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**POSTOPERATIVE ADHESIVE INTESTINAL OBSTRUCTION FOLLOWING
LAPAROTOMY IN ADULTS IN SAUDI ARABIAN TERTIARY HOSPITAL**

M. ABDELRAZIK MRCS (Ireland), MRCS (Eng)

Email: doctorme@gmail.com; **Phone:** +966115886688

Department of General Surgery, Faculty of Medicine, Salman Bin Abdulaziz University

ABSTRACT

Background: Intra-abdominal adhesions after laparotomy is common surgical problem, it is considered as the main cause of postoperative intestinal obstruction, and also associated with high morbidity and mortality rates.

Aim of the work: This study was designed to evaluate postoperative adhesive intestinal obstruction (PAIO) with relation to types of the previously used surgical procedure, Also postoperative period will be correlated in the same study group.

Patients and Methods: A retrospective study on total of 438 adult patient were operated on for intestinal obstruction in Prince Sultan Military Medical City, Saudi Arabia (tertiary referral hospital) between January 2006 and December 2014, 259 male (59.1%) and 179 female (40.9%). About 399 patient (91.1%) had previous one or more laparotomies as appendectomy (n=182, %=41.6), cholecystectomy (n= 129, %= 29.5), gynecological surgery (n= 25, %= 4.8), right hemi colectomy (n= 18, %=4.1), left hemi colectomy (n= 19, %=4.3), total colectomy (n=11, %=2.5), perforated duodenal ulcer (n= 9 %= 2.1) or rectal surgery (n= 6, %= 1.6), 39 patient (8.9%) presented with adhesive intestinal obstruction had no previous abdominal surgical.

Conclusion: Post-operative adhesions are the most common causes of intestinal obstruction in surgical patients presenting at our hospital, Previous laparotomy and type of surgery affect largely on occurrence of adhesive intestinal obstruction, also follow up of patients during the

first post-operative month can detect and prevent more than 26 % of the post-operative intra-abdominal adhesions.

Keywords: Intestinal obstruction, adhesions, laparotomy, adhesive intestinal obstruction

INTRODUCTION

Intestinal obstruction (IO), is a common surgical problem associated with high morbidity and mortality rates as 20% of all surgical emergencies are attributed to Intestinal obstruction¹. The post-operative adhesions are the most common cause of intestinal obstruction², although 10 % of patients have IO with no previous abdominal surgery but postoperative adhesions cause more than 75 % of all Small bowel obstruction cases³⁻⁷, an autopsy study of 752 cadavers found an incidence of adhesions of 67% in those that had undergone previous abdominal surgery⁷.

Although the basic etiology is unclear⁹, but peritoneal irritation is the main factor associated with the occurrence of post-operative adhesions in the form of obstructive single bands or matted adhesions⁴, they cause intestinal obstruction over a variable period of time ranging from the immediate post-operative period to many years after the surgery⁵.

Risk factors that facilitate adhesions include; rough handling of tissues, excessive use of dry packs and gauze, presence of foreign materials (glove powder, excessively

long ligatures etc.), mass ligation of omentum or mesentery which tends to produce nodules of necrotic fat, residual blood in the peritoneal cavity, raw peritoneal surfaces and ischemic tissues¹⁰.

Colectomy, hysterectomy, and appendectomy are the most common operative procedures usually associated with postoperative adhesive IO⁷. Other causes of IO are neoplasm (5–10 %), Crohn's disease (7 %), hernia (2 %), or radiation-induced enteritis (1 %) ²⁻⁵.

The management of IO is based on clinical evaluation, while conservative treatment is successful in a variable percentage of patients, regular re-evaluation is compulsory for early recognition of bowel ischemia that would necessitate urgent surgical intervention¹⁰⁻¹². Successful conservative treatment may leave adhesions that could cause recurrence; on the other hand, surgery may be the source of new adhesions like any other abdominal surgery^{13, 14}. Post-operative adhesive intestinal obstruction does not have enough researches in the developing countries, thus, we conducted this study in Saudi Arabia to evaluate the incidence of IO due to adhesions

or spontaneously without no initial laparotomy also to find the relation with the previous surgical operation type and site.

