

ORIGINAL RESEARCH

THE IMPACT OF ELECTIVE DIAGNOSTIC LAPAROSCOPY IN DIAGNOSING CHRONIC ABDOMINAL PAIN

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ABSTRACT

Background: Chronic abdominal pain is defined as a condition in which the patient complains of a long term persisting pain that lasts for several months (>6 months) since the irritation of pain. Chronic abdominal pain has a variety of causes which requires prompt treatment, but all of them do not require exploration. Chronic Abdominal Pain (CAP) is a common complaint of patients seeking a primary care physician, it is a leading reason for referral to a gastroenterologist and the 4th frequent chronic pain syndrome in the general population, it represent about 13% of all surgical admissions. **Aims and Objectives:** We aim to evaluate the diagnostic and therapeutic efficacy of laparoscopy in the management of such patients in this prospective study.

Materials and Methods: Thirty five patients with chronic pain abdomen were included in this study. The pain in all these patients was either of unclear etiology or not responding to the treatment given after clinical assessment and lasting for more than 3 months duration. Pain of shorter duration and patients less than 14 years of age were excluded from the study. All patients were subjected to diagnostic laparoscopy and procedure. The results were tabulated and analyzed.

Results: Females were more affected by this condition and the most common site of pain being the peri-umbilical region. A definitive diagnosis was made per operatively in 29 patients (82.85%) while in the remaining 6 (17.14%), no obvious pathology was detected. The most common findings in our study was post-operative adhesions (40%), followed by recurrent appendicitis (1%), Carcinoma (7.5%), Mesenteric lymphadenopathy and Tuberculosis (2.5% each). Pain assessment done at 1 month follow up showed pain relief in 85.7% and 3 month follow up showed pain relief in 70% of patients.

Conclusion: Post operative adhesions form a majority of cause for causing chronic pain abdomen. Diagnostic laparoscopy is a safe and effective modality for the diagnostic and therapeutic management of such patients.

Keywords: Diagnostic laparoscopy, chronic pain abdomen, post operative adhesions, diagnostic efficacy.

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INTRODUCTION

Pain is derived from the Latin word “Poena,” which means penalty or punishment. Chronic abdominal pain is defined as a condition in which the patient complains of a long term persisting pain that lasts for several months (>6 months) since the irritation of pain.¹ Chronic abdominal pain has a variety of causes which requires prompt treatment, but all of them do not require exploration. Chronic Abdominal Pain (CAP) is a common complaint of patients seeking a primary care physician, it is a leading reason for referral to a gastroenterologist and the 4th frequent chronic pain syndrome in the general population, it represent about 13% of all surgical admissions.² Patients with chronic abdominal pain are amongst the most difficult to manage. Potentially it can be unrewarding for both the patient and the treating physician. Chronic abdominal pain is a difficult complaint.³ It leads to evident suffering and disability, both physically and psychologically. Chronic abdominal pain is associated with poor quality of life.² Studies conducted with large community samples or hospital populations imply chronic abdominal pain is a pervasive problem. Most patients in this group would have already undergone many diagnostic procedures. More than 40% of the patients presenting with chronic abdominal pain have no specific etiological diagnosis at the end of their diagnostic workup^{3,4,5,6}. These searches for pathology often include such procedures as upper and lower gastrointestinal endoscopies, computerized tomography and screening for undetected carcinoma.

Exploratory laparotomy has several disadvantages apart from chances of negative laparotomy. It has an abdominal incision which makes the patients less ambulatory due to pain, also it causes respiratory discomfort. It increases chances of wound infection, paralytic ileus. As a solution to these problems diagnostic laparoscopy has become very much popular now a days. Laparoscopy is derived from the Greek word “lapara” meaning flank or loin and “skopein” meaning to see, view and examine. Diagnostic Laparoscopy (DL) is minimally invasive surgery for diagnosis of intra-abdominal diseases. The procedure enables direct inspection of large surface areas of intra-abdominal organs, facilitates biopsies and obtaining cultures and aspirates, allows the use of laparoscopic ultrasound and makes therapeutic intervention possible. DL has become an integral part of general surgical procedures with recent advancements in laparoscopic technology. It minimizes surgical trauma in chronically ill patients with chronic abdominal disorders resulting in a better outcome and making short stay possible.

