International Surgery Journal
Sharma A et al. Int Surg J. 2018 Oct;5(10):3350-3355
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20184087

Original Research Article

Laparoscopy: a tool for undiagnosed pain abdomen

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Received: 31 July 2018
Accepted: 29 August 2018

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ABSTRACT

Background: Diagnostic laparoscopy has been in the armamentarium of the surgeon and gynaecologist for many years as a useful technique for evaluating pelvic pathology and it is now one of the most frequently performed laparoscopic procedures. The purpose of this study is to evaluate the role of diagnostic laparoscopy in undiagnosed pain abdomen. The Objectives of this study is to evaluate laparoscopy as a diagnostic tool in cases of undiagnosed abdominal pain where clinical symptoms and investigations are not conclusive and to evaluate benefits and complications of diagnostic laparoscopy.
Methods: The study was done in 60 patients, presenting with chronic undiagnosed pain abdomen to a tertiary care hospital. All the patients were operated under general anesthesia in supine position. Diagnostic laparoscopy was done using 3 ports, one umbilical 10 mm, other two depending upon possible pathology. After the study, the data was analyzed to evaluate the role of laparoscopy in undiagnosed abdominal pain.
Results: Out of 60 patients, 44 were female and 16 males. On diagnostic laparoscopy, findings were- chronic appendicitis - 31, chronic appendicitis with left ovarian cyst - 1, endometriosis with adhesions - 3, PID - 5, PID with adhesions - 3, suspected TB (GI/Genital) - 4, adhesions - 12, negative diagnostic lap - 1. So it may be concluded that diagnostic laparoscopy is a very useful tool to establish diagnosis in patients with undiagnosed abdominal pain with the following benefits are, superior diagnostic ability, better visualization of the abdominal cavity including the paracolic gutters and the pelvis, able to pin point the sites of adhesions with adhesiolysis during the same procedure, retrieval of specimen for histopathological examination, management of the pathology during the same procedure, avoiding unnecessary laparotomy, low complication rate.
Conclusions: Laparoscopy is an efficient tool in the armamentarium of the surgeon to diagnose the patients of undiagnosed pain abdomen with numerous benefits and minimal complications.

Keywords: Adhesiolysis, Diagnostic, Laparoscopy, Laparoscopic appendicectomy, Undiagnosed pain abdomen

INTRODUCTION

The term laparoscopy has been derived from a Greek word 'lapara' which means 'body wall' or 'flank' and 'skopein' which means 'to examine'. The terms 'laparoscopy' and 'peritoneoscopy' are interchangeable, however, peritoneoscopy is the preferred term as the purpose is to examine the contents of peritoneal cavity and not the abdominal wall.[1]

Chronic abdominal conditions represent a major group of cases for a general surgeon. In the majority of cases, diagnosis can be made by clinical examination and sometimes with the help of basic and advanced

modalities of investigations such as ultrasound, computed tomography (CT), magnetic resonance imaging (MRI) etc. In spite of detailed history, examination and exhaustive investigations, there are a large number of cases in which diagnosis remains uncertain and treatment is started empirically. Such situations present surgeons with a difficult challenge in terms of diagnosing and staging the disease accurately in order to plan an effective management modality and cut short the number of negative laparotomies. Laparoscopy is as much a surgical procedure as exploratory laparotomy but less invasive, less disabling and disfiguring and yet just as informative as conventional techniques.[2]

It can provide almost the same information as exploratory laparotomy but with far less discomfort, cosmetic compromise, operative risk and expense to the patient.[3]

Diagnostic laparoscopy has been in the armamentarium of the surgeon and gynecologist for many years as a useful technique for evaluating pelvic pathology as it allows a surgeon to look directly at the contents of a patient's abdomen or pelvis, including the fallopian tubes, ovaries, uterus, small bowel, large bowel, appendix, liver, and gallbladder. It is easier to exclude abdominal trauma following an accident by use of laparoscopy rather than a large abdominal incision. The procedure also allows rapid and thorough inspection of the paracolic gutters and pelvic cavity that is not possible with the open approach.

