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ADHESION BAND IN EMERGENCY OPERATION AND INTESTINAL OBSTRUCTION

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ABSTRACT

Background: To investigate the epidemiologic features, clinical characteristics and outcomes of patients with intestinal obstruction in an academic tertiary referral center. **Methods:** Clinical records of 241 patients with intestinal obstruction were retrospectively reviewd. The patients referred to an academic tertiary center between 2009 to 2019. The patients with the final diagnosis of intestinal obstruction who underwent operation were entered into the study. Exclusion criteria consisted of the incomplete records of the patients, congenital adhesion band and conservative managements. Demographic data, etiology of obstruction, management type and final outcome of the patients were extracted from the files. **Results:** Average age of the patients were 56.4 ± 21 years. One-hundred and seventy two (71.4 %) patients were male. Adhesion band was the first etiology of small intestinal obstruction in 73 (47%) patients followed by abdominal hernia in small intestine in 15 (10%) patients and tumors in large intestine in 13 (15%) of patints. In adhesion band group, there were 58 males, with an average of 31 years, ranging in age from 4 years to 80 years. Appandectomy was the most common surgical procedure in 37 (51%) patients followed by trauma surgery in 18 (25%) patients. Twelve patients (16%) had history of more than one abdominal operation. **Conclusions:** Adhesion band is a common complication of laparotomy, consisting half of the patients undergoing surgery with the

diagnosis of intestinal obstruction. The most common surgeries leading to adhesions and intestinal obstruction were emergency surgeries. Improvements in surgical technique alone will help decrease but not prevent adhesion formation.

KEYWORD: Adhesion band, Small intestinal obstruction, Etiology of bowel obstruction, Adhesion preventive. Emergency surgery.

INTRODUCTION

Postoperative adhesions, which approximately occur in 67% to 93% of abdominal operations, represent a major clinical problem, resulting in intestinal obstruction, infertility, and pain leading to considerable economic costs.[1] Abdominal post-surgical adhesions develop following trauma to the mesothelium, which is caused by surgical handling and instrument contact, foreign materials such as sutures and glove dusting powder, dissection, and overheating. Postoperative adhesions band occur after most surgical procedures and can result in serious complications, including intestinal obstruction, postoperative adhesions impact the surgical workload, and hospital resources resulting in considerable health care expenditure.[2] Adhesions result from the normal peritoneal wound healing response and develop in the first five to seven days after injury. Adhesion formation and adhesion-free re-epithelialization are alternative pathways, both of which begin with coagulation, which initiates a cascade of events resulting in the buildup of the fibrin gel matrix.[3]

Intestinal obstruction is most commonly caused by intra-abdominal adhesions, malignancy, or intestinal herniation. Adhesion causes one of the most important abdominal complication, intestinal obstruction, which can lead to death if the bowel gangrene. The clinical presentation generally includes nausea and emesis, colicky abdominal pain, and a failure to pass flatus or bowel movements. The classic physical examination findings of abdominal distension, suggest the diagnosis[4] There are two types of postoperative adhesions, can cause obstruction, the primary occurred in the first twenty days after surgery and the secondary one month after surgery. Treatment of primary is nonoperative management and secondary treatment is most likely operative,[5] The treatment of ce choice for adhesive small obstruction remains controversial on the surgeon's judgment. More recently, the use of laparoscopy is gaining widespread acceptance and is becoming the preferred choice in centers with specific expertise.[6] Modification in the technique in abdominal surgery that all surgeons should implement includes minimizing the invasiveness of surgery, minimizing surgical trauma, such as ischemia from peritoneal suturing, and avoiding the introduction of

foreign material, e.g., starch glove powder, into the body.[7] Any abdominal laparoscopy reduces adhesion complications after surgery.[8]

Ths study aimed to investigate the prevalence of previous abdominal surgery in a cohort of patients operated for bowel obstruction and to analyze the causes of obstruction, types of obstruction, and the operative procedure discovered at surgery.

METHODS AND PATIENTS

In this cross-sectional study, 241 patients with intestinal obstruction who underwent surgical interventions and had at least 2 years follow up were entered. The study protocol was approved by a local ethics committeeand adhered to the tenets of declearation of Helsinki.

All Patients who were operated between Jan 2009 and Jan 2020 at Loghman Medical Center were included. Exclusion criteria consisted of incomplete records, conservative managements and congenital adhesion bands.

The diagnosis of intestinal obstruction was based on clinical signs and symptoms, simple abdominal x-ray, CT scan, and laparotomy findings The records of patients with obstruction secondary to postoperative adhesion band were thoroughly inspected for the patients' demographic, etiologic factors, management and clinical outcomes of the patients.

