

**Original article:**

## **A clinical study of the role of laparoscopy in acute abdomen**

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### **Abstract:**

**Introduction:** Laparoscopy has been widely accepted among surgeons for the diagnosis and management of acute abdominal conditions. In this study, we aim to evaluate and summarize the experience in laparoscopic procedures, both diagnostic and interventional, for emergency nontraumatic abdominal conditions, in a tertiary academic center.

**Material and methods:-** from October 2013 to October 2015 over period of 2 years 100 patients with provisional diagnosis of acute abdomen were operated laparoscopically;( 40 acute Appendicitis, 24 hollow viscous Perforation, 18 acute Cholecystectitis, 11 non- specific acute abdominal pain, 7 intestinal obstruction.)

**Results:** The definitive diagnosis was established in 100% cases and 89% of those were managed successfully by use of laparoscopy in emergency. Conversion rate was 11% with prevention of laparotomy in 11% cases. Time required for each operation varied according to the procedure and no intraoperative complications were noted. The morbidity of study was 13% with mortality of 0%.

**Conclusions:** We consider the laparoscopic approach in patients with abdominal emergencies to be feasible and safe in experienced hands. It provides diagnostic accuracy as well as therapeutic capabilities. Sparing patients laparotomy reduces postoperative pain, improves recovery of GI function, reduces hospitalization, cuts health care costs, and improves cosmetic results. This approach promises to play a significant role in emergency abdominal situations and will certainly become increasingly important in today's health care environment.

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### **Introduction**

Acute abdominal pain, defined as any abdominal pain with duration of less than 7 days, is a common presentation at the surgical department, both in primary care and secondary referral hospitals<sup>1</sup>. Acute abdominal pain can present a diagnostic dilemma. Clinical examination often fails to yield a diagnosis, 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. Radiology may suggest diagnosis; however, both radiography and ultrasound have false-negative rates<sup>2</sup>. The acute abdomen is characterized by the sudden appearance of abdominal complaints that oblige the surgeon to decide promptly whether to operate immediately, to treat conservatively, or to observe the patient. Despite new diagnostic developments such as ultrasonography and computed tomography, it seems that an acute abdominal condition presents a situation in which a surgeon dares to open an abdomen without a clear diagnosis<sup>3</sup>. In the past 25 years, the role of laparoscopy in emergency surgery has increased continuously. Diagnostic laparoscopy may be a key to solving the diagnostic dilemma of an unspecific acute abdomen. Furthermore, it allows not only direct

inspection of the abdominal cavity but also surgical intervention, if needed<sup>4</sup>. The decision to perform diagnostic laparoscopy is based on clinical judgment, weighing the sensitivities and specificities of other modalities such as computed tomography and ultrasound versus the relative morbidity of minimally invasive laparoscopy<sup>5</sup>. Diagnostic laparoscopy is particularly useful when the presentation of acute abdominal pain suggests Anti-abdominal catastrophe, but the exact diagnosis remains obscure despite standard measures<sup>6</sup>.

Further laparoscopy will always provide us the opportunity to treat the condition as soon as diagnosis has been made. This is our humble attempt to assess the feasibility of use of laparoscopy in cases of acute abdomen in our setup.

#### **Methodology :**

- In our study, “**A CLINICAL STUDY OF THE ROLE OF LAPAROSCOPY IN ACUTE ABDOMEN**” was carried out on patients admitted in our hospital in surgical ward with acute abdomen over period of 2 years from October 2013 to October 2015. This study was approved by director of surgery department. All the patients were informed regarding other possible modality i.e. open surgical method.
- Patient target; 30
- Method:-

#### **Selection criteria:-**

- Pain in abdomen less than 7 days in duration
- Tenderness over abdomen present on examination
- X-ray abdomen showing:- gas under diaphragm / multiple air- fluid level
- USG abdomen showing:- acute appendicitis / acute cholecystitis / peri-gallbladder collection / free fluid in abdomen / splenic laceration / liver laceration
- CT scan showing:- pneumoperitoneum / obstruction / intra-abdominal solid organ injury

#### **Exclusion criteria:-**

- (1) Hemodynamic instability.
- (2) Trauma with head injury.
- (3) Uncorrectable coagulopathy.
- (4) Clear indication for immediate laparotomy (frank peritonitis).
- (5) Trauma to abdomen.
- (6) A decompensated cardiorespiratory system. And
- (7) Patient's refusal for the procedure
- (8) Patients who were managed conservatively.

