

Study of Laparoscopic Adhesiolysis in Post Operative Adhesive Intestinal Obstruction

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A B S T R A C T

Introduction: Postoperative adhesions are a common occurrence and may cause small bowel obstruction requiring a repeat surgery. Adhesive obstruction if not managed properly it may cause small bowel ischemia and potentially lethal complications. Urgent imaging including CT or MRI may diagnose the condition more accurately than conventional X-ray and Ultrasound. Laparoscopic adhesiolysis (if feasible) is associated with less morbidity and early mobilization. In some cases laparoscopic surgeries are needed to be converted to open procedure in the interest of the patient and should in no way be considered as failure.

Material and Methods: We conducted this study prospective study of 40 patients admitted to department of surgery for post operative adhesive intestinal obstruction. Demographic data, history, clinical and intraoperative findings, investigations and complications during hospital stay and during follow up visits were recorded. After the conservative management all patients were posted for laparoscopic adhesiolysis. Perioperatively and postoperatively patients were managed according to standard protocol. Later patients were discharged and followed up at 15 days, 1 month, 3 months and 6 months. None of the patients presented with recurrence. The data was analyzed using SPSS16.0 version software.

Results: This was a prospective study comprising of 40 patients of post-operative adhesive intestinal obstruction carried out in a tertiary care institute. The most common symptom in the studied cases was found to be abdominal pain (100%) followed by vomiting (60%), not passed stool (45%) and abdominal distension (37.5%). In majority of patients emergency surgeries were done in majority of patients (67.5%) whereas elective surgeries were done in 9 (22.5%) patients. The common indications for previous surgeries were perforation peritonitis (40%), acute appendicitis (15%) and obstetrics and gynecological surgeries (15%). Failed laparoscopic surgeries were found to be distinctively associated with wound infections (33.33%).

Conclusion: Laparoscopy adhesiolysis effective and useful mode of treatment in patients with Postoperative adhesive intestinal obstruction following laparoscopic as well as open surgeries.

Keywords: Post Operative Adhesive Intestinal Obstruction, Laparoscopic Adhesiolysis, Laparotomy, Complications.

INTRODUCTION

Postoperative adhesions are one of the common causes of small bowel obstruction (SBO), a potentially lethal surgical emergency and a crucial aspect in management is to differentiate whether there is actual, or impending, small bowel ischemia and therefore a need for emergency surgery.¹ There are no completely accurate imaging or hematological techniques to exclude the requirement for surgery. Modern computerized tomography (CT) has been a significant advance in noninvasive assessment of SBO and may demonstrate the cause of the obstruction and suggest the presence of bowel ischemia. It is important to note that adhesions are not the only cause of SBO in a patient who has had abdominal surgery. Recurrent cancer, an obstructive colon lesion in the presence of an incompetent ileocaecal valve, an occult hernia, small bowel arterial or venous ischemia, amongst others may be the cause and CT may

elucidate some of these causes and help plan management.² Increasing utilization of laparoscopic surgery may reduce the extent and incidence of adhesions. Laparoscopic adhesiolysis, in experienced hands, may be successful in managing acute obstruction or alternatively as a planned procedure when the obstruction has resolved. Adhesive SBO remains a common surgical emergency and there is no substitute for repeated examination by a surgeon, capable of performing a laparotomy, in the optimal management of these complex patients. According to the EAES (European Association of Endoscopic Surgery) recommendations, in case of clinical and radiological evidence of small bowel obstruction not responding to conservative management, laparoscopy may be performed using an open access technique. If adhesions are found at laparoscopy, cautious laparoscopic adhesiolysis can be attempted for release of small bowel obstruction.³ However, laparoscopic adhesiolysis in emergency has not gained wide acceptance because of the limited visualization