Diagnostic laparoscopy has been embraced by the surgeon for the diagnosis of a wide range of abdominal diseases that also helps in the application of laparoscopic techniques for the treatment of many of these diseases and has accelerated the use of laparoscopy as a diagnostic tool.

Laparoscopy is an invasive procedure, though minimally invasive. When non-invasive technology for diagnosis has reached such sophistication, laparoscopy has to prove its value, both in terms of positive diagnosis and also in terms of safety. Laparoscopy must always be a sequel to careful examination and its greatest value is in judicious conjunction with other diagnostic aids. In the real sense, laparoscopy is the most effective technique for closing the gap between clinical evaluation and surgical exploration.[4]

Advantages

Cosmetically better because of small incision, less post-operative pain, less chances of postoperative adhesions, better visualization of paracolic gutters and pelvic cavity, easy availability and cost effectiveness.[5]

Disadvantages

- Diagnostic laparoscopy is an invasive procedure, so there are more chances of complications, as compared to a non-invasive procedure.
- For diagnostic laparoscopy, special instruments and special training is required.
- Instruments of diagnostic laparoscopy are longer and more complex to use than in open surgery and significant hand-eye coordination problem may occur in trainees.

The purpose of this study is to evaluate the role of diagnostic laparoscopy in undiagnosed pain abdomen. The Objectives of this study is to evaluate laparoscopy as a diagnostic tool in cases of undiagnosed abdominal pain where clinical symptoms and investigations are not conclusive and to evaluate benefits and complications of diagnostic laparoscopy.

METHODS

The study was done in 60 patients, presenting with pain abdomen to a tertiary care hospital.

Inclusion criteria

Chronic undiagnosed abdominal pain with normal or non-relatable investigations and clinical examination.

Exclusion criteria

- Patients undergoing some definitive elective abdominal procedure.
- Uncorrectable coagulopathy and pregnancy.
- Severe cardio-pulmonary unrest and uncontrolled high blood pressure.
- Age <10 years

All the patients were operated under general anaesthesia in supine position. Diagnostic laparoscopy was done using 3 ports, one umbilical 10 mm, other two depending upon possible pathology.

During diagnostic laparoscopy abdomen was inspected in the following order: Left lobe of the liver, around the falciform ligament to the right lobe of liver, gallbladder and hiatus, the stomach, the ascending colon, the caecum and the appendix, the ileocaecal junction and the terminal ileum, (the Meckel's diverticulum), the transverse colon and round the sigmoid colon, pelvis, the full length of the fallopian tube, round ligament, anterior cul de sac, uterus and the adnexae.

When a pathologic finding needed surgical intervention then it was dealt with accordingly. Appropriate biopsies, cytology, cultures were carried out laparoscopically. If laparoscopic management was not possible due to any reason, conversion to laparotomy was done to tackle the pathology.

If no pathology was found, then completion of the diagnostic laparoscopy was done. After the study, the data was analyzed to evaluate the role of laparoscopy in undiagnosed abdominal pain.

RESULTS

A total of 60 patients with undiagnosed abdominal pain underwent diagnostic laparoscopy after thorough clinical examination and a battery of selected laboratory tests. Imaging techniques like X-ray and abdominal ultrasound were helpful in some but not in all the cases.

The procedure was evaluated as a positive outcome when one of the following were seen or done.

- Positive pathologic findings correlated with clinical and ultrasound examination.
- Positive pathologic findings not correlated with clinical and ultrasound examination or a new diagnosis was established.
- Therapeutic procedure done to relieve the obvious pathology encountered inside the abdominal cavity.

However, in certain instances, conversion to laparotomy was done, when the surgery was not proceeding further as desired.

Age and sex wise distribution of patients

Out of 60 cases, the maximum number of patients 31.6% was in the age group between 31-35 years, followed by age group 21-25 years and 26-30 years (Figure1). Female patients outnumbered the male patients by a ratio of 44:16 (Figure2).