PATIENT AND METHODS

This is a retrospective study of all adult patients who were operated for intestinal obstruction due intra-abdominal adhesions either post-operative or spontaneous adhesions at Prince Sultan Military Medical City, Riyadh Saudi Arabia (tertiary hospital) between January 2006 and December 2014. Patients' medical records were reviewed after obtaining local ethical approval. Secondary data were sourced from the operative registers and from the patients' files in the Records Department. Files with inadequate data were excluded.

The diagnosis of adhesive intestinal obstruction carried out by studying the clinical history of previous laparotomy, clinical symptoms of obstruction, such as abdominal pain, distention, vomiting, and constipation; also radiological evidence of IO on plain x-ray of the abdomen; finally all other organic lesions were excluded by radiological contrast study.

The abdominal pathology accounted for the initial laparotomy were recorded for all patients as well as the number of previous hospitalizations. The time gap separating the initial laparotomy and the re-admissions was

also recorded. The treatment methods achieved by the surgical team either conservative or surgical re-exploration were recorded, as well as the post-operative observation period. All the patient diagnosed to be IO due to intra-abdominal adhesions were confirmed intra-operatively and were reported by the surgical teams.

Patients were classified into two main groups, group (A) included the patients who didn't have previous laparotomy and group (B) included the patients had previous one or more abdominal laparotomy. Data sheet was designed and divided to include patient's age, gender, causes of the intestinal obstruction, presenting clinical picture, diagnostic imaging and management also included the type of previous operation and the cause and number of previous admissions also the post-operative complications. The data were entered and analyzed using the statistical package for social sciences (SPSS Inc., Chicago, IL, USA), version 16.00. The quantitative data were presented in the form of mean, standard deviation, percentage.

RESULTS

A total of 438 adult patient included in our study, that were operated on for intestinal obstruction, 259 male (59.1%) with mean age

of (46.8±16.6) range (18-85) and 179 female (40.9%), with mean age of (48.3±15.4) years old range (18 – 83) years old.

We found the distribution of patients according to the type of adhesions in group **A** was 39 patient with spontaneous adhesions, male (n=24 %= 5.48) and female (n=15, %=3.42) and in group **B** with Post-operative adhesions total number of patients was 399, male (n=235, %=53.65) and female (n=164, %=37.44) [table-1].

Also we founded that the distribution of patients according to the number of previous laparotomies was as shown in [table 2] with 63.1% of the patients had one previous laparotomy only, 28% had more than one surgery while around 8.9% had no previous surgery, we didn't find enough data to explained the relation between the number of previous surgeries with the occurrence of post-operative adhesive intestinal obstruction so further studies are needed to illicit that correlation.

Also we found that the distribution of patients according to the causes of initial laparotomy in 399 patients was appendectomy (n=182,%=45.6), cholecystectomy

(n=129,%=32.3), hysterectomy (n=25,%=6.3), left hemi colectomy (n=19,%=4.8), right hemi colectomy (n=18,%=4.5), total colectomy (n=11,%=2.8), duodenal ulcer repair(n=9,%=3.2) and rectal surgery(n=6,%=1.5). Figure 1.

The time before re-admission with adhesive intestinal obstruction in group B patients ranges between 7 days and 68 years after previous discharge. Figure. 2

The preoperative clinical findings in all patients (n=438) were abnormal vital signs in 10.3% (n=45), Dehydration in 58.2% (n=255), Abdominal distension 67.4% (n=295), abdominal tenderness 60.7% (n=266), Visible peristaltic waves 10% (n=44), Audible Bowel sounds 67.6% (n=295) and absent Bowel sounds 32% (n=140). Figure. 3

Postoperative complications accounts for 161 mild to critical complication in 126 cases, as one case can has more than one complication , wound sepsis was 14.8% (n= 65), hypovolemic shock accounts for 5.7% (n=25), peritonitis 8.4% (n=37) enter cutaneous fistula 3.4% (n=15), and death was 4.3% (n=19). Table (3.) Figure. 3

Table-1 Distribution of patients according to the type of adhesions

Groups	Frequency (n=438)	Percentage (%)
Spontaneous adhesions group(A)	39	8.9
Male	24	5.48
Female	15	3.42
Post-operative adhesions group (B)	399	91.1
Male	235	53.65
Female	164	37.44

Table-2 :The distribution of patients according to the number of previous laparotomies.