of the abdominal cavity secondary to the distended bowel and because of the risk of iatrogenic intestinal injury. The high conversion rate is also an issue.⁴ The best cases for laparoscopic approach are patients with moderate abdominal distension (proximal obstruction), a bowel diameter not exceeding 5 cm, a few adhesions and a limited number of previous scars.⁵ Laparoscopy is feasible, safe and efficient in all forms of intestinal obstruction from early, acute and chronic obstruction. Furthermore, it has a diagnostic role in rare cases of intestinal obstruction like internal herniation, mesenteric vein thrombosis. In almost more than half of cases surgical intervention can be accomplished laparoscopically either completely or hand assisted, which is still minimally invasive and complication are comparable to conventional procedure. The conversion rate is high and should not be considered as failure once it is in the interest of patient's health. Enthusiasm for elective adhesiolysis is often limited by concern about subsequent scar tissue formation following major laparotomy. According to Ellis surgeons must learn to consider adhesions as friends, which occasionally misbehave, and this misbehavior should be corrected. Although the etiology for intra-abdominal scar tissue formation is likely to be multifactorial, the inflammatory response, which is less in laparoscopy than laparotomy, has been considered a cause for subsequent scar tissue formation. Many studies suggest a lower incidence of scar tissue formation following laparoscopic procedures; therefore it is possible that laparoscopic adhesiolysis result in immediate resolution of symptoms attributed to intra-abdominal adhesions. Long-term effectiveness of laparoscopic adhesiolysis remains unknown at time. With special emphasis on laparoscopic adhesiolysis, we had tried to evaluate the role of laparoscopy in the management of post-operative adhesive intestinal obstruction as compared to open technique and to know whether laparoscopy is superior to open surgery in management of these cases considering different parameters.

MATERIAL AND METHODS

This was a Prospective non randomized observational study carried out on patients of post-operative adhesive intestinal obstruction, who have undergone operative intervention by open surgery previously in the form of laparotomy carried out in the department of surgery of a tertiary care medical college situated in an urban area. The study was approved by institutional ethical committee and duration of the study was 2 years. After subjecting the patients to inclusion and exclusion criteria's, 40 patients were included into our study. Informed consent was taken from all the patients. All cases were scrutinized according to pre-determined proforma. Study was planned to determine etio-pathogenesis, age-sex incidence, various clinical and radiological findings, incidence of post-operative adhesions after various surgeries, recurrence of signs and symptoms. Patients were assessed on the basis of nature of previous surgery, whether emergency or elective, indication of previous laparotomy, number of previous episodes of obstruction, general condition and complication if any related to previous surgery. All patients had undergone routine investigations in the form of hemoglobin, blood counts, blood sugar, kidney function tests, blood grouping,

serum electrolytes and radiological investigation like x-ray chest, x-ray abdomen and USG abdomen. During the acute episode, patients were managed with correction of dehydration, nasogastric aspiration and antibiotic therapy. In all patients, correction of dehydration, antibiotic therapy (ciprofloxacin with metronidazole) and naso-gastric aspiration was given priority. During the admission, TPR, B.P and abdominal signs and girth were monitored so as to pick up any complication occurring as early as possible and after relief of obstruction all the 40 patients were subjected to elective laparoscopic adhesiolysis out of which in 12 patients, laparotomy was done in the same sitting, because of reason like presence of meckle's diverticulum, iatrogenic bowel injury, strictures etc, either during same admission or, they were discharged and called electively afterwards.

The surgeries were done by experienced surgeons according to the institutional protocol. Wounds were examined on post-op day 4, 6 and 8 for open cases and on post-op day 4 in cases managed by laparoscopically entirely and the complications were noted. Minor wound infections were managed conservatively, one patient managed by laparoscopy developed faecal fistula and eventually succumbed to death. There were no other post-operative complications in laparoscopy group. There were no complications related to general anesthesia like aspiration pneumonia, or DVT, septicemia etc. Patients were discharged after removal of sutures in non laparoscopy (in open group) on 11th – 12th day and on 5th day (average) in laparoscopy group. There was minimal morbidity in laparoscopy group as compared to open group. Patients were then called for follow-up at 15 days, 1 month, 3 month and 6 months. None of the patients presented with recurrence of the symptoms till date.