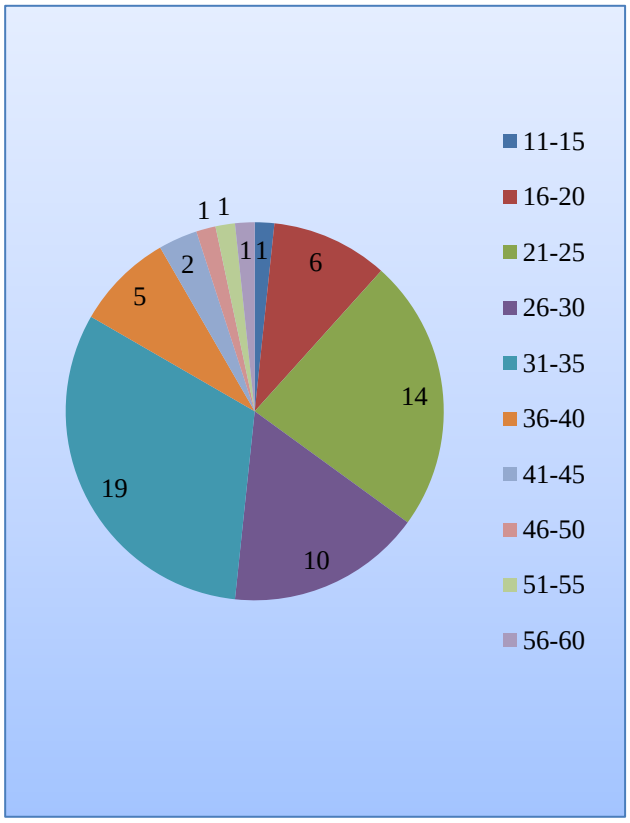

Figure1: Age wise distribution of patients.

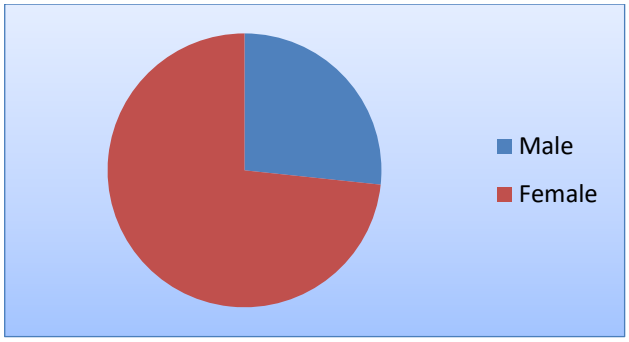

Figure 2: Sex wise distribution of patients.

Site

Most common primary site of occurrence of pain/tenderness in the abdomen was the right iliac fossa (60%), followed by around the umbilicus in 20% and the hypogastrium in 15%. Sites such as epigastrium and right hypochondrium were present in remaining 5%.

Bar

Associated complaints

The most common associated complaint was vomiting in 9 patients, followed by Diarrhoea and constipation 6, Dysuria 4, Abdominal Distention 3 and Discharge Per Vaginum 3.

Past surgical history (Other than normal vaginal delivery)

The most common significant past history was of abdominal sterilization that was present in 6 out 44 female patients (14%), followed by 9 cases each of LSCS and TAH/SOO. Out of 44 females, 27 patients had no significant past history. Male patients had no significant past history (Table 1).

Table 1: Previous medical or surgical history in females.

Past history	No. of cases	% (out of 44)
Sterilization (Abdominal tubal ligation)	6	14
LSCS	4	9
TAH / SOO	4	9
Tuberculosis	3	7
Insignificant	27	61
Total	44	100

Ultrasonography

In most of the cases (47) USG was normal study. Six patients showed chronic Appendicitis in their USG. In 3 patients, USG showed small Renal calculi, but site of their pain was not corresponding to their USG findings.

In 1 case, incidentally, left ovarian cyst was found (Table 2).

Table 2: USG findings.

