

# Comparative Study of Postoperative Adhesions by Laparotomy and Laparoscopic Procedures

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## Abstract

**Background:** Abdominal operations result in random and unpredictable adhesion formation. Postoperative adhesion may contribute to recurrent episodes of small bowel obstruction, chronic pain abdomen or both. Laparotomy and laparoscopy are the modes used to treat the adhesion related complications.

**Aims and objectives:** (1) To study the adhesion related complications and treat the same by means of laparotomy and laparoscopic procedures. (2) To study how the risk of postoperative adhesions can be minimized.

**Materials and methods:** About 50 cases from March 2007 to February 2009 were studied in Government hospital, Sirsi, Karnataka, India. Patients who underwent some surgical procedures before presenting with adhesions related complications like small bowel obstruction and chronic pain abdomen were considered. Patients who required intervention were treated with surgical procedures. Patients who presented with obstructive features underwent laparotomy and who presented with chronic pain abdomen underwent laparoscopy.

**Results:** All the 50 patients who were in our study had undergone some conventional surgeries in previous instance. No patient in our study had undergone laparoscopy in previous instance. Appendicectomy (40%), lower segment cesarean section (22%) were the common surgeries which resulted in adhesions. Thirty-four patients in our study presented with obstructive features, underwent laparotomy and adhesiolysis. Sixteen patients in our study underwent laparoscopy for chronic pain abdomen. Both surgeries were safe and resulted in recovery of almost all patients. We could not follow-up most of the patients after 3 months so the outcome of adhesiolysis by both procedures is not known.

**Conclusion:** (1) Conventional surgeries leads to more adhesion formation than the minimal invasive procedures. (2) Appendicectomy and pelvic surgeries are the common cause of adhesions. (3) Both laparotomy and laparoscopy can be safely used as mode of treatment of adhesion related complications. (4) Operative treatment of acute abdomen by laparoscopy can be recommended.

**Keywords:** Laparotomy, laparoscopy, postoperative adhesions, adhesiolysis.

## INTRODUCTION

Postoperative adhesions remain one of the most common problems which the surgeons have to face in present time. Adhesions are bands of tissues that connect anatomic sites at locations, where there should not be connections. Post-operative surgical adhesions are formed as a result of trauma, infection or injury to tissue. A surgical incision made into abdominal wall in an aseptic injury, yet it may get infected. Over the past two decades there have been many claims made that alternative in mode of access into abdominal cavity or instruments utilized will reduce postoperative adhesions. There is little evidence that development of adhesions in humans is less prevalent following laparoscopic procedures compared to laparotomies. There is high incidence (40 to 60%) of morbid events like small bowel obstruction associated with presence of adhesions. Mortality has been reported to be up to 30%. Adhesions result in large surgical workload and cost to health care systems. Good surgical technique remains an important part of prevention of

adhesion. Intra-abdominal adhesions may be prevented by minimizing injury and there is increasing evidence that laparoscopic surgery is an important method of adhesion prevention.

## OBJECTIVES

I opted to take this study with following aims and objectives:

1. To study adhesion related complications and to treat the same by means of laparoscopy and laparotomy.
2. To study how the risk of postoperative adhesions can be minimized.
3. To assess clinically the feasibility or limitations of laparoscopy.

## MATERIALS AND METHODS

Postoperative adhesions presenting as acute and subacute intestinal obstruction is one of the common condition presenting in surgical department. In this study, I have taken the patients who attended the OPD and emergency department from March 2007 to February 2009.

Patients who presented with pain abdomen, distension, vomiting who previously underwent some abdominal surgical procedure were considered for the study. Patients who recovered after conservative management were not included in study.

The patients with above symptoms are admitted to ward with provisional diagnosis of acute, subacute intestinal obstruction and pain abdomen, assuming postoperative adhesions as a cause. A detailed history, previous surgery and examination were done. The routine investigations were done. RBS, S, blood urea, serum creatinine was also done. Serum electrolytes were done for patient who presented with features of obstruction. Plain X-ray abdomen was done for all cases presenting with features of obstruction. CT scan of abdomen was not done on any patients as diagnosis of obstruction was made out by X-ray. ECG and chest X-ray were done in elderly individuals and individuals with significant clinical findings. Routine ultrasound scanning of abdomen was not done due to want of 24 hours emergency services but they were done during office hours and outside the institution wherever possible.

