Role of Early Laparoscopy in Diagnosis of Acute Abdominal Pain

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ABSTRACT

Introduction: Emergency admissions due to acute non specific abdominal pain, make up large proportion of overall general surgical workload. Hospitalization followed by active clinical observation, has been the most widely used method earlier, but entails risk of complications to patients eg peritonitis, infertility etc and unnecessary laparotomy. Incorporation of laparoscopy has improved management of emergency admissions, besides providing cost benefits. The study was undertaken to evaluate role of early laparoscopy in management of acute non-specific abdominal pain and to compare early laparoscopy with clinical observation in cases of acute abdominal pain.

Material and Methods: The study was performed in 50 patients admitted with acute non specific abdominal pain with normal baseline investigations. Patients were randomly divided for early laparoscopy (Group I) and clinical observation (Group II). Early laparoscopy was done within 18 hours to establish diagnosis and simultaneous intervention was done, if possible. The clinical observation group was managed with serial investigations, empirical treatment and interventions. Postoperative hospital stay, laparoscopy related complication, hospital re-admission, final diagnosis achieved and response rate were recorded.

Results: The mean age of presentation was 30.5±12.9 years, with M:F ratio of 1:2.1. 62% patients were young adults (20-40 years). The most common presenting symptom were pain, nausea, vomiting. The laparoscopic findings were appendicitis (32%), bands and adhesions (20%) and gynaecological pathology (24%). Group I had less mean radiation exposure ($p<0.01$), less VAS score on days 1,3,5,7 ($p<0.01$), less mean injectable antibiotic requirement ($p<0.01$), injectable analgesic ($p<0.01$) requirement with less NBM status ($p<0.01$) and decreased hospital stay ($p<0.01$). Recurrence rate and readmissions were more in Group II at 3 months (48%), 6 months (16%) and 12 months (8%). Final diagnosis was achieved in 92% cases.

Conclusion: Early laparoscopy is valuable in management of acute non specific abdominal pain. It provides significantly high diagnostic accuracy, permits early patient discharge and minimizes the incidence of unnecessary laparotomy.

Keywords: Early Laparoscopy, Acute Abdominal Pain, Non Specific

INTRODUCTION

Acute abdominal pain represents 1% of hospital admissions and 6% of emergency visits. Though challenging, a careful history-taking, thorough evaluation of symptoms, head-to-toe physical examination and judicious use of laboratory tests can simplify the evaluation of this complaint. However, some cases still remain confusing after all diagnostic tools have been utilized.[1,2]

Acute nonspecific abdominal pain (NSAP), generally defined as acute abdominal pain of less than 7 days duration, for which there is no diagnosis after examination and baseline investigations. It oblige surgeon to decide promptly whether to operate immediately, to treat conservatively, or to observe the patient. It is a significant problem in general surgery and accounts for estimated 13% to 40% of emergency surgical admissions.[3,4]

Despite new diagnostic developments like ultrasonography and computed tomography, sometimes, acute abdominal condition presents a situation, in which surgeon opens abdomen without clear diagnosis. These cases cause burden on hospital and physician. NSAP can be caused by pelvic inflammatory disease (PID), appendicitis, ectopic pregnancy, torsion of adnexa, etc.[1,3]

Hospitalization followed by active clinical observation, traditionally defined as "wait and watch," has been the most widely used method of clinical management of such patients. The predictive value of clinical diagnosis reached by this method, is 68% to 92%. On one hand, this method entails risk of complications eg peritonitis, hemorrhage, or infertility; on other hand, laparotomy might be unnecessarily performed. Computer-aided diagnostic questionnaires, abdominal ultrasound (US), abdominal computed tomography (CT) scan, and early laparoscopy have all been described as potential methods for improving diagnosis.[3]

Laparoscopy is most effective technique for bridging gap between clinical evaluation and major surgical exploration. Advantage in terms of safety, reduced morbidity and mortality, decreased postoperative pain and short hospital stay makes it a valuable diagnostic tool.[5,6]

