracy of laparoscopy in patients with acute abdomen ranges from 85 to 100%. In one study, laparoscopy could establish a definite diagnosis in 93 to 100% of cases, and could accomplish a definitive treatment of the underlying disease in 44 to 73% of cases (*Beauchamp et al., 2016*).

In another study, a definitive diagnosis was accomplished in 85.7% of cases, and 90.6% of those cases were successfully treated by laparoscopy (*Agresta et al., 2012*).

In a third study, laparoscopy was diagnostic in 100% of cases and could accomplish treatment in 94% of those cases (*Jamma and Jadhav, 2015*). This indicates that the therapeutic efficacy was relatively higher in patients who underwent laparoscopy after a definite clinical diagnosis had been made preoperatively.

In our study, the intra-operative complications were 6 % in group A and 1% in group B patients. However, the rate of post-operative complications was relatively higher in group B (7 %) compared to group A patients (4%). The overall morbidity rate in our study is almost consistent with previous studies which reported various complications in patients undergoing laparoscopy for acute abdomen, with morbidity rates ranging from 0 to 24% (*Agresta et al., 2012*).

Obviously, the overall rate of conversion in our study (32 %) was higher than the rates reported in previous studies, in a retrospective review stated that patients who underwent laparoscopy for acute abdominal pain, the conversion rate was 2.2% (*Karamanakos et al., 2010*).

In another series of 25 patients, the conversion rate was 19% and the reasons behind conversion were either a difficult procedure or a failure to establish a definite diagnosis (*Subramaniam et al., 2019*).

The only patient who died in this study was a 62 -years old female diabetic patient in group A in whom diagnostic laparoscopy revealed pericholecystic abscess. Drainage only was done, two days postoperative patient developed duodenal fistula where open exploration was done and primary repair of the duodenal fistula was performed. Fistula had recurred. The general condition of the patient worsened and patient transferred to the intensive care unit. On 12th postoperative day, patient died from severe sepsis and organ dysfunction.

The mortality rate in our study coincides with the rates reported in the literature. In a study there was no procedure-related mortality, and the three deaths that were reported were due to extensive bowel infarctions, other studies reported mortality rates ranging from 0 to 5% (*Sages, 2010*).

In a recent case series of 50 patients who underwent laparoscopy for acute abdomen, the mortality rate was 0% (*Jamma and Jadhav, 2015*).

CONCLUSION

The surgical laparoscope can be used in all cases of acute abdominal pain. Choosing the right patient and the experience of the good surgeon in the laparoscope in emergency situations is necessary to reduce the rates of conversion to surgical opening and achieve satisfactory results.

Conflicts of interest: There are no conflicts of interest.

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دور منظار البطن فى تشخيص وعلاج الام البطن الحادة

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خلفية البحث: يشكل ألم البطن الحاد تحدياً كبيراً أمام أطباء الجراحة العامة تحديداً لما قد يسببه من كوارث فى حالة تأخر التشخيص والعلاج قد تودى بحياة المريض. جدير بالذكر أن جراحة المناظير قد اقتحمت كافة مجالات التدخلات الجراحية بوجه عام وأن منظار البطن الجراحى يحتل الآن دوراً هاماً فى تشخيص وعلاج آلام البطن الحادة بوجه خاص.

الهدف من البحث: بيان دقة منظار البطن التشخيصى فى تحديد سبب آلام البطن الحادة وفعالية المنظار فى العلاج بعد التشخيص وقدره منظار البطن على تجنب المرضى عمليات جراحية غير علاجية غير ضرورية.

المرضى وطرق البحث: تم اجراء هذه الدراسة بمستشفى الحسين الجامعى فى الفترة من ابريل 2018 الى ابريل 2019، ولقد تضمنت الدراسة مائة مريض يعانون من آلام حادة بالبطن وتراوحت أعمار المرضى الخاضعين لهذه الدراسة من 12 الى 60 عاماً. وتم تقسيم المرضى الى مجموعتين: **مجموعة (أ)** وتشمل المرضى الذين تم تشخيصهم بالفعل قبل المنظار بواسطة الفحص الاكلينيكي والفحوصات وكان استخدام المنظار فى هذه المجموعة لتأكيد التشخيص والعلاج. **مجموعة (ب)** وتشمل مرضى الام البطن الحادة الذين لم يتم تشخيصهم بالفحص والفحوصات ولذا استخدم المنظار فى هذه المجموعة للتشخيص وامكانية العلاج وتجنب المرضى الاستكشاف الجراحى بالفتح.

نتائج البحث: وبعد استخدام منظار البطن الجراحى مع المرضى، فاقد اكد المنظار تشخيص 67 حالة قد تم تشخيصهم بالفعل قبل المنظار بواسطة الفحص الاكلينيكي والفحوصات، ولقد وصلت قدرة المنظار الجراحى فى تشخيص الحالات الغير معروفة السبب الى نسبة عالية تبلغ 97% من الحالات، أما قدرة المنظار العلاجية فقد بلغت 64% بدون فتح جراحى. هذا وقد بلغت نسبة الحالات التى تم اللجوء فيها الى الفتح الجراحى الى 33% من المرضى. وفيما يتعلق

بالمضاعفات اثناء الجراحة فقد بلغت نسبة الحالات 7%. وتصدر الاشارة ان جراحة المناظير تميزت بحدوث اقل معدل ممكن للألم بعد الجراحة وأقل احتياجا للمسكنات. وفيما يتعلق بالمضاعفات بعد الجراحة: فقد سجلت نسبة 11%، وحدثت حالة وفاة واحده (1%)، وفيما يتعلق بالاقامة فى المستشفى بعد الجراحة: فقد كشفت الدراسة أن المرضى الذين تم علاجهم بالمنظار كانت مدة الاقامة اقل بكثير من الذين استكملت جراحتهم بالفتح الجراحى، وقد تراوحت مدة الاقامة من يوم الى 3 أيام وكانت اقصى مدة 12 يوم لمريضة ناسور الاثنى عشر.

الاستنتاج: يمكن إستخدام منظار البطن الجراحى فى كل حالات ألم البطن الحاد . إختيار المريض المناسب وخبرة الجراح الجيدة فى منظار البطن فى حالات الطوارئ ضرورى لخفض معدلات التحويل إلى الفتح الجراحى وتحقيق نتائج مرضية.