**Study design:** The study includes patients diagnosed of acute abdomen and admitted under surgical ward. The study involved re-operative assessment; intra-operative observations and post-operative follow up.

#### **surgical technique:**

Open technique is used to gain access to peritoneum and insert blunt trocar. Then Co2 cable is attached to umbilical port to create pneumoperitoneum. A CO2 intraabdominal pressure between 8 and 12mmHg is usually sufficient to realize enough room to work properly.

The optic is inserted through the 10-12 mm trocar placed in the periumbilical position. Once the abdominal cavity entered other ports are inserted according the diagnosis made.

**Discussion:**

Our study “To Study The Role Of Laparoscopy In Cases Of Acute Abdomen” was conducted on patients admitted in surgical ward of government hospital as cases of acute abdomen. Our hospital is a tertiary care centre with feasibility of endoscopy and laparoscopy for both emergency and elective patients. 100 patients were included in our study after counselling them and their relatives about need to convert to open.

in our study 100 patients were included and commonest age group was 21 to 40 years of age. Our study findings match with that of Temma, Irvin, and Miettein P et al in which the commonest age group was 21-30 years and 10-29 years respectively, with male preponderance (M:F 1.56:1).

**INCIDENCE OF DISEASE**

Disease	Our study	Agrusa et al 2012	Karmanakos et al 2010	Ates et al 2008	Agresta et al 2000
Appendicitis	45%	52.46%	42.4%	46.25%	64.93%
Gastroduodenal perforation	18%	3.08%	2.5%	11.5%	4.1%
Cholecystitis	20%	33.95%	45.9%	42.17%	24.38%
Small bowel obstruction	3%	7.4%	4.4%	2.04%	6.3%
Nonspecific pain	2%	3.08%	4.6%	-	-
Diverticulitis	1%	0	0	0	0
Intussusception	3%	0	0	0	0
Enteric perforation	5%	0	0	0	0
Meckel’s diverticulitis	2%	0	0	0	0

In our clinical study 100 patients were operated for acute abdomen, which on diagnostic laparoscopy had following findings: 45% (45) patients had acute appendicitis, 18% (18) had duodenal perforation, 20% (20) had acute cholecystitis, 6% (6) had enteric perforation, 3% (3) had obstruction of small bowel due to adhesions, 3% (3) had intussusception, 2% (2) had meckel’s diverticulum, 1% (1) had Diverticular abscess, 2%(2) had abdominal tuberculosis. In our study acute appendicitis is the most common disease followed by acute cholecystitis and duodenal perforation. Our findings correlate with findings of Agrusa et al, Karmanakos et al, Ates et al and Agresta et al in which studies acute appendicitis was the most commonest disease followed by acute cholecystitis.

	Our study	Temma <sup>11</sup> M S et al 2013	Agrusa <sup>9</sup> et al 2012	Karmanakos <sup>7</sup> et al 2010	Ates <sup>10</sup> et al 2008	Agresta <sup>8</sup> et al 2000
Definite diagnosis	100%	98.5%	96%	98.2%	93%	95.3%
Laparoscopic treatment	89%	87%	95.47%	95.2%	85.7%	88.2%
Prevention of laparotomy	11%	30%	-	-	17%	88.2%
Conversion rate	11%	19%	4.53%	2.2%	14.2%	6.8%
Morbidity	13%	5%	-	7.9%	4.1%	4.1%
Mortality	0%	0%	-	1.1%	0.68%	0.8%

In our study 100 patients were subjected for laparoscopy in emergency with clinical diagnosis not specific in 11 patients. Diagnostic laparoscopy done initially was able to diagnose these conditions and also confirmed the diagnosis in rest of the cases. In total 100% cases had definitive diagnosis after laparoscopy.