The overall diagnostic rate is 99% for acute abdominal pain, 70% for chronic pain syndrome, 95% for focal liver disorders, 95% for abdominal masses, 95% for ascites and 80% for retroperitoneal disease. Diagnostic accuracy of laparoscopy in abdominal trauma is 91%, and laparotomy is found unnecessary in 54% of patients. Incorporation of diagnostic laparoscopy along with biopsy, may improve the management

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of vague abdominal pain, by making a definite diagnosis, access for immediate treatment, reducing hospital stay and readmission rates and eventually having cost benefits.[7,8]

The role of early laparoscopy compared with the traditional "wait and watch" policy in the management of NSAP has been recently evaluated by 2 randomized controlled trials (RCTs). This study was undertaken to study the role of laparoscopy in acute abdominal pain in a rural tertiary care institute[3,9,10].

The study was undertaken to evaluate role of early laparoscopy in management of acute non-specific abdominal pain and to compare early laparoscopy with clinical observation in cases of acute abdominal pain

MATERIAL AND METHODS

The present study was carried out in 50 patients of acute abdominal pain at Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala.

The inclusion criteria was all patients, of either sex, with age range of 0-60 years, with acute abdominal pain, in which diagnosis could not be made by routine hematological, biochemical and radiological investigations and who presented to hospital within seven days of onset of symptoms.

The exclusion criteria were patients with acute on chronic abdominal pain, pregnancy, diagnosis of malignancy or chronic disorders, contraindications to pneumoperitoneum eg co-morbid illness like COPD or IHD, blood dyscrasias, severe coagulopathy, patients with features of peritonitis, patients with psychiatric disorder, excessive abdominal distension and in patients where precise diagnosis after baseline investigations was reached.

The general bio-data of patient along with detailed medical history, general and abdominal examination was recorded. The duration of pain and pain severity was determined on day 1,3,5,7 according to "visual analogue scale". (1-4: mild, 5-8: moderate, 9-10: severe).

Baseline haematological, biochemical and radiological evaluation was done at time of admission to rule out any hidden cause of acute abdominal pain.

Chest X ray, X ray abdomen erect and ultrasonography abdomen was done in all patients. The number of times, these tests were required was recorded. CT scan was done in some patients, who had a clinical suspicion of some diagnosis. The estimation of mean radiation dose (mSv) was undertaken considering the following parameters: 0.1 mSv for plain X ray thorax, 2 mSv for plain X ray abdomen, 20 mSv for a CT scan with contrast and 10 mSv for a CT scan without contrast.

All patients with normal findings, fulfilling inclusion criteria were then, randomly arranged into two different groups-

1) Early Laparoscopy Group-I (EDL)
2) Active Clinical Observation Group-II (OBS)

The patient were followed until a definite diagnosis was made or until patients' condition and abdominal pain improved and the patients were discharged.

Group I: Early Laparoscopy (EDL)

The patients underwent surgery within 18 hours of admission. A fully explained well informed consent was taken, for therapeutic intervention with explanation of risk of conversion to open surgery.

The whole abdominal cavity was inspected - liver, gallbladder, anterior surface of stomach, spleen, small bowel from ligament of Treitz to ileocaecal valve, colon, appendix along with uterus, adnexa and pouch of Douglas in females. Special note was made of presence of fluid (amount, colour, site), adhesions or bands (whether dense or flimsy, site, bowel to parietal peritoneum, interbowel, pelvic adhesions, omentum to peritoneum), Thickened appendix with peri-appendiceal adhesions, cholecystitis, dilated bowel loops, adenexitis, endometriosis, PID. Therapeutic interventions were done according to findings.

When no abnormality was identified on laparoscopy, appendectomy was performed on the basis that symptomatic appendicitis is not always evident at macroscopic examination.

Group II: Active Clinical Observation (OBS)

A complete clinical examination was repeated daily, baseline hematologic and biochemical tests were repeated at 24 and 48 hours of admission, and complementary hematologic and/or radiologic investigations were performed on the basis of patient's clinical progress. The number of times, each test was done, was recorded.