Data analysis

To represent data we used mean, median and standard deviation. All data were entered into the SPSS (IBM, Chicago co).

RESULTS

Two-hundred and forty one patients underwent surgery for bowel obstruction over the ten years. One-hundred and fifty-six (64.7 %) patients had a small intestine obstruction and 85 (35.3%) had a large bowel obstruction. The most common cause was the post-operative adhesion band. The most common surgeries leading to adhesions and intestinal obstruction were emergency surgeries. The summary of the causes of bowel obstruction is shown in Table 1.

Table 1. Causes of bowel obstruction in loghman medical center.

Etiology	Patients	Number of patients
Small bowel	Adhesion band	73 (47%)
	Abdominal Hernias	15 (10%)
	Internal Hernias	6 (5%)
	Tumor	12 (8%)
	Volvulus of the small intestine	12 (8%)
	Invagination	6 (4%)
	Body packer	18 (12%)
	Chron disease	2 (1%)
	Abdominal TB	2 (1%)
	Phytobezoar	5 (3%)
	Others	5 (3%)
Total		156
Large bowel	Adhesion band	2 (2%)
	Hernias	-
	Tumor	13 (15%)
	Volvulus	63 (74%)
	Invagination	1 (1%)
	Fecal impaction	1 (1%)
	Foreign body	5 (6%)
Total		85

Mean follow-up time was 4.5 ± 2.1 years. Adhesion band with 73 (47%) patients was the first cause of small intestinal obstruction. There were 58 males and 15 females, with an average of 31 years, ranging in age from 4 years to 80 years. In this group, the primary operation was appendicitis in 61 (84%) patients. The other operations were as follows; appendectomy, trauma, perforated peptic ulcer, gynecological surgery, and upper gastrointestinal and abdominal hernia. Twelve patients (16%) underwent more than one abdominal operation. The etiologies of primary operation are presented in Table 2 . Figures 1, 2 and 3 demonstrate representative figures of the patients.

Table 2. Causes of primary operation in adhesion band at loghman medical center.

Previous operation	Number (percent)
Appendicitis: Simple, Gangrenous, Perforated	37 (51%)
Trauma Spleen, Kidney, Liver, GI tract	18 (25%)
Perforated peptic ulcer	3 (4%)
Gynecologic problem	3 (4%)
Abdominal hernia	1 (2.5%)
GI cancer	2 (2.5%)
Peptic ulcer	2 (2.5%)
Negative laparotomy	2 (2.5%)
Others	4 (7%)
Total	73 (100%)

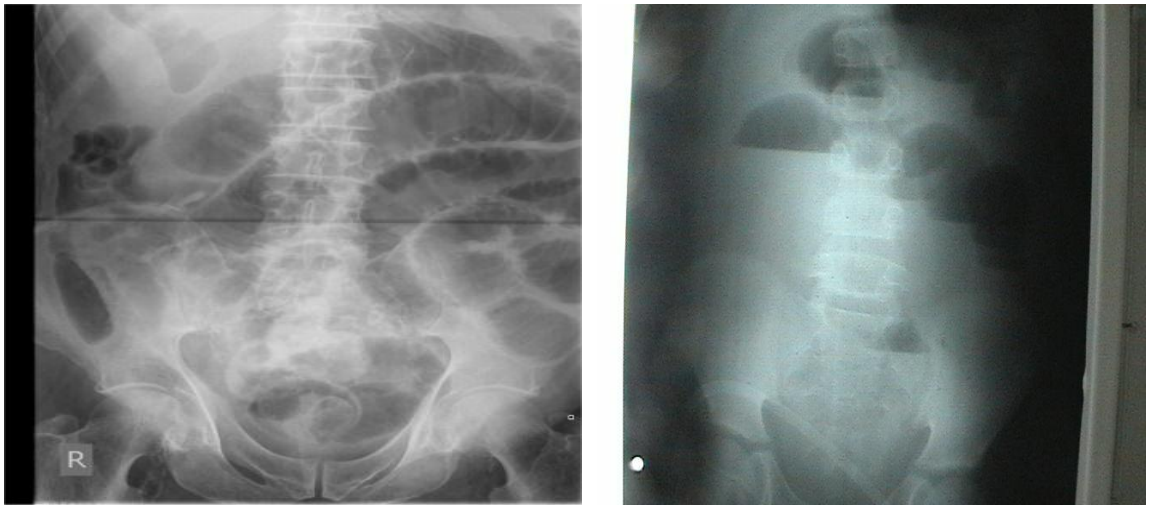

Figure 1: Simple sleeping and upright X-R in a patient with a small bowel obstruction.