Number of Previous surgery	Frequency (n=438)	Percentage (%)
0	39	8.9
1	276	63.01
2	96	21.92
3	13	2.97
4	8	1.83
5	5	1.14
>5	1	0.23

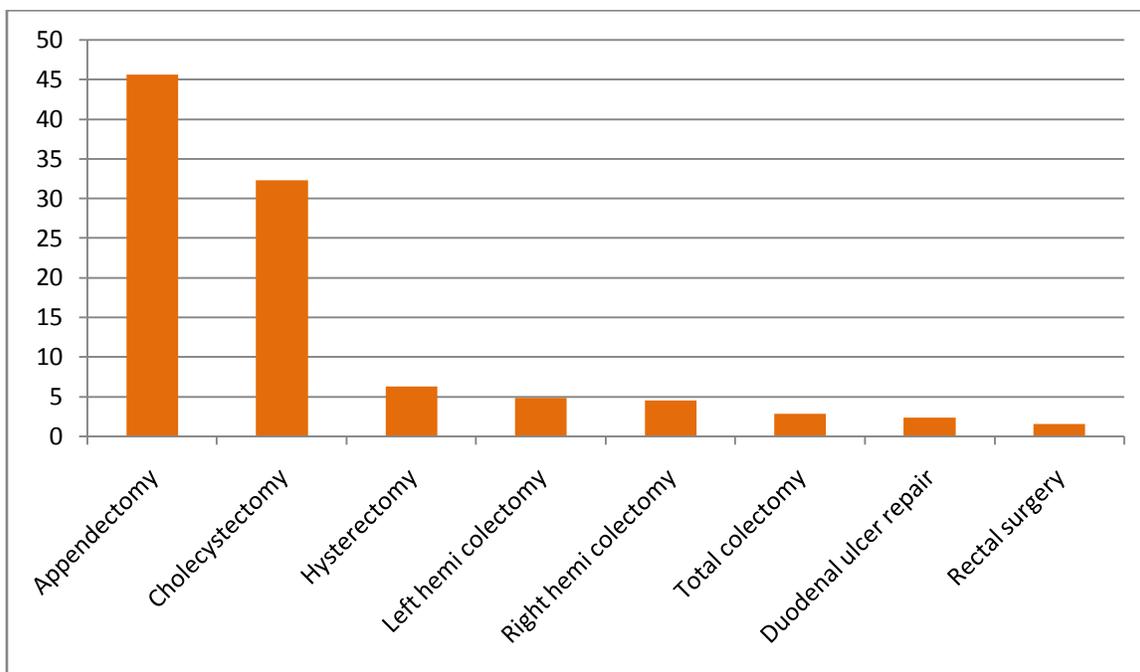


Fig 1: Distribution of causes of initial laparotomy

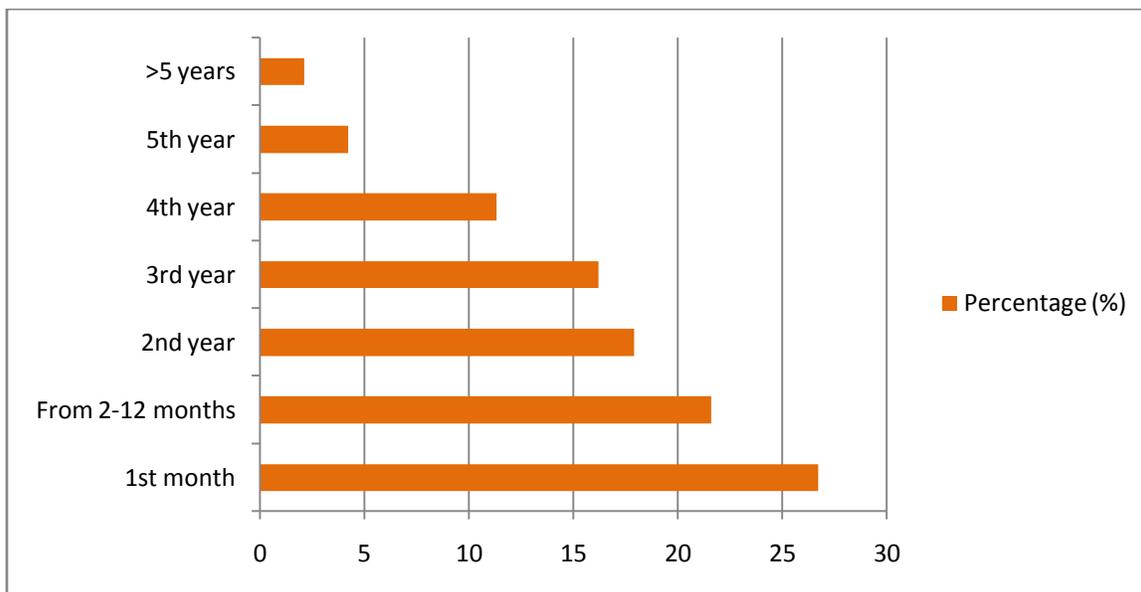