In some patients, clinical improvement occurred and symptoms finally disappeared, before a precise diagnosis was reached; in such cases, the asymptomatic patient with normal laboratory tests was discharged undiagnosed.

Whenever a clinical diagnosis was not defined, the appropriate medical or surgical treatment was undertaken. In the presence of persistent or worsening pain at 48 hours from admission, a laparoscopic evaluation or laparotomy was undertaken, even in the absence of diagnosis.

The patients were followed at 3, 6 and 12 months. Any patient who presented with recurrence and readmission, in between were included in nearest follow up. The recurrence group were retreated, either conservatively or surgically, on OPD basis or after admission. The response rate and final diagnosis achieved, was analysed.

STATISTICAL ANALYSIS

The data was entered into a spreadsheet (Excel, Microsoft corp.) and then transferred to statistical software, EPI6 Info for data analysis. Descriptive statistics were used for the analysis.

RESULTS

The overall mean age of presentation was 30.5±12.9 years (males: 27.87±14.7 years, females: 31.76±12.1 years, $p>0.05$). The mean age of presentation in Group I (diagnostic laparoscopy) was 32.4±10.9 years (76% females, 24% males) while in Group II (observation) was 28.7±14.7 years (60% females, 40% males) ($p>0.05$). Majority (62%) of the patients with undiagnosed acute abdominal pain were young adults (20-40 years) with overall female preponderance (68%) [Table-1].

66% presented between 6 - 24 hours from onset of their symptoms, of whom 44% patients presented within 12 hours. Earliest presentation (Less than 6 hours) to the hospital was noted in 20% cases in group I (EDL) whereas 12.0% cases presented very late between (5-7 days) in group II (OBS) ($p \leq 0.01$). Majority (42%) of patients presented with generalized abdominal pain followed by pain around umbilical area (24%) and right iliac fossa pain (14%).

The most common presenting symptom, apart from pain abdomen, was nausea (84%), vomiting (80%). Though 72% patients presented with fever but only 8% cases experienced chills and rigors. Loss of appetite was also a statistically significant symptom (88% EDL vs 44% OBS, $p < 0.01$).

86% patients presented with tachycardia (pulse > 100/ min), while 64% patients presented with hypotension (BP < 90 mm Hg). Abdominal tenderness was present in all patients, with localized tenderness in 58%, severe abdominal distension (6%) and rebound tenderness (48%). None of the patients had guarding or rigidity. Leucocytosis was observed in both groups (11340$\pm$ 2186.89 cells/ mm^3, group I versus 14716$\pm$2377.27 cells/ mm^3, group II).

Apart from initial X Ray, only 12% patients had follow up X Rays (either once, twice or thrice) in group I (EDL) whereas in Group II (OBS) 84% patients required follow up X Rays (either once, twice or thrice), as diagnosis was uncertain and 16% patients even required more than 3 X Rays. Group II (OBS) had more exposure to radiation in terms of repeated serial X Rays, done either to ascertain diagnosis or formulate plan of management ($p<0.01$). [Table-2]

Initial USG abdomen was done in all cases (100%) in both groups. In group I (EDL), only 12% cases needed follow up USG abdomen (once, twice or thrice) whereas in group II (OBS) all cases (100%) were subjected to follow up ultrasound abdomen (>3 times) ($p<0.01$) [Table-3].

Only 40% patients required CT Scan prior to laparoscopy, for confirmation of diagnosis in group I (EDL). In 60% cases, the need for CT scan was not felt, due to availability of laparoscopy. In contrast, in group II (OBS), all patients (100%) underwent CT Scan ($p<0.01$), indicating increased cost and increased radiation exposure suffered by (OBS) group. [Table-2]

Visual Analogue Score was applied to quantify pain of patients in both group I (EDL) and group II (OBS). The mean pain score was maximum on day 1 in both groups, with