Diagnostic laparoscopy is an important tool in final minimally invasive exploration for patients with chronic abdominal disorders, the diagnosis of which remains uncertain despite employing the requisite laboratory and non-invasive imaging investigations. Diagnostic laparoscopy can be used to evaluate several types of liver diseases including discrete masses, diffuse diseases, unexplained portal hypertension, abdominal tuberculosis, congenital anomalies, non-palpable testis, various types of malignancies etc. Diagnostic laparoscopy is absolutely contraindicated in coagulation defects, bleeding disorders, major cardiac and respiratory disorders.

When the limits of reasonable non invasive testing are reached in an individual patient's illness, which is likely to occur without the extensive testing practiced today, the surgeon is often consulted. A high chance of a non therapeutic abdominal exploration naturally results. Clearly diagnostic laparoscopy is an important intermediate option between refusing to explore a patient's abdomen and performing a laparotomy.

Aims and Objectives

To study the efficacy of diagnostic laparoscopy in identifying the etiology of undiagnosed chronic abdominal pain.

MATERIALS & METHODS

The study group consisted of 40 patients admitted to the surgical wards of with pain abdomen of 3 months duration or more between December 2019 to June 2021. A detailed history was taken from each of the patient as per the proforma designed before the commencement of the study. The clinical examination findings were also recorded in the proforma. The results werethen tabulated.

The recorded data included particulars of the patient, duration of illness, site of abdominal pain, other associated symptoms such as vomiting or fever or white discharge per vagina, past history of surgical explorations, co morbid conditions, investigations. Subsequently the intra operative findings, therapeutic/ diagnostic intervention done, correlation of the intra operative findings with the histopathology report, complications during the intra and post operative period and the relief from the pain were recorded and analysed.

As a part of the work up of a patient the following investigations were done routinely: Hemoglobin estimation, Bleeding time, Clotting time Random blood sugar, Total leucocyte count and differential count, Serum electrolytes, Blood urea, Serum creatinine, Urine for albumin, sugar and microscopic examination, Electrocardiogram, Ultrasonogram abdomen and Chest X Ray.

The other investigations listed below were done as and when indicated Blood: Erythrocyte Sedimentation Rate, Fasting blood sugar and post prandial blood sugar. Imaging: Erect X Ray abdomen Barium studies, Esophago gastro duodenoscopy, Colonoscopy, Computerised tomograph of the abdomen, Written informed consent was taken prior to all the procedures.

Inclusion Criteria:

1. All age groups.
2. Both the sexes.
3. Patients presenting with undiagnosed chronic pain abdomen.
4. Patients who had undergone previous surgeries.

Exclusion Criteria:

1. Patients with acute abdomen.
2. Patients unfit for GA.
3. Patients with bleeding disorders.
4. Patients with severe cardiac and respiratory problems.
5. Patients of gynaecological origin.
6. Patients where laparotomy was clearly required.

Preoperative Preparation

Complete history was taken and thorough physical examination was performed in all the patients giving stress on the duration, site of pain, previous history of any surgery and other related problems. In all patient's routine investigations like haemoglobin, total count, differential count, erythrocyte sedimentation rate, bleeding time, clotting time, blood sugar, blood urea, serum creatinine, sodium, potassium, urine routine and microscopy, chest X-ray, electrocardiogram and ultrasonography was done. Liverfunction tests, blood grouping and prothrombin time was done in selected cases. CT and MRI was done in selected cases. Physicians and gynaecologists opinion was taken if needed. Informed risk consent was taken

from the patient and their relatives after explaining the procedure, the risk and its complications.

All surgeries were carried out under general anaesthesia. All patients had a Ryle's tube inserted and bladder catheterized prior to anaesthesia. Pneumoperitoneum was created using Hasson's technique. A 10mm umbilical camera port was inserted and two lateral 5mm ports depending on the organ of interest and the suspected pathology.

The sites of port insertion varied depending on the presence or absence of previous abdominal surgery scars. Diagnostic laparoscopy of the abdomen was carried out carefully inspecting the entire visceral contents of the abdomen for any pathology. Starting from the liver, the gall bladder, anterior surface of the stomach, large intestine, entire length of small intestine with particular emphasis on appendix and terminal ileum, anterior surfaces of the retroperitoneal organs, uterus, fallopian tubes and ovaries and peritoneal surface. Adhesions between the bowel loops or to the anterior abdominal wall was also looked for. The surgical procedure carried out were depending on the intra operative findings and as per indications which ranged from biopsy from suspicious lesions to adhesiolysis to appendectomy. All the ports were closed using absorbable suture materials at the end of the procedure.