Fig 2: Time between initial laparotomy and re-admission for adhesive intestinal obstruction

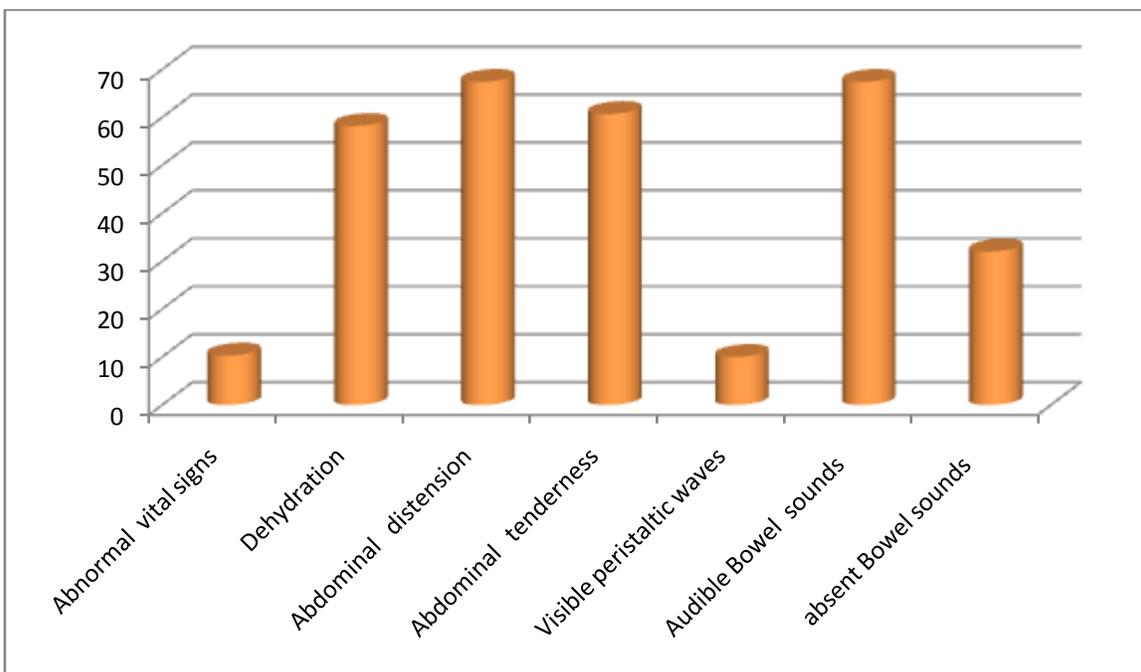


Fig.3: Preoperative clinical findings

Tab. 3: post-operative complications

Complication	No.	(%)
Wound sepsis	65	14.8
Hypovolemic shock	25	5.7
Peritonitis	37	8.4
Enterocutaneous fistula	15	3.4
Death	19	4.3
Total	161	36.8