Age Group	Group I (EDL) N=25 (%)		Group II (OBS) N=25 (%)		N=50 (%)
	Male	Female	Male	Female	
0-10yrs	0(0.0)	0(0.0)	1(2.0)	1(2.0)	2 (4.0)
11-20yrs	2(4.0)	1(2.0)	2(4.0)	2(4.0)	7 (14.0)
21-30yrs	2(4.0)	7(14.0)	4(8.0)	8(16.0)	21 (42.0)
31-40yrs	1(2.0)	7(14.0)	1(2.0)	1(2.0)	10 (20.0)
41-50yrs	1(2.0)	2(4.0)	1(2.0)	1(2.0)	5 (10.0)
51-60yrs	0(0.0)	2(4.0)	1(2.0)	2(4.0)	5 (10.0)
Total	6(12.0)	19(38.0)	10(20.0)	15(30.0)	50 (100)

Table-1: Age and Sex distribution among the patients in Group I (EDL) and Group II (OBS)

Parameters	Variables	Group I (EDL) Total= 25 (%)	Group II (OBS) Total = 25 (%)
X ray Abdomen	Initial X ray	22 (88.0)	0 (0.0)
	1-3 X ray	3 (12.0)	21 (84.0)
	>3 X ray	0 (0.0)	4 (16.0)
USG Frequency	1	22 (88%)	0 (0%)
	1-3 time	3 (12%)	0 (0%)
	>3 time	0 (0%)	25 (100%)
USG Finding	Absent	11 (44%)	25 (100%)
	Organomegally	0 (0%)	0 (0%)
	Free Fluid	5 (20%)	0 (0%)
	Lymphadenopathy	4 (16%)	0 (0%)
	Dilated Gut Loops	5 (20%)	0 (0%)
	Lump	0 (0%)	0 (0%)
CT Abdomen		10 (40%)	25 (100%)

Table-2: Radiological assessment – X Ray chest, abdomen and USG abdomen

Group	Group I (EDL)		Group II (OBS)		t value	df	p value
	Mean	SD	Mean	SD			
Day1	4.96	0.73	8.96	0.68	-20.0	48	0.00**
Day3	2.92	0.76	5.00	0.76	-9.66	48	0.00**
Day5	1.44	0.65	5.92	0.70	-23.40	48	0.00**
Day7	0.36	0.49	2.84	0.75	-13.89	48	0.00**

Table-3: Assessment of pain - Visual Analogue Score (VAS) among patients of Group I (EDL) and Group II (OBS)

Group I (EDL) suffering less pain as compared to Group II (OBS), on day 1 (4.96 ± 0.73, EDL vs 8.96 ± 0.68, OBS). On day 7, "EDL" group had mean pain score of (0.36 ± 0.49), far less than, mean pain score of "OBS" group (2.84 ± 0.75), ($p<0.01$). [Table-3]

Blood/ colloid Transfusion was needed in 36% patients in group I (EDL) as compared to nil in Group II (OBS). The mean period when early diagnostic laparoscopy was performed after admission was 11.28 ± 4.35 hours and mean duration of early laparoscopy was noted as 46.76 ± 29.74 minutes.

EDL was 100% effective in detecting pathology. The most common pathology detected was appendicitis (32%) followed by adhesion bands with no previous surgery (20%). Torsion of ovary (12%) and PID (8%) were other common pathologies. 2 patients had normal laparoscopy and was labeled as having non specific abdominal pain. Amongst the least common pathologies were intussusception, hemorrhagic ovarian cyst, meckel's diverticulum, partial intestinal obstruction and post cholecystectomy syndrome detected in 1 patient each. [Table-4]

In early laparoscopic group, therapeutic interventions included appendectomy (32%) (28% laparoscopic, 4% open), band adhesionolysis (20%), oopherectomy for torsion of ovary (12%), fluid aspiration, biopsy and methrogyl flush for PID (8%), wedge resection and anastamosis for meckel's diverticulum (8%), excision of residual GB stump (4%), multiple puncture for ovarian cyst (4%) and enterotomy for phytobezoar (4%). [Table-4]