USG findings	No. of cases	Remarks
Chronic appendicitis	6	2 males and 4 females
Small renal calculi	3	All 3 male, site of pain was not related to USG finding
Left ovarian cyst	1	Site of pain was not related to USG finding
Pelvic inflammatory disease	3	-
Usg-normal study	47	-
Total	60	

Intra-operative findings

Most common finding during laparoscopy (53.3%) was chronic Appendicitis in 32 patients; though preoperatively, in only 6 cases, USG showed the diagnosis of chronic Appendicitis. Intra-peritoneal adhesions were found in 18 cases (solely or along with other co-existent diseases). In 1 patient no pathology was found on laparoscopy (Table 3).

Table 3: Findings during laparoscopy.

Finding	No. of patient	%
Chronic appendicitis	31	51.6
Chronic appendicitis with left ovarian cyst	1	1.7
Endometriosis with adhesions	3	5.0
PID	5	8.3
PID with adhesions	3	5.0
Suspected TB (GI/genital)	4	6.7
adhesions	12	20.0
Negative diagnostic laparoscopy	1	1.7
Total	60	100

Culture positive PID was present in 4 cases; the causative organisms included *Pseudomonas, Escherichia coli* and *Neisseria gonorrhoeae.*

Therapeutic Procedures Performed

The most common therapeutic procedure was Laparoscopic Appendicectomy (32) followed by laparoscopic adhesiolysis (16). Two cases were converted to open laparotomy due to dense adhesions. In 6 cases, Biopsy from Endometriosis, lymph node or omentum was taken and sent for histopathological exam. Fluid from pelvis was aspirated and sent for examination in 8 cases of PID (Table 4).

Table 4: Therapeutic procedures performed.

Therapeutic procedure	No. of cases
Laparoscopic appendicectomy	32
Ovarian suction-aspiration	1
Adhesiolysis	16
Biopsy (endometriosis, lymph node, omentum)	6
D and C	1
Fluid aspiration for cytology and bacterial culture	8
Conversion to laparotomy (dense adhesions)	2

TB of the gastrointestinal tract was detected in 3 cases, in two cases mesenteric lymph adenitis was present, and in one case omental biopsy revealed TB. TB of the genital tract was suspected in 1 case and was confirmed by endometrial biopsy after D and C.

Patients of PID were put on medical treatment. Patients that were positive for TB were referred to the Pulmonary Medicine department and were put on ATT by the Physician.

Evaluation of outcomes of diagnostic laparoscopy

Out of 60 patients that were studied, diagnosis was established in 59 cases (98.3%). A total of 9 patients (chronic appendicitis-6 and PID-3) that were provisionally diagnosed by USG, were confirmed by laparoscopy. Out of remaining 51 patients, 50 patients were diagnosed by laparoscopy (98.03%)

Out of 59 cases in which diagnosis was established, 57 cases were diagnosed by laparoscopy only and hence laparotomy was avoided (96.6%). 2 cases needed laparotomy. In 1 case no diagnosis could be established even with laparoscopy.

Complication

In 1 case, minor complication (port site minor infection) was encountered (1.6%). The port to be infected was the umbilical port, through which the specimen was retrieved.

Follow up

The patients were followed up in the post-operative period up-to discharge from the hospital then after 2 weeks and 4 weeks. All except three patients were followed up till 4 weeks and were found to be stable and comfortable. Patients of TB were followed up by pulmonary medicine department. Three patients were lost in follow up.

DISCUSSION

In surgical practice pain in the abdomen is a frequent complaint in both the sexes and may present as an acute or chronic condition. A patient with abdominal pain, acute or chronic, almost always poses a diagnostic challenge for a surgeon. Hospitalizing the patient and performing frequent examinations when they present with atypical signs employ a "wait-and-watch" approach while some are scheduled for elective or emergency exploratory laparotomy. Diagnostic laparoscopy is a worthy alternative to laparotomy which may be even more informative than former with the added advantage of performing multiple therapeutic procedures.

Diagnostic laparoscopy is a minimally invasive surgical procedure that allows the visual examination of intra-abdominal organs in order to detect pathology.