Several researches over period of years have reported about diagnostic accuracy of laparoscopy up to 70-99%. It is considered as most useful in patients with unclear abdominal syndromes and those cases where exact diagnosis of presentation is difficult. Diagnostic laparoscopy can change the initial clinical diagnosis and help in planning the treatment of emergency cases. In our study we were able to treat 89/100 patients with laparoscopy that included, 43 appendectomies, 18 gastroduodenal perforation closures, 3 adhesiolysis, 20 cholecystectomies, 2 intussusception release, and 1 case of peritoneal lavage for a case of Diverticular abscess. In 2 cases abdominal tuberculosis was diagnosed, as no obvious surgical intervention was needed, patients were shifted to medical management.

Laparoscopy has established itself in various elective procedures over decades. Role of laparoscopy in diagnosing conditions is proven beyond doubt. Therapeutic laparoscopy for emergency cases is still under scanner. From above studies we can say that with increasing experience and availability of various newer modalities, laparoscopy can be used for treatment of acute abdomen in emergency cases in safe and effective manner<sup>11</sup>. In our study of 100 cases, 11 cases didn't had definitive diagnosis which would have undergone exploratory laparotomy. with laparoscopy in this cases we were able to establish the diagnosis and further line of management. The above studies are enough to cite that laparoscopy in case of acute abdomen is an accurate means of management which avoids major exploratory laparotomy done previously to find and treat the cause.

In our study 11 out of 100 cases were converted to open surgery. Of these 6 cases were enteric perforation, , 2 cases were meckel's diverticulum, 2 were gangrenous appendix and 1 was laparoscopic release of intussusception. Initially laparoscopy in these cases plan incision according to condition, because of which major laparotomy was avoided and patient had mini-laparotomy with mini-scar for the same. Laparoscopy even though has advantage of preventing laparotomy, it still has limits in emergency cases. Exploratory laparotomy still remains the mainstay tool in those patients who even after diagnosis, laparoscopic technique is found not sufficient to treat. In such situation conversion to open surgery is best in benefit of patient. Conversion to open surgery mostly depends on experience of surgeon, available facilities for advanced laparoscopic back up, intra-operative pathological findings which may differ as per case, person and institution.

In our study we had conversion rate of 11% which correlates with other studies.

**Duration of surgery:** in our study duration varied according to the cases and their pathology. As the patients included in study were vitally stable and duration of surgery optimal as compared to elective surgery or open surgery. Laparoscopy in emergency is acceptable. Considering the benefits which patient has after laparoscopy, i.e. early recovery and return to work, the duration of surgery can be justified.

**Intra-operative complications:** none of the patient had intra-operative or procedure related complications.

In our study of 100 cases were managed with laparoscopy technique. Of which 11 cases were converted to open surgery. The morbidity in our study was 13%. When compared to other studies our study shows higher morbidity, which can be attributed to higher no. of cases with peritonitis and conversion to open surgery also added to higher morbidity. Discharge was early in cases which were treated by laparoscopic method, than open surgery. Its well known fact that laparoscopy due to its minimal handling helps in early recovery, minimal infection rate as compared to open surgery, which results in early recovery of patient and discharge<sup>11</sup>.

This is particularly important in patients who visit our hospital, most of whom are bread earner for their family. Early recovery and discharge save their many hours and so the income of their family. In our study 100 patients were subjected to laparoscopy out of which 89 were treated laparoscopically while 11 were converted to open surgery. During study and follow up no patient died. Making the mortality of 0%. Patients vital status on presentation, pathological condition, duration of disease and post-operative period are some of the factor which may contribute to mortality. Judicious case selection, appropriate diagnosis and tailoring of treatment helped us in having no mortality in our study.

**Conclusion:**

- Emergencies are uninvited in human life, so is acute abdomen, it disturbs the routine and clings' one to bed. Delay in diagnosis, modality of treatment and post-operative morbidity adds to misery.
- Laparoscopy in such condition can decrease the burden.
- From our study we can conclude that laparoscopy in acute abdomen is feasible, effective and safe modality for diagnosis and treatment.
- Laparoscopy in emergency cases when used as diagnostic and therapeutic tool, can extend the proven benefits of minimal access surgery to patients and ensure that no diagnosis is missed.

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