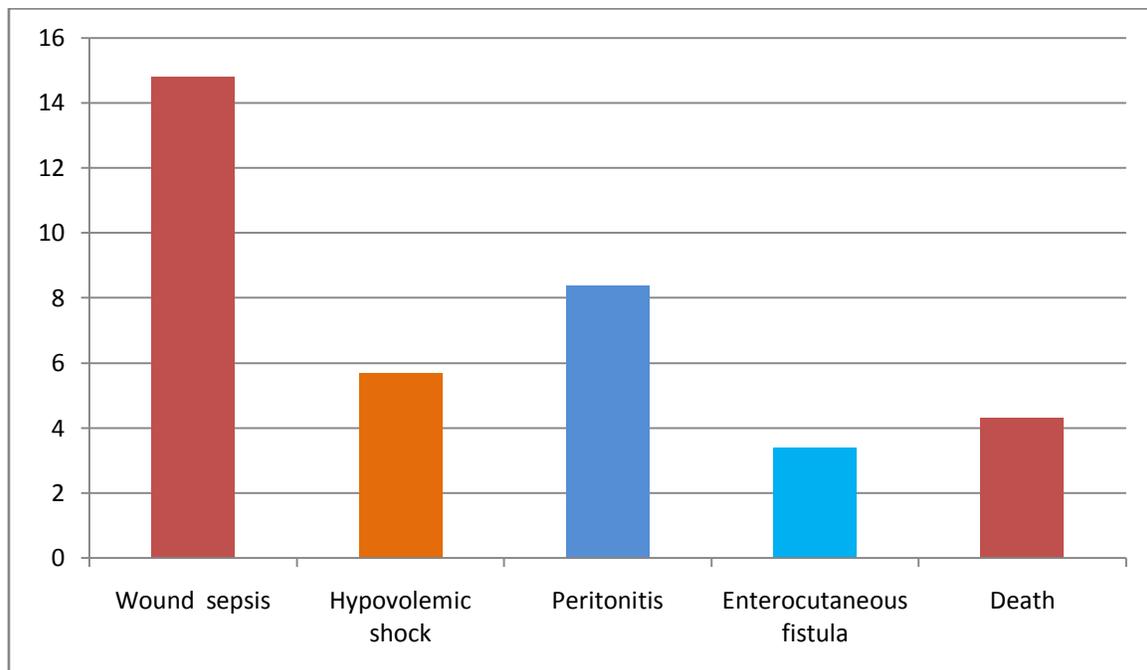


Figure 4: Post-operative Complications

DISCUSSION

Adhesive Intestinal obstruction is a common surgical emergency. With various causes, and should be diagnosed and treated promptly¹⁴,¹⁵. Etiological factors of adhesive intestinal obstruction varies in developed and developing countries¹⁶⁻¹⁸. Morbidity and mortality rates are high so early diagnosis and proper treatment are critical^{19, 20}. Our study showed male to female ratio of 1.45:1, it is higher than the reported ratio in local

literatures²⁰⁻²¹, whereas the incidence in male still higher in other countries²³⁻²⁸.

In our study 8.9% of patients had adhesive intestinal obstruction without having laparotomy before, they were represented in group A with male to female ratio 1.6:1 which matches the results in developed countries²³⁻²⁸. On the other hand 91.1% of patients belonged to group B had adhesive intestinal obstruction after doing one or more laparotomies with male to female ratio 1.4:1.

The mean age of the patients was 46.8 ± 16.6 years, which is similar to other reports²⁹.

In our study, we found that the distribution of patients according to the number of previous laparotomies was irregular with more than 63% of the patients had one previous laparotomy and only one patient had more than 5 previous surgery, we didn't find enough data to explained the relation between the number of previous surgeries with the occurrence of post-operative adhesive intestinal obstruction so further studies are needed to show that correlation, but we do believe there is some correlation as more laparotomies gives more chances to bowel irritation and more risk factor for adhesions formation .