RESULTS

Age Distribution:

Table 1: Age distribution of patients presenting with chronic pain abdomen

Age(in Years)	No. of Patients	Percentage(%)
15-30	18	45%
31-40	5	12.5%
41-50	8	20%
51-60	2	5%
61-70	1	2.5%
Total	40	100

Our study of 40 patients with chronic pain abdomen showed a peak incidence of chronic pain abdomen in the third decade. The youngest patient in our study was 15 years and the oldest patient being 70 years. The mean age of presentation was 38 years.

Sex Distribution:

Table 2: Sex Distribution Of Patients Presenting With Chronic Pain Abdomen

Sex	No. of cases	Percentage (%)
Male	15	37.5%
Female	25	62.5%

Table 3: Duration of pain before laparoscopy

Duration of pain(months)	No. of patients	Percentage (%)
3-12	14	35%
12-18	4	10%
18-36	20	50%
>36	2	5%

Graph 3: Duration Of Pain Before Diagnostic Laparoscopy 50% of the patients in our study gave a history of pain abdomen of duration between 18 to 36 months.

Table 4: Location of Pain

Region of pain	No. of Patients	Percentage (%)
Upper abdomen	8	20%
Peri umbilical	15	37.5%
Lower abdomen	5	12.5%
Diffuse abdomen	12	30%

The majority of the patients in our study of 40 patients presented with peri-umbilical region pain. It was followed closely by diffuse pain abdomen.

Table 5: History of Previous Abdominal Surgeries

History of surgery	No. of cases	Percentage (%)
Present	28	70%
Absent	12	30%

Around 28(70%) of patients in our study had undergone a previous surgery compared to 12 (30%) of them without any history of abdominal surgeries. Most of the patients had a previous history of tubectomy and subsequent adhesions.

Table 6: Findings at laparoscopy and intervention done

Diagnosis	Procedure	No. of Patients	Percentage (%)
Post operative adhesions	Adhesiolysis	16	40%
Normal Study	No intervention	7	17.5%
Recurrent Appendicitis	Appendectomy	6	15%
Chronic Cholecystitis	Cholecystectomy	3	7.5%
Carcinoma	Biopsy	3	7.5%
Mesenteric Lymphadenopathy	Biopsy	1	2.5%
Tuberculosis (Strictures)	Resection Anastomosis with Cat1 ATT	1	2.5%

In our study of 40 patients, the most common finding was post operative adhesions, in 40 % of patients. Most of the patients in this group were females and had a past history of abdominal surgery, tubectomy in most cases. Adhesiolysis was done in all these patients. The next most common finding at laparoscopy in our study was a normal study (17.5%). These patients were just observed and followed up.

Recurrent appendicitis was our per operative diagnosis in 15% of our patients. The appendices felt firm to palpate per operatively. Appendectomy was done in such patients. Subsequent histopathological examination confirmed our diagnosis in most of these cases. One of the patient in this group had adhesions between the appendix and the lateral abdominal wall. Adhesiolysis and appendectomy was done. HPE turned out to be chronic inflammation in the appendix and hence included in this group for statistical analysis. We did laparoscopic cholecystectomy for 3 of our patients. HPE confirmed our findings in this group of patients.

3 patients were diagnosed with carcinoma per operatively. One of them being Carcinoma pancreas and the other had peritoneal deposits whose biopsy turned out to be Adeno Carcinoma. Mesenteric lymph node biopsy was done in 1 patient.

Diagnosis of tubercular strictures was made in 1 patient. This patient underwent resection and anastomosis of the long segment stricture and stricturoplasty for another short segment stricture by open method. Post operatively, he was started on anti tubercular drugs and the patient followed up. Histopathological examination confirmed tuberculosis.

Morbidity: In most of our cases there was no post operative complications except in three patients who developed surgical site infection which was managed conservatively by appropriate antibiotic cover and alternate day wound dressing. No mortality was encountered in our study group.

Duration of hospital stay: Post operative hospital stay ranged from 4 to 11 days with a mean duration of stay of 6.2 days.

Duration of procedure: The average length of the operative time was 70 minutes and two patients required conversion to an open procedure. Both the cases were converted due to technical difficulties.