Immediately after admission along with above procedure resuscitation with IV fluids especially ringer lactate and normal saline infusion started till hydration and urine output becomes normal. For patients with obstructive features nasogastric decompression with Ryles tube carried and antibiotic prophylaxis started. Close observation of all parameters (like pulse rate, blood pressure, abdominal girth, bowel sounds, tenderness and guarding looked for. Patients who recovered from obstructive features by passing bowels, reduction in pain and tenderness were managed conservatively and were excluded from the study. Patients with above signs and symptoms and in patients with clear cut signs and symptoms of intestinal obstruction for long duration were managed with surgical procedures. Patient presenting with features of obstruction were posted for laparotomy and adhesiolysis was done. Patients presenting with long-lasting pain abdomen were chosen for laparoscopic procedure. I attended operative procedures in majority of cases and findings were recorded and photographs were taken. Surgery adopted and criteria for deciding the procedures were noted. The postoperative period was monitored carefully and all parameters were recorded four hourly bases depending upon patient's general condition. Postoperative follow-up after discharging of patients was done in majority of patients up to 3 months. Most of the patients did not come for follow-up after one or two visits. The results are tabulated stressing the following

points, age, sex, symptoms, examination finding, previous surgeries, operative procedure adopted and duration of hospital stay.

## RESULTS

The study of 50 cases of postoperative adhesions by laparotomy and laparoscopic procedures from March 2007 to February 2009.

### Age vs Sex Correlation

In our study, Male:Female ratio is 1:1. 28% of the cases that is 14 off the 50 cases were in the age group of 31 to 40 followed by 26% of the cases in age group of 21 to 30.

### Sex vs Pain Abdomen, Distension and Vomiting

All the 50 cases presented with pain abdomen. Distension of abdomen was present in 20 off the 25 male patients. Among females 13 cases presented with distension of abdomen and absent in 12 cases. This shows distension of abdomen is less common in females than in males in our study. Ten cases presented with vomiting 7 male and 3 female.

### Age and Sex vs Previous Surgeries and Frequency

Previous appendicectomy was the commonest surgery done constituting 20(40%) of the 50 cases. Among males appendicectomy was the commonest previous surgery followed by cholecystectomy. Among females 11 cases underwent previous cesarean section followed by hysterectomy. Cases which underwent previous appendicectomy and cesarian section are of younger age group. Previous hysterectomy and cholecystectomy belonged to older age group.

### Diagnosis

34 cases presented with obstructive features. 14 with acute and 20 with subacute intestinal obstruction. 16 cases presented with chronic pain abdomen.

### Sex vs Diagnosis Correlation

Acute intestinal obstruction was more common among males (44%). Among females, subacute intestinal obstruction and chronic pain abdomen (44%) was a common presentation.

### **Diagnosis and Sex vs Procedure Correlation; Age vs Clinical Presentation; Sex vs Diagnosis**

Laparoscopy and adhesiolysis was done in 16 cases who presented with pain abdomen, of which 11 were female and 5 male. Laparotomy and adhesiolysis was done in 34 cases that presented with acute and subacute intestinal obstruction of which 20 male and 14 female cases.

### **Intraoperative Complications**

Intraoperative complications—1 case in laparoscopy had the intraoperative complication of bleeding. 7 cases had intraoperative complication in laparotomy—3 enterotomy, 2 bleeding, 1 resection and anastomosis and 1 resection with ileostomy. 41 cases (82%) did not have any intraoperative complications.

### **DISCUSSION**

Postoperative adhesions are one of the common surgical problems all over the world. There is a little evidence that development of adhesions in humans less prevalent following laparoscopic procedures versus open (laparotomy) procedures. Major clinical concerns associated with postoperative adhesion formation are small bowel obstruction, chronic abdominal and pelvic pain, infertility. Open and laparoscopic adhesiolysis is done to treat the patient presenting with adhesion related complications. This study highlights the magnitude of problem of adhesion and treatment of the same by laparoscopic and laparotomy. About 50 patients were treated from March 2007 to February 2009.