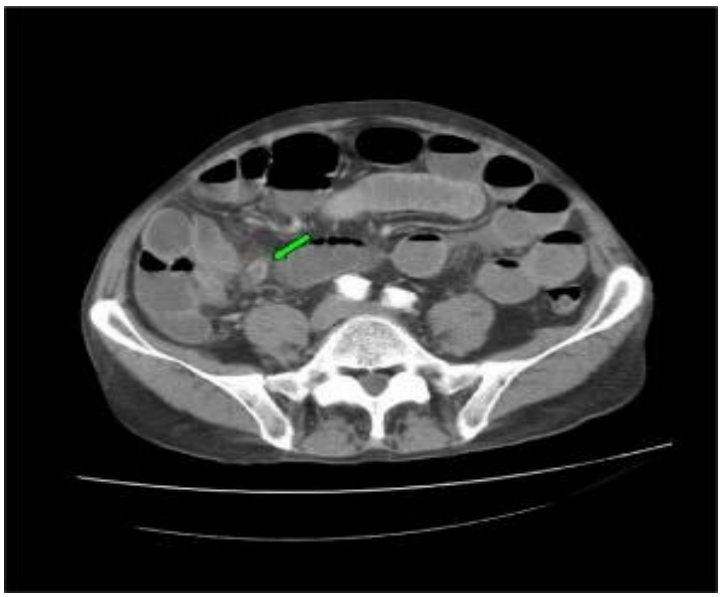

Figure 2: CT scan with contrast in a patient with a small bowel obstruction.

Figure 3: Intestinal obstruction with gangrene is part of it.

The ranging time between the first operation and intestinal obstruction, were from 3 days to 240 months, with an average of 34.3 months. In more than 55% of patients, adhesive obstruction developed within one year of surgery, and half of these occurred within the first postoperative month. Adhesion involving the small intestine occurs more frequently than those involving large bowel do the most common site of obstruction was in the ileum 64 (88%). The frequency of simple obstruction 65 (90%) was more than strangulation 8 (10%). The mortality rate escalates from 1% for simple obstruction to 5% when the bowel becomes necrotic or perforated.

DISCUSSION

This study shows that the postoperative adhesion band accounts for 47% of admission with small bowel obstruction, it was the most common cause of intestinal obstruction emergency operation e.g., perforated appendicitis, trauma with gastrointestinal tract perforation, increase the adhesion band, and bowel obstruction. This rate is almost the same as in Western countries. In some Eastern countries, as in the past, an inguinal hernia is the most common cause of intestinal obstruction.[9] Most of our patients were men who were no different from other studies but they were was relatively young.[10] Postoperative adhesions occur after almost every abdominal surgery and are the leading cause of intestinal obstruction, accounting for more than 40% of all cases and 60% to 70% of those involving the small bowel.[2] A 1992 British survey reported an annual total of 12,000 to 14,000 cases of adhesive intestinal obstruction.[2] In other studies, postoperative adhesion account for 64% to 79% of small bowel obstruction, which was not significantly different. The previous operations were appendectomy, colorectal resection, gynecological surgery, and upper gastrointestinal and small bowel surgery. More than one previous abdominal operation was 23%.[11] After operated adhesive postoperative SBO, risk of recurrence remains and the literature reported a wide-ranging rate of overall recurrence (range, 8.7%–53%) at 3 years and more.[10] The most likely cause of adhesions after emergency surgery is the nature of the primary disease. Same as another study the timing of the onset of clinical signs adhesion is unclear.

Postsurgical adhesions have major impacts on health care outcomes. Adhesions cause significant morbidity, including intestinal obstruction, infertility, and pain. Adhesions band are associated with multiple surgical complications which lead to greater surgical workload and all these negative impacts result in significant economic burden to society. A great deal of effort has been dedicated to reducing adhesion formation, such as physical barriers,

including both mechanical and viscous solutions, heparin, hyaluronic acid-phosphate-buffered saline solution, applied intraoperatively.[12-17] However, no adjuvant has proven uniformly effective in preventing postoperative adhesions. The major strategies for adhesion prevention or reduction are surgical practice.[18] Surgeon, especially in an emergency operation, should adjust their major practices by 1) becoming aware of potential adhesive complication of a procedure; 2) minimizing the invasiveness of surgery; and 3) minimizing surgical trauma, ischemia, exposure to intestinal contents, the introduction of foreign material into the body, and use of talc-or starch-containing gloves. Given the adhesiogenic nature of the peritoneal repair,[7,19,20] however, improvements in surgical technique alone will help decrease but not prevent adhesion formation.

CONCLUSION

Adhesion intestinal obstruction is a common complication, after emergency laparotomy with important complications. Improvements in surgical technique alone will help decrease but not prevent adhesion formation.

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