Follow up: During the follow up period, all patients were re-evaluated for pain. The patients were reviewed at one month and three months post operatively. Subjective assessment of pain was done during the follow up and positive outcome (less pain or disappearance of pain) was noted and negative outcome (persistence of pain or worsening pain) was also noted. 5 patients were lost to follow up at the three-month time frame.

Table 7: Post Operative Pain Relief

Duration (in months)	Positive Outcome (%)	Negative Outcome(%)
At 1	86.2	14.4
At 3	70	30

DISCUSSION

Chronic abdominal pain is a common problem dealt not only by the general surgeon but by all practicing physicians. Even after extensive non-invasive work up of such patients, the exact cause of pain abdomen is seldom known.

Though first laparoscopy in dog was done in 1901 by George Kelling and in humans in 1910 by Jacobsus, surgeons have been slowly adopting laparoscopy as a diagnostic modality. The growing experience with therapeutic laparoscopy has resulted in development of diagnostic laparoscopy. In cases of diagnostic uncertainty or ambiguities in radiological tests laparoscopy may exclude or confirm a pathological finding or diagnosis. It can also help a surgeon to plan appropriate treatment modality and also avoid unnecessary laparotomies.^[11-13]

Diagnostic laparoscopy makes it possible for the surgeon to directly visualize the contents of the abdominal cavity better than any other investigative modality. The study confirmed that in this difficult patient group, laparoscopy could safely identify abnormal findings and can improve the outcome in a majority of the cases.

In this prospective study 40 patients were considered who were admitted in the surgical ward. All patients had pain abdomen lasting for more than a period of three months.

Age and Sex Incidence: There were 15 males and 25 female patients in the study. The age group of patients in this study ranged from 15 to 69 years with the average age being 35years. Male: Female ratio was 1 :1.9.

In a study involving 34 patients by Klingensmith et al,¹⁵ the majority were women (85%). The average age in their study was 39years (Range 21-75years).

In a study by Karl Miller MD et al,^[15] of 30 patients with chronic right lower quadrant pain, the average age was 27.5 years. In a study by Raymond et al¹⁶ for utility of laparoscopy in

chronic abdominal pain involving 70 patients, the average age was 42 years. In a study by Swank DJ et al,^[17] involving 30 patients, the average age of presentation was 36 years.

All the above studies show that the female sex was more commonly afflicted by chronic pain abdomen and the average age at presentation in our study is comparable with the aforementioned studies.

Pain Duration:

50% of the patients in our study gave a history of pain abdomen of duration between 18 to 36 months. In a study by Raymond et al,^[16] of 70 patients, the duration of pain ranged from 3 months to 5 years. In a study by Swank DJ et al,^[17] involving 30 patients, the duration of pain ranged from 3 to 15 months.

Prior Surgery:

Table 8: Comparison of Past History Of Abdominal Surgeries

Study	No. of patients with Priorsurgery (%)
Swank DJ et al, ^[17]	56.6
Krishnan P et al, ^[18]	22
Present study	70%

Around 28(70%) of patients in our study had undergone a previous surgery compared to 12 (30%) of them without any history of abdominal surgeries.

In a study by Swank DJ et al,^[17] involving 34 patients, most of the patients had previous history of abdominal surgery. In a study by Krishnan P et al,^[18] involving 50 patients, 11 of them had a past history of abdominal surgery.

Laparoscopic Diagnosis:

Post operative adhesions:

Table 9: Comparison of Patients with Adhesions

Study	No. of patients with adhesions (%)
Lavonius M et al, ^[19]	63
Klingensmith et al, ^[14]	56
Present study	51.42

40 % of the patients in our series were found to have intestinal adhesions secondary to a prior abdominal surgery, mostly tubectomy (in 8 patients). Some patients had a past history of appendectomy (in 7), cholecystectomy (in 2), hysterectomy (in 4) and one patient had a prior history of laparotomy for hollow viscus perforation. Adhesiolysis was done as a therapeutic procedure. Lavonius M et al,^[17] in their study of laparoscopy for chronic abdominal pain in 46 patients reported post operative adhesions in 63% of cases. In a study by Klingensmith et al,^[15] involving 34 patients, 56% of them underwent adhesiolysis. In a study by Swank DJ et al,^[17] involving 18 cases, laparoscopic adhesiolysis resulted in a 77.8% cure rate from chronic abdominal pain. In a study by Krishnan P et al,^[19] laparoscopic adhesiolysis resulted in a positive outcome in more than 50% of patients.