Diagnostic laparoscopy has been embraced by the surgeon for the diagnosis of a wide range of abdominal diseases and the application of laparoscopic technique for the treatment of many of these diseases have accelerated its use as a diagnostic tool. In the present study, the average age was 30.83 years (range 11-59 years) which was comparable with the other study by Al-Bareeq et al having average age 31 years (16-62 years).[6] The sex ratio in present study was Female: Male 2.75:1 which was comparable to that of Easter et al and Lavonius et al.[7,8]

The primary site of pain/tenderness in present study was right iliac fossa (60%) followed by umbilicus (20%) and hypogastrium (15%) which was comparable to the series of the study conducted by Klingensmith et al who reported the reproducible tenderness to be close to 50%.[9]

History of previous surgery

A history of previous surgery was present in 23% of the cases in the present study (all patients were female). The history of previous surgery should be a relative contraindication to laparoscopic examination and that laparoscopy in patients with multiple previous abdominal operations is not entirely safe.

With the advent of open technique for creation of pneumoperitoneum this no longer holds true.[9,10] Diagnostic laparoscopy should be performed in patients who have chronic abdominal pain, especially if they have had previous surgery or pelvic inflammatory disease because a laparotomy causes formation of newer adhesions while laparoscopy is associated with a low frequency of post-operative adhesion formation.[8]

Findings in diagnostic laparoscopy

In the present study, the most common finding based on gross morphology during laparoscopy was appendicitis (chronic) seen in 32 patients (53.3%), followed by PID in 8 cases. In study by Onders et al, appendicular pathology was found in only 16% cases while in study by Al-Bareeq et al, it was 73%. [11,6]

Intra peritoneal adhesions were present in 18 cases (30%) while in the study of Arya et al, it was in 8% cases only. Adhesions are common source of pain especially in the patients who have undergone some elective abdominal procedure in the past.

One of the major benefits of diagnostic laparoscopy is that we can, not only accurately pin point sites of adhesions but also perform adhesiolysis in the same operative session thus relieving the patient of adhesion induced pain in a majority of circumstances.[12] Diagnostic laparoscopy facilitates the retrieval of histopathologic specimen without sacrificing on the patient comfort and cosmetic issues.

In the present series, the final outcome based on histopathology ha not deviated much for the gross diagnoses made during surgery mainly due to the panoramic view, brilliant illumination and extensive examination of the abdominal cavity done during diagnostic laparoscopy.

Establishment of accurate diagnosis by laparoscopy in chronic abdominal pain

Establishment of accurate diagnosis was achieved in 98.3%of the cases in our study. In previous years, diagnostic accuracy by laparoscopy was only 47% while in the current years diagnostic accuracy has raised to 99 - 100%. [7,6,11,13] Hence it may be considered a useful tool in the diagnosis of undiagnosed pain abdomen.

Laparotomy avoided

In our study using laparoscopy 58 cases (96.6%) were saved from undergoing laparotomy. similar results were observed by Schrenk et al (94%) and Onders et al (100%).[14,11]

Complications of diagnostic laparoscopy

In our study, minor complications were observed in 1 case (1.6%). In other studies, also, complication rate was found to be quite low as in the study by Udwadia (0.09%). [15]

The low incidence of complications during laparoscopy can be explained on the basis of the availability of better instruments, for example, the use of Hasson's cannula for creation of pneumoperitoneum by open technique in patients with previous history of abdominal surgery, and due to availability of a better expertise and training to the laparoscopic surgeon. [16]

So, it may be concluded that diagnostic laparoscopy is a very useful tool to establish diagnosis in patients with undiagnosed abdominal pain with the following benefits:

- Superior diagnostic ability
- Better visualization of the abdominal cavity including the paracolic gutters and the pelvis.
- Able to pin point the sites of adhesions with adhesiolysis during the same procedure.
- Retrieval of specimen for histopathological examination.
- Management of the pathology during the same procedure.
- Avoiding unnecessary laparotomy.
- Low complication rate.

CONCLUSION

Laparoscopy is an efficient tool in the armamentarium of the surgeon to diagnose the patients of undiagnosed pain abdomen with numerous benefits and minimal complications.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sharma A, Sethi D, Sethi A. Laparoscopy: a tool for undiagnosed pain abdomen. Int Surg J 2018;5:3350-5.