Group I (EDL) patients received less injectable antibiotic (mean period 3.48±1.50 days) in contrast to group II (OBS) (mean period 5.12± 1.72 days, $p<0.001$) and less injectable analgesics (mean period: 3.32±3.04 days, group I vs 6.08± 3.12, group II), ($p<0.001$). Enteral feeding was started early in group I (EDL) patients as compared to group II (OBS) (NBM status: 36.24 ± 47.22 hours, group I vs 90.76 ± 54.54 hours, group II, $p<0.001$). Prolonged hospital stay was seen in group II (OBS) as compared to group I (EDL) (7.68 ± 3.35 days, group II vs 4.52 ± 3.10 group I, $p<0.001$) [Table-5]

Group I patients with early laparoscopic intervention suffered some complications at the cost of their early diagnosis and treatment of abdominal pain, of which scar pain occurred most commonly in 16% followed by bleeding (8%) and wound infection (4%).

The recurrence of symptoms was more in group II (OBS) at 3 months, 6 months and 12 months. Maximum recurrence

Pathology	Group I (EDL) N (%)	Intervention Performed	Group I (EDL) N (%)
Appendecitis	8(32.0)	Appendectomy	8(32.0)
Post Cholecystectomy Syndrome	1(4.0)	Excision of residual GB stump	1(4.0)
Partial Intestinal Obstruction	1(4.0)	Enterotomy	1(4.0)
Meckels Diverticulum	1(4.0)	Resection and Anastomosis	1(4.0)
Ovarian Cyst	1(4.0)	Multiple Puncture	1(4.0)
Torsion of Ovary	3(12.0)	Oopherectomy	3(12.0)
PID	2(8.0)	Biopsy with metrogyl flush	2(8.0)
NSAP	2(8.0)	Normal Laparoscopy	2(8.0)
Band with no previous surgery	5(20.0)	Division of Band	5(20.0)
Intussusception	1(4.0)	Resection and Anastomosis	1(4.0)

Table-4: Pathology detected on EDL in Group I

Group	Group I (EDL)		Group II (OBS)		t value	df	p value
	Mean	SD	Mean	SD			
Injectable Antibiotic (in days)	3.48	1.50	5.12	1.72	-3.59	48	0.00**
Injectable Analgesic (in days)	3.32	3.04	6.08	3.12	-3.17	48	0.00**
NBM Status (in hours)	36.24	47.22	90.76	54.54	-3.78	48	0.00**
Hospital Stay (in days)	4.52	3.10	7.68	3.35	-3.46	48	0.00**

Table-5: Treatment offered in Group I (EDL) and Group II (OBS)

Variable		Group I (EDL)	Group II(OBS)	Chi-Square value	p value
Final diagnosis achieved		23 (92%)	6 (24%)	9.97	0.00**
Radiation exposure		Less	More		
Recurrence	3 months (%)	01 (4%)	12 (48%)	1.48	0.48
	6 months(%)	01 (4%)	04 (16%)		
	12 months(%)	01 (4%)	02 (8%)		
Readmission	3 months (%)	00 (0%)	08 (32%)	2.14	0.34
	6 months(%)	01 (4%)	04 (16%)		
	12 months(%)	00 (0%)	00 (0%)		
Response to Treatment		22(88.0)	13(52.0)	7.71	0.00**

Table-6: Response to treatment in patients in Group I (EDL) and Group II (OBS)

(48%) was noticed within 3 months followed by 16% patients in 6 months and 8% within 1 year whereas the recurrence of 4% patient each, was evident in group I (EDL). Readmission was frequent in group II (OBS). 32% readmissions were noted within 3 months followed by 16% readmission within 6 months whereas only 4% patients were readmitted within 6 months in group I (EDL). [Table-6]

92% in Group I (EDL) achieved final diagnosis as compared to 24% in Group II (OBS) ($p<0.01$). 88% patients responded to treatment in Group I (EDL) as compared to 52% patients in Group II (OBS) ($p<0.01$) [Table-6]