Inclusion criteria

1. Patients who were admitted with one or more attacks of post-operative adhesive intestinal obstruction during the study period.
2. Patients who had undergone laparotomy previously for any indication (known or unknown)
3. Patients with history of recurrent post-operative adhesive intestinal obstruction treated previously either conservatively or with surgery.
4. Patients of post-operative adhesive intestinal obstruction, who didn't presented with signs of peritonitis or those who could be conserved.

Exclusion criteria

1. Patients presenting with intestinal obstruction due to other causes eg tuberculosis, malignancy etc.
2. Patients of age less than 12 years
3. Patients in whom signs and symptoms of obstruction didn't got relieved with conservative management and who needed open exploration.
4. Patients who refused to undergo laparoscopic surgery after relief of signs and symptoms.
5. Patients of post-operative adhesive intestinal obstruction, who had signs of peritonitis.
6. Patients who were not fit for general anesthesia due to co-morbidities e.g. cardio-respiratory instability.

RESULTS

This was a prospective study comprising of 40 patients post-operative adhesive intestinal obstruction carried out in a tertiary care institution. Out of these 40 patients 26 (65%) were males and 14 (35%) were females with a M: F ratio of

1: 0.65. The analysis of the age groups of the studied cases showed that the most common affected age group was 31-40 years (37.5%) followed by 41-50 years (22.5%) (table-1). The analysis of predominant symptoms in affected patients showed that the most common symptom which was present in all cases was abdominal pain (100%). The other common symptoms seen in patients were found to be vomiting (60%), constipation (45%) and abdominal distension (37.5%).

Age group (Years)	Male	Female
12-20	2	1
21-30	1	5
31-40	10	5
41-50	7	2
51-60	3	1
>61	3	0
TOTAL	26	14

Table-1: Age distribution of the studied cases

Type of Elective Surgery	No of Patients (n=11)	Percentage
OBGY Surgeries	6	54.55%
Other(APD, Renal Calculus etc)	3	27.27%
Colonic surgeries	2	18.18%

Table-6: Elective Surgeries Causing Post-Operative Adhesive Intestinal Obstruction

Indication of previous surgery	No of patients	Percentage
Perforation peritonitis	16	40%
Acute appendicitis	6	15%
Intestinal obstruction	3	7.5%
OBGY surgeries	6	15%
Abdominal trauma	4	10%
Colonic surgeries	2	5%
Others	1	2.5%
Not known	2	5%
Total	40	100%

Table-2: Indications of previous surgery

Type of emergency surgery	Number of patients (n=33)	Percentage
Appendectomy	6	18.18
Perforation peritonitis	16	48.48
Intestinal obstruction	3	9.09
Abdominal trauma	4	12.12
Details not available	2	6.06

Table-7: Emergency Surgeries Causing Post-Operative Adhesive Intestinal Obstruction

X-Ray abdomen finding	No. of pts.	Percentage
Single air fluid involving small bowel	1	2.5
Multiple air fluid levels	24	60
Dilated small bowel loops	4	10
Within normal limits	11	27.5

Table-3: X-Ray Abdomen (erect) Finding In Selected Cases.

Type of adhesions with associated findings	Number of patients (n=40)	Percentage
Simple adhesions	35	87.5
Adhesions+ meckle's diverticulum	1	2.5
Adhesion + stricture	2	5
Adhesions + chr.appendicitis	2	5

Table-8: Intra-Operative Findings On Laparoscopy

Ultra-sonographic findings	Numbers of patients	Percentage (%)
Mild dilatation of bowel loops	22	55
Gross dilation of bowel loops	4	10
Normal caliber bowel loops	4	10
Problems tenderness in RIF	2	5
Asso. Other anomalies	1	2.5
Within normal limits	7	17.5

Table-4: Ultrasonographic Finding In Selected Case.