Also we found in 399 patients the causes of the initial laparotomy is appendectomy 45.6%, cholecystectomy 32.3% followed by hysterectomy 6.3% ,left hemi colectomy 4.8% nearly the same of right hemi colectomy 4.5% but total colectomy was the reason in 2.8%, and duodenal ulcer repair was only 3.2% finally the rectal surgery was the cause in 1.5% ,All the results were in accordance with the local and other recent report from Saudi Arabia²⁰, Turkey²⁸, Malaysia²⁴ , Nigeria¹⁷, and Pakistan²². Kapan et al. report nearly similar result recently³⁷. In terms of the types of previous

operations, (47%) had undergone an appendectomy, (21 %) abdominal wall hernia repair, (13%) had open Cholecystectomy, (9%) had different bowel surgeries, (6%) had gynecological surgical procedures, and (4%) had other surgical procedures⁴⁰.

The complication rates stated in local and western studies for patients with post-operative adhesive intestinal obstruction varies between 15 - 54 %^{26,30,31}. In contrary with our study results for Postoperative complications which accounts for 36% of total cases with mild to critical complication varying from wound sepsis which affected 14.8% of patients then hypovolemic shock caused by repeated vomiting as well as fluid loss which 5.7% also peritonitis in 4.3% of total cases finally post-operative enterocutaneous fistula was the complication in 3.4% patient , and mortality was 8.4% of the total patients in our study . There are similar results reported by Fevangetal.³⁵, and Halis et al.⁴¹.

In our study 26.7 % of patients were re-admitted to the hospital having adhesive intestinal obstruction in the first post-operative month. This due to rough handling of intraperitoneal organs or other factors which enhance the formation of intra peritoneal fibrous bands specially the emergency laparotomies. The time ranges

between 7 days and 68 years after previous discharge for all the patients to be re-admitted for intestinal obstruction. That range varies according to patient and/or surgical factors, also variation between patients in developing countries and developed countries³⁰.

The preoperative clinical findings in all patients were abnormal vital signs in 10.3% , Dehydration in 58.2% , Abdominal distension 67.4% , abdominal tenderness 60.7% , Visible peristaltic waves 10% , Audible Bowel sounds 67.6% , and absent Bowel sounds 32% , comparing with recent local report which shows The diagnosis of intestinal obstruction is based on the four classic features of pain, vomiting, abdominal distension and absolute constipation. The extent of each features differ according to the cause and site of intestinal obstruction. In our study, absence of passage of flatus (92%) and/or feces (84%) was the most common presenting symptoms and abdominal distension (73.6%) was the most frequent physical finding on clinical examination. These findings are consistent with recent report from Saudi Arabia and different countries³⁰.

In the current study the main cause of intestinal obstruction was adhesions but cases with incarcerated hernias as a second common cause were excluded, only the

laparotomies (opening of the peritoneal cavity) were included. Adhesions is the most common cause in the Western world³³, and authors from developing countries observed almost similar findings in their study³⁴⁻³⁶.

We found that the number of cases are increasing every year during the study time , that may be attributed to the increase in general population or that may be due to the recent increased rates of elective abdominal surgeries⁴⁷.

To decide either conservative treatment, or going with surgery to treat post-operative adhesive intestinal obstructive and the timing of the surgical procedure is difficult^{45, 46}. Careful assessment should be performed on an individual basis to get good results⁴⁷. Several studies indicate that up to 75% of patients with previous abdominal surgeries can be treated safely and effectively with non-operative management^{48,49}, But We had excluded the patients treated by conservative methods in our study as that method has high incidence of failure rates and majority of conserved patients rapidly re-admitted in short time after discharge .

CONCLUSION

Post-operative intra-abdominal adhesion is the most common causes of intestinal obstruction in surgical patients presenting to Prince Sultan Military Medical City

(tertiary referral Hospital). Previous appendectomy are the most common cause of re-admission for PAIO, followed by cholecystectomy. Almost 50% of the patient with PAIO were operated during the first post-operative year so the early follow up can detect and prevent more than 48% of the post-operative intra-abdominal adhesions. Also, surgeons should try to minimize the known risks of adhesions, as washing off glove powder before operation, with maintaining good patient hydration and prevention of complications that affects largely on the incidence of post-operative adhesive intestinal obstruction.

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