DISCUSSION

Vague abdominal pain is a diagnostic dilemma. The abdominal disease is obscure and patients usually undergo exploratory laparotomy for definitive diagnosis. A delay in surgical intervention may increase morbidity and prolong hospital stay.[4-6,11]

Diagnostic laparoscopy is useful for making a definitive clinical diagnosis whenever there is a diagnostic dilemma. Laparoscopy reveals either no abnormality or discovers a disease requiring no surgery for proper management, thus avoiding an unnecessary burden of non-therapeutic laparotomies.[12-14]

Laparoscopy is particularly useful in women of childbearing age in whom tubo-ovarian abnormality simulates acute appendicitis. Without laparoscopy, the overall rate of unnecessary appendectomy is high (women 39%; men 15%). Bitter complaints of persistent symptoms and resistance to discharge from hospital without a 'diagnosis' are typical features of many patients with NSAP. These features, combined with a natural desire in surgeon to ensure that nothing serious is overlooked, contribute to excessive hospital stay in this group of patients.[15-19]

Acute nonspecific abdominal pain affected mostly the young, productive age group of society (mean 31 years, 20 – 40 years) and any undiagnosed disease process involving this age group can have social and financial constraints on dependant members of the family. The mean age of presentation in present study was 30.5±12.9 years. Similar results were observed by Yehia MA et al[20] and Al – Bareeq R et al[21] (mean 31.3 years; 13 - 62 years and 31 years; 16 – 62 years respectively).

A higher female preponderance was observed in present study (M:F = 1:2.13) and studies by Valpen GCV et al[4], Yehia MA et al[20] and Ilce Z et al[22] (1:2.5, 1:2.07 and 1:2.5 respectively). Acute nonspecific abdominal pain affected mostly females, indicating the extra participation of female reproductive pelvic organs in producing undiagnosed pain.

Most patients presented with generalized abdominal pain (42%), umbilical pain (24%) and right iliac fossa pain (14%), while Ali SAS et al[23] and Valpen GCV et al[4] reported higher incidence of right lower quadrant pain (33.3% and 87.5% respectively). Patient initially presenting with referred pain to umbilical region may not later have right lower quadrant pain if timely intervention and antibiotics are given which may be a possible explanation for the above discordance.

Nausea, vomiting, fever and loss of appetite are commonly associated symptoms in acute nonspecific abdominal pain and needs symptomatic treatment, till definitive diagnosis is reached. Yehia MA et al[20] observed nausea and vomiting in 55% patients, while Al-Bareeq R et al[21] observed loss of appetite (48%) as second most common symptom after pain along with vomiting (34%) and fever (11%). Localized tenderness (58%) and rebound tenderness (48%) are some of the localizing signs, though not always present, which helps in clinical diagnosis and helps to judge the progress of patients and also determines early need of surgical intervention.

Laparoscopy as a diagnostic aid has an added advantage of no radiation exposure along with decreased cost. Group I (EDL) had less follow up X Rays (either once, twice or thrice) as compared to Group II (OBS) (12% vs 84%, $p<0.01$) and less CT exposure (40% group I vs 100% group II, $p<0.01$). Repeat USG abdomen (once, twice or thrice) was also less in group I (EDL) (12%, EDL vs 100% OBS, $p<0.001$). Morino M et al[3] (2006) also concluded that less mean radiation exposure in LAP group (1.1 ± 1 mSv vs 2.2 ± 5.1 mSv). Repeated X ray, USG and CECT was done more in group II (OBS) either to ascertain diagnosis or formulate plan of management

Injectable analgesics were required more in case of OBS group (6.08 ± 3.12 days vs 3.32 ± 3.04 days, $p<0.001$) as they suffered more pain due to lack of diagnosis and definitive management which is also evident by the increased VAS score on days 1, 3, 5, 7, though Morino M et al[3] concluded same amount of analgesics requirement in either group, which may vary as per case selection and pain threshold of the concerned population. EDL group enjoyed early enteral feed without pain (NBM status: 36.24 ± 47.22 hours, group I vs 90.76 ± 54.54 hours, group II, $p<0.001$).