Luciano grade of adhesions (lap)	Number of patients (n=40)	Percentage
1	0	0
2	15	37.5
3	11	27.5
4	14	35

Table-9: Frequency Of Various Grade Of Adhesion On Laparoscopy

Complication in post-operative period	Failed lap (n=12)	Percentage	Laparoscopy group (n=28)	Percentages
No complications	5	41.67	24	85.71
Wound infections	4	33.33	2	7.1
Paralytic ileus	3	25	0	0
Faecal fistula	0	-	1	3.5
Death	0	-	1	3.5

Table-5: Complications in postoperative period.

Post operative events	No of days (avg)	
	Post operative events for failed laparoscopy (avg days)	Post-operative events for laparoscopy (avg days)
NBM Period	3	2
RTA	2.5	1.5
Appearance Of Bowel Sounds	2	1.5
Motion Passed On	3.5	2
Hospital Stay	13	4

Table-10: Post operative events laparoscopy and open surgery patients

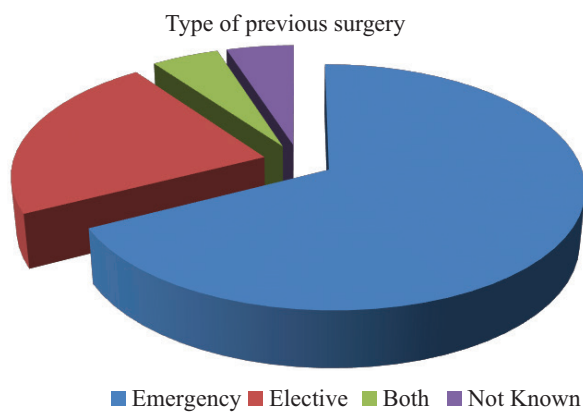


Figure-1: Type of previous surgery in the studied cases.

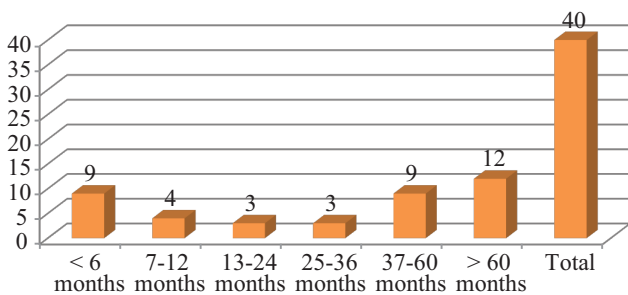


Figure-2: Duration between last laparotomy and start of Signs and symptoms.

In majority of the patients previous surgery was done in emergency (67.5%) while elective surgery was done in 9 (22.5%) patients. 2 patients had h/o emergency as well as elective surgeries in past. 2 patients didn't have a proper past history and hence type of past surgery couldn't be determined in these cases (figure-1).

Most of the patients, who presented to us with post-operating adhesive intestinal obstruction, were predominantly operated previously for some emergency condition (67.5%), followed by elective (22.5%) indications. Two patients were operated previously for both emergency as well as elective conditions (perforation peritonitis with renal calculus). Two patients had undergone laparotomy, of which details were not available contributing 5% each. Out of all emergency surgeries, most of the patients, were operated for perforation peritonitis (40%), followed by acute appendicitis (15%). Amongst the elective surgery, obstetric and gynecological accounted for

the most (15%) (table-2).

Most of the patients operated previously, had the beginning of their signs and symptoms after 5 years (30%). Few patients had their s/s begun within 6 months of surgery (22.5%). This shows that, there is no minimum time limit, after which a patients can present with post-operative adhesive intestinal obstruction (graph-2).

Most of the patients (60%) of post-operative adhesive intestinal obstruction had multiple air-fluid levels in their erect abdominal x-rays, 27.5% patients has their x-ray within normal limits, 10% patients had dilated small bowel loops in their x-ray, and 2.5% has single air-fluid level. This shows that x-ray abdomen (erect) is the most valuable investigation for diagnosis intestinal obstruction, whereas ultrasonography is not of much value, as depicted in next chart (table-3).

Majority (55%) patients had mild dilation of bowel loops in their ultrasonography, 10% had gross dilatation of bowel loops, while 10% had normal caliber of bowel loops with sluggish peristalsis. 17.5% patients had entirely normal ultrasonography, while 5% had probe tenderness in right iliac fossa and 2.5% had associated other anomalies in the form of incisional hernia, which was repaired simultaneously, laparoscopically (table-4).