Normal Study**Table 10: Comparison of Patients with Normal Study at Laparoscopy**

Study	Normal study (%)
Salky B A et al, ^[20]	24
Lauder TD, ^[21]	10
Vander Velpen et al, ^[22]	23
Klingensmith et al, ^[14]	26
Jonathan M. Sackier, ^[23]	14.2
Present study	17.5

17.5% of patients in our study did not have any pathology detected preoperatively. In a study by Salky B A et al,^[20] involving 265 patients, normal laparoscopic findings were recorded in 24%. In a study by Lauder TD,^[21] involving 50 patients, 10% of them had no identifiable cause detected after laparoscopic examination. In a study by Vander Velpen et al,^[22] a 23% of patients with uncertain diagnosis at the end of the procedure was reported. In a study by Klingensmith et al,^[14] involving 34 patients, 26% of patients needed no operative intervention other than laparoscopic exploration. In a study by Jonathan M. Sackier et al,^[23] involving 70 patients, no abnormality was detected in 14.2 % of cases.

Recurrent Appendicitis:

6 (15%) of patients in our study were diagnosed to have recurrent appendicitis.

Histopathological examination confirmed the diagnosis in 4 of them. One of the specimens was reported normal. This is still justifiable because it makes the diagnosis of appendicitis less likely if the patient complains of similar pain in the future. Laparoscopy is a useful technique for the diagnosis and treatment of abdominal pain even if the appendix is normal on inspection.⁴⁴ In a study by Jonathan M. Sackier et al,^[23] involving 70 patients, appendiceal pathology was detected in 7.14% of cases.

Diagnostic Efficacy of Laparoscopy:**Table 11: Diagnostic Efficacy of Diagnostic Laparoscopy**

Study	No. of patients	Diagnosis achieved (%)
Raymond P et al, ^[16]	70	85.7
Karl Miller et al, ^[15]	59	89.8
Klingensmith et al, ^[14]	34	65
Lauder TD, ^[21]	92	87
Vander Velpen et al, ^[22]	50	90
Klingensmith et al, ^[14]	168	86.3
Jonathan M. Sackier, ^[23]	265	76
Present study	40	82.85

The present study findings correlate well with other published studies. Therapeutic efficacy of diagnostic laparoscopy:

Table 12: Therapeutic Efficacy

Study	No. of patients	Efficacy (%)
Raymond P et al, ^[16]	70	73
Karl Miller et al, ^[15]	59	77.8
Klingensmith et al, ^[14]	34	89.3

Lauder TD, ^[21]	92	94
Vander Velpen et al, ^[22]	50	78
Klingensmith et al, ^[14]	168	70
Jonathan M. Sackier, ^[23]	265	>70
Present study	35	70

Therapeutic efficacy here denotes the percentage of patients who reported a positive outcome (no pain or decrease in pain) at the time of follow up. The efficacy of diagnostic laparoscopy achieved in the present study compares well with other previous studies.

CONCLUSION

Laparoscopy has an effective diagnostic accuracy and therapeutic efficacy in the management of patients who present to us with chronic abdominal pain, especially in whom conventional methods of investigations have failed to elicit a cause for the pain. Laparoscopy is safe, quick and effective modality of investigation for chronic abdominal pain. Diagnostic laparoscopy has a high diagnostic and therapeutic efficacy. Ability to pinpoint a cause for the abdominal pain or exclude a more major cause for pain not only avoids further investigations but also plays a significant role in alleviating the fears in the minds of the patients. Not only does laparoscopy point to a diagnosis, it has the added advantage that therapeutic intervention can be done at the same sitting in most cases thus avoiding another hospitalization or another exploration of the abdomen. Laparoscopy prevents unnecessary laparotomy in a significant number of cases. Diagnostic laparoscopy has a definitive role in the management of patients with chronic pain abdomen and should be an important investigative tool in the armamentarium of all practicing surgeons. Where laparotomies are indicated DL can decide the site of incision. It should be reserved for those situations after non-invasive method fail to make a diagnosis. DL has many advantages of shorter hospital stay, early recovery and good cosmesis. Laparoscopy should be performed as an early investigative procedure in these patients, because "Diagnosis should precede treatment whenever possible" as quoted by Hutchison's Clinical methods.

Acknowledgment

The author is thankful to Department of General Surgery for providing all the facilities to carry out this work.

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