### **Age Incidence**

The youngest patient in the study was of 5 years and oldest patient was 85 years old. The mean age was 40.10 years of this 42.92 years for male and 37.32 years for female. The mean difference in the age between male and female is not statistically significant. In this study, 54% of patient belonged to 21 to 40 years of age.

Previous studies by Majewski WD reported the mean age of  $38.9 \pm 19.9$  years.

Parent S et al reported in his study the mean age of 48.2 years. These studies almost correlate with present study.

### **Sex Incidence**

In the present study, there were 25 males and 25 females among 50 cases. The male female ratio is 1:1.

### **Previous Surgeries**

In the present study, all the 50 patients underwent laparotomy for some cause. No cases were available for study that underwent laparoscopy in first instance. This shows that there is a reduction of adhesion formation after laparoscopic surgery compared to open surgery.

Gutt CN et al reported that in all clinical studies most of the experimental studies found a reduction of adhesion formation after laparoscopic surgery compared to open surgery. Schafer M et al reported that laparoscopic surgical procedures with their minimal access to abdominal cavity are associated with fewer postoperative adhesions compared to open surgery, although adhesion formation cannot be entirely prevented. Levrant SG et al reported prior laparotomy, whether through a midline vertical or suprapubic transverse incision, significantly increased the frequency of anterior abdominal wall adhesion and thus adhesions may complicate the placement of the laparoscopic cannula through the umbilicus. Majewski WD reported laparoscopic treatment of patients with acute abdomen offers an outcome comparable to that achieved with open approach. There were fewer episodes of adhesions ileus in laparoscopic patients. Consequently the operative treatment of acute abdomen patients by laparoscopy can be recommended. In the present study, appendectomy and cholecystectomy were the leading previous surgeries which led to adhesion formation in males. Caesarian, appendectomy, hysterectomy were the leading previous surgeries in females. Menzies D, Ellis H<sup>31</sup> reported cholecystectomy, appendectomy, colon surgery and pelvic surgery are associated more with adhesion formation. This study coincides with present study. In present study, all 50 patients presented with pain abdomen. Distension of abdomen was present in 20 males and absent in 5 whereas 13 females presented with distention and absent in 12. Vomiting was present in 10 patients, 7 males and 3 females.

### **Clinical Presentation**

In present study, 34 patients presented with obstructive symptoms. 14 acute and 20 subacute intestinal obstructions. 16 patients presented with chronic pain abdomen which was off more than 6 month duration. Menzies D et al<sup>31</sup> reported small bowel obstruction, chronic abdominal and pelvic pain, infertility are of major clinical concern associated with adhesion. Schafer M et al reported early and late bowel obstruction, chronic abdominal pain and infertility all the main clinical complications and they also increase the socioeconomic costs.

## Investigations

In the present study investigations did not have much role to play. Plain X-ray abdomen was taken for all patients presented with acute obstructive symptoms. Ultrasound was advised for patients preventing with chronic pain abdomen to rule out other cause. Other investigations like CT, MRI were not affordable by patients. Routine investigations were done to all patients.

## Treatment

In the present study, 34 patients (20-subacute and 14-acute intestinal obstruction) were treated by laparotomy, suspecting adhesion to be the cause. Most of the cases were opened with midline incisions; care was taken not to injure the bowel. Adhesions in most conditions were to the anterior abdominal wall was released, wash was given with isotonic saline and in few patients ringer lactate solution (300 ml) was left in the abdominal cavity. Peritoneum closure was avoided in many patients. In present study 16 patients presented with chronic pain abdomen for more than 6 months. They were subjected to diagnostic laparoscopy. Pneumoperitoneum was created using veress needle in few cases and open Hassan's technique in others. Adhesiolysis was done and in few cases, 300 ml of Ringer lactate left alone in abdominal cavity. No cases were converted to laparotomy. Parent S et al reported laparoscopic treatment of adhesion occlusion is a feasible operation. Sato Y et al reported laparoscopic adhesiolysis is a safe and effective treatment for small bowel obstructions. Conversion to laparotomy should be considered in patients well dense adhesions. However, in our study we subjected the patients to laparotomy suspecting dense adhesions and possible high complication rate. Swank DT et al reported laparoscopic adhesiolysis in patients with chronic pain abdomen seems to be feasible and effective operation with considerable risk.