Appendicitis (32%) was the most common pathology detected in present study. The same is substantiated by Valpen GCV et al[4] (32.5%), Al-Bareeq R et al[21] (73%), Yehia MA et al[20] (40%). Band adhesions (20%) were next common and has been reported by Yehia MA[20] et al (7.5%) and Ali SAS et al[23] (13.3%). Tubo-ovarian pathology (12%) and PID (8%) were other common pathology and same has been reported by Valpen GCV et al[4], Morino M et al[3], Al-Bareeq R et al[21], Yehia MA et al[20] (22.5%,5%; 11.53%, 21.2%; 10%,14%; 25%,0% respectively). It is seen that the common pathologies detected in undiagnosed acute abdominal pain are appendicitis (mostly retrocaecal, not detected on USG), adhesions and bands causing partial intestinal obstruction and tubo-ovarian pathology. These pathologies should be particularly kept in mind in cases of acute abdominal pain with negative radiological investigations as they remain hidden even after thorough search for diagnosis.

Early diagnostic laparoscopy didn't always reveal a pathology and these cases were then labeled as having " non specific abdominal pain" (4% in present study). Valpen GCV et al[4], Morino M et al[3], Yehia MA et al[20] and Ali SAS et al[23] also reported cases of normal laparoscopy in their series (15%, 37.5%,5% and 6.6% respectively)

The more early the diagnostic laparoscopy procedure was undertaken, the more early was the patient intervened with subsequent early recovery and decreased morbidity in hospital. EDL was performed, in present study, within mean period of 11.28 ± 4.35 hours after admission. Talaat A et al[15] and Morino M et al[3] also reported time range of EDL as 2 – 39 hour (median 9 hours) and 3 – 12 hours (mean 7.5 hours) respectively after admission.

Group II (OBS) patients showed longer hospital stay (7.68 ± 3.35 days vs 4.52 ± 3.10 days). Similar results were recorded by Morino M et al[3] (3.7 ± 0.8 days, EDL vs 4.7± 2.4 days, OBS). The duration of hospital stay was dependant on the intervention performed in diagnostic laparoscopy group, the conversion rate and satisfaction and pain relief of patient.

92% patients in Group I (EDL) achieved final diagnosis as compared to 24% patients in Group II (OBS) ($p<0.01$). Valpen GCV et al[4], Al-Bareeq R et al[21], Yehia MA et al[20], Ali SAS et al[23] and Teamma MS et al[24] also observed final diagnosis achievement in 100%, 98%, 92.5%, 93.3% and 98.5% respectively in early laparoscopy group.

Patients undergoing early laparoscopic intervention suffered some complications at the cost of early diagnosis and treatment. Wound infection was the most common complication post operatively in all other series [Talaat A et al[15] (2%), Morino M et al[3] (3.7%) and Teamma MS et al[24] (6.6%)], but not in our series (4%), suggesting better wound care and intraoperative and postoperative sterilization protocols.

Recurrence of symptoms and readmissions was more in group II (OBS) at 3 months, 6 months and 12 months due to lack of definitive diagnosis and failure of applied treatment protocols as compared to group I (EDL). Morino M et al[3] also reported low recurrent abdominal pain in early diagnostic laparoscopy group (20.8%,3 month; 15.9%,12 months: EDL vs 52.2%,3 months; 25%,12 months: OBS).

CONCLUSION

Acute NSAP affects mostly young, productive age group of society, especially females. Early diagnostic laparoscopy provides better visualization, better cosmesis and less radiation exposure. Short hospital stay, less repeated investigations, decreased antibiotic and analgesic requirements, early oral feed and ambulation forms the basis of overall decreased costs with early diagnostic laparoscopy. Clinical observation (OBS) lead to overall higher cost of treatment and radiation exposure, more antibiotic and analgesic requirement with lack of final diagnosis, and more readmissions, with longer hospital stay. Therefore, early presentation to hospital and early intervention by diagnostic laparoscopy in such cases can prevent further morbidity and mortality, and improve patient's satisfaction and quality of life.

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