Rate of post-operative complications was distinctly more in failed laparoscopy group. Infection (33.33% in failed laparoscopy and 10.1% in laparoscopy group) and paralytic ileus. (0% and 25% in laparoscopic and failed laparoscopic respective) were common in failed laparoscopy group. 1 patient had faecal fistula (3.5%) and 1 patient expired in post-operative period due to intra-abdominal sepsis (3.5%) in laparoscopy group, while none were noted in failed laparoscopy group. This shows that laparoscopy if performed cautiously, in selected group of patients can cause minimal post-operative morbidity (table-5).

Most of the patients operated previously under elective condition, had undergone obstetric and gynecological surgeries in the form of caesarean section, hysterectomy or tubectomy (54.55%). This was following by surgeries for the indication like acid peptic disease in which patients had undergone gastro-jejunostomy, and for renal calculus (27.27%). Few patients had undergone colonic surgeries (18.18%) (table-6).

Majority of the patients (48.48%) were operated for perforation peritonitis, which was followed by appendectomy for acute appendicitis (18.18%), 6% patients had details not available with them while abdominal trauma (stab injury or blunt trauma) and intestinal obstruction accounted for 9.09% and 12.12% each. The two cases whose previous type of surgery was not known were included in emergency as well (table-7).

In most of the patients, it was the simple, single adhesion which were causing obstruction (88%), 2 patients had associated stricture (5%) and 2 patient had chronic appendicitis (5%) and meckel's diverticulum (2.5%). Patient with meckle's diverticulum and strictures required open exploration with resection and anastomosis. Appendectomy was done laparoscopically simultaneously with adhesiolysis, in both of the patients (table-8).

Most of the patients were having grade 2 adhesions (37.5%)

which were predominantly lysed by scissor. Few patients had multiple grades of adhesions. Use of cautery was minimized so as to reduce the chance of bowel injury (table-9).

The average period for keeping the patient nil by mouth, RT aspirate, appearance of bowel sounds and motion passed were compared. It was found to be significantly less in laparoscopy group. Finally the analysis of hospital stay showed that the average hospital stay was significantly less in laparoscopy group (4 days) as compared to open group (13 days) (table-10).

DISCUSSION

This was a prospective study, to evaluate the role of laparoscopic adhesiolysis in cases of post-operative intestinal obstruction which did not require immediate exploration, and they could be managed conservatively and could be posted electively for laparoscopic adhesiolysis. Adhesion formation was less after laparoscopic adhesiolysis, since it involves minimal trauma to peritoneum, minimal bowel handling and minimal change in homeostasis of the peritoneal cavity. Simultaneously laparoscopy has the additional advantage of ability to visualize the entire peritoneal cavity, so that any other associated pathology can be detected within the limited time constraint and with high accuracy and managed accordingly.

In this study we found maximum incidence of adhesive intestinal obstruction in 4th decade (31-40 years). Males contributed to almost 65% of the total cases. Such high incidence was also shown by Peter Sykes⁶ (65.38%), Quatromoni⁷ (85.36%), S.Iliyas⁸ (71.73%) and Tanphiphat⁹ (63.32%). However high incidence in females was noted by Beker¹⁰ (54%) and Meagher¹¹ (64.51%).

In our study, incidence of post-operative adhesive intestinal obstruction was seen mostly in the patients undergoing emergency surgeries i.e. 77.5%. These findings were comparable with the findings noted by Quatromoni⁷ (73.17%), S.Iliyas⁸ (71.6%), Tanphiphat⁹ (61.9%) and Meagher¹¹ (75.6%).