## Duration of Surgery

In present study, the mean time for laparoscopy and adhesiolysis was 53.44 minutes and laparotomy and adhesiolysis was 92.65 minutes.

## Intraoperative Complications

In present study, we had 9 complications—8 in laparotomy and 1 in laparoscopy. 3 enterotomies which occurred while release of adhesions which was closed primarily. 4 cases had bleeding—1 in laparoscopy and 3 in laparotomy for which hemostasis was achieved. 1 case had a patch of gangrene

which was resected and anastomosed. 1 case had gangrene of whole of ascending colon up to transverse colon which was resected and ileostomy was done. C Wellstein et al reported 15 major intraoperative complication in lap group off 52 patients and 8 intraoperative complications off 62 conventional group ( $P = 0.156$ ) results of present study is comparable. No major postoperative complications were observed in our study except for prolonged paralytic ileus for few patients.

## Duration of Stay

In present study in laparoscopy and adhesiolysis, mean duration of stay was 5.81 days and in laparotomy and adhesiolysis it was 13.53 days. C Wellstein et al reported 11.3 days of hospital stay for laparoscopy group and 18.1 days for laparotomy group. This difference in laparoscopic group in our study might be due to choosing of small bowel obstruction in the group. In present study only chronic pain abdomen cases were chosen. In present study in laparoscopy group, patient were mobilized on mean 2.94 days and laparotomy group 6.97 days.

## FOLLOW-UP

Most of the patients in our study did not turn up after 3 months follow-up. So long-term outcome of procedure used for adhesiolysis could not be made out.

## CONCLUSION

1. Postoperative adhesions are still a common surgical problem.
2. Mostly occurring in 20 to 40 years age group, the active period of ones life.
3. Pain abdomen vomiting and distension common symptoms.
4. Previous laparotomy is common cause of postoperative adhesions than previous laparoscopy.
5. Second surgery requires more time than the normal and meticulous techniques to avoid complication.
6. Previous appendicectomy is the commonest cause of postoperative adhesion in males. Previous pelvic surgeries commonest among female.
7. Minimally invasive procedures like laparoscopy minimize the adhesion formation.
8. Diagnostic laparoscopy can be used as a mode of treatment for patient with chronic pain abdomen.
9. Laparoscopic adhesiolysis takes less time, less hospital stay and early ambulation.

10. Adhesions can be prevented by using laparoscopy as a means of surgery in first instance.
11. Adhesions can also be presented with meticulous technique and minimal tissue handling.
12. Laparotomy and adhesiolysis can be used for patients with acute intestinal obstruction safely.

## SUMMARY

A clinical study of 50 cases of postoperative adhesions by laparotomy and laparoscopy was done during March 2007 to February 2009.

Various etiopathogenies of postoperative adhesions with respect to age and etiology and to monitor the outcome of management like laparoscopic and conventional (open) adhesiolysis.

The mean age of incidence is – 40.10 years. The incidence was more in 31 to 40 years of age group followed by 21 to 30.

Sex Ratio is 1:1 for male and females.

All patients in this study presented with pain abdomen, 33 patients presented with distension of abdomen and 10 patients with vomiting.

Clinically the patients were diagnosed to have acute, subacute intestinal obstruction and chronic pain abdomen. Patient with acute and subacute intestinal obstruction were subjected to plain X-ray abdomen and patient with chronic pain abdomen to ultrasound abdomen.

All the patients in this study underwent surgery. Patients with acute, subacute intestinal obstruction well subjected to laparotomy and patient with chronic pain abdomen to laparoscopy. 34 patients underwent laparotomy and adhesiolysis and 16 patients underwent laparoscopy and adhesiolysis.

Mean time for laparotomy 92.65 minutes Mean time for laparoscopy 53.44 minutes.

Mean duration of stay following laparotomy was 13.53 days and following laparoscopy it was 5.81 days.

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