Incidence following surgeries for stomach and duodenum accounted for most (42.5%) cases in the present study. Quatromoni⁷ (14.63%), S.Iliyas⁸ (19.57%), Tanphiphat⁹ (16.9%) reported a lower incidence. Incidence following appendectomy was 15% in our study. This was comparable with the finding of Quatromoni⁷ (26.82%), S.Iliyas⁸ (20.09%), Meagher¹¹ (21.21%) and Cox¹² (23.3%). Obstetric and gynecological surgeries were the cases in 15% of our patients. Similar incidences were noted by S.Iliyas⁸ (18.02%), Tanphiphat⁹ (15.4%), Meagher¹¹ (17.18%) and Cox¹² (11.7%). While McCune¹³ (34.3%) and Beker¹⁰ (31.41%) reported much higher incidence after obstetric and gynecological surgeries. Small bowel surgeries including both for intestinal obstruction and abdominal trauma accounted for 17.5% in the present study. McCune¹³ reported a bit higher incidence (30.57%) and Peter Sykes⁶ and Cox¹² reported a lower incidence of 8.68% and 8.3% respectively. Colonic surgeries were the cases in 5% in the present study. This finding was similar to that reported by McCune¹³ (2.85%), Tanphiphat¹⁰ (5.7%), S.Iliyas⁹ (8.7%), while in other series by Peter Sykes⁶ (17.39%), Quatromoni⁷ (26.82%) a higher incidence was

reported. In remaining 5% cases in this study the indication of previous laparotomy was not known due to unavailability of the details and planned surgeries like gastro-jejunostomy for peptic ulcer disease etc. accounted for the remaining 2.5% cases. Intra-abdominal infection in post-operative period of previous surgery was associated with high incidence of multiple adhesions during laparoscopy. This conclusion was shared by Menzies et al¹⁴, Welch J P et al¹⁵ and Ratcliff J P et al¹⁶ in various studies.

In our study, maximum patients presented after 5 years of the previous surgery (30%), while 22.5% presented within 6 months of previous surgery chances of recurrent attack increases after the first attack of obstruction. It was found that there was no co-relation between the duration between last laparotomy and start of signs and symptoms of obstruction, which had a wide range of 15 days (minimum) to 18.5 years (maximum) after first laparotomy. James Shalkow¹⁷ reported that, the onset of obstructive symptoms ranged from 2 days to 10 years. Quatromoni⁷ in his study of 11 patients showed that there were 45.55% cases of simple adhesions, 27.27% had volvulus, 18.18% patients had internal herniation and intussusceptions each. Tanphiphat⁹ observed simple adhesions in 45.77%, volvulus in 11.61% and closed loop obstruction in 1.76% of 284 cases.

In the present study, 28 out of 40 patients (70%) could be managed successfully by laparoscopy entirely. Remaining 12 patients (30%) required conversion to open due to various reasons. Sato et al¹⁸ suggested conversion to open in cases with dense adhesions, which could not be lysed with laparoscopy. 11 patients developed complications post-operatively (27.5%) out of whom 4 (10%) were from laparoscopic group and 7 (17.5%) were from failed laparoscopy group in which laparoscopy had to be converted to open.

Most frequent complication was found to be wound infection i.e. 15% (6 out of 40 patients of which 2 was from laparoscopy group and remaining 4 from open group). Nezhath et al¹⁹ reported 6.2% complication rate after laparoscopic adhesiolysis. It was found that complications adversely affects the duration of hospital stay and post-op morbidity. Average post-operative stay in our study was 4.61 days in laparoscopy group and 12.91 days in open group. Wellstein²⁰ reported duration of hospital stay at 11.3 days for laparoscopy group, while 18.1 days for open group. Both studies showed smaller duration of hospital stay in laparoscopic group; however we had significantly lesser duration of hospital stay in either group. Only one death occurred out of 40 patients (2.5%) which belong to laparoscopy group which was due to intra-abdominal sepsis following accidental intra-operative bowel injury.

CONCLUSION

Postoperative adhesive intestinal obstruction is seen following laparoscopic as well as open surgeries. Laparoscopy is effective and useful mode of treatment in these patients. Though laparotomy is associated with increased chances of further adhesion formation and recurrent small bowel obstruction conversion to open surgeries, if needed, must be done and should not be considered as failure.

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