

Prosthetic Mesh In Complicated Hernia: A Prospective Study At Al -Yarmouk Teaching Hospital

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Abstract

Background : Prosthetic mesh became one of the most widely used, and effective technique in the repair of different types of hernias. However its use in acute obstructed and strangulated hernia is still controversial.

Aim of the study: Assess the rate of postoperative complications in emergency mesh hernia-repair, and whether it is related to the presence of gangrenous bowel, and the need for bowel resection, or not. Or it is related to the site (type) of the complicated hernia (inguinal, incisional, or para-umbilical).

Patients and methods: A prospective cohort study was performed at Al-yarmouk teaching hospital for the period from the 1st of march 2011 to the 31st of march 2013. Forty three patients were admitted to the general surgery department with acute obstructed or strangulated hernia. Prosthetic mesh (prolene) was used for repair of the hernia in all patients whether there is bowel resection or not. Collected data are classified, tabulated and cases were prospectively assessed for postoperative outcome.

Result : The mean age for patients was (52.8±16.7). Regarding the gender, 24 patients (55.8%) were male, and 19 patients (44.1%) were female, there were 23 patients (53.4%) with incisional hernia, 11 patients (25.5%) with Para umbilical hernia, and 9 patients (20.9%) with inguinal hernia. The wound related complications (Superficial surgical site infection, Abscess, Recurrence, and mesh removal) in relation with the type of hernia; the result was statistically insignificant with a p-value (0.142, 0.218, 0.627, 0.218) respectively. Bowel resection was statistically an insignificant risk factor with p-value (0.280).

Conclusion: Using of prolene mesh in obstructed or strangulated hernia regardless of the type(site) of hernia is safe, and bowel resection cannot be considered as a contraindication.

Key words: Obstructed hernia / Strangulated hernia / Prolene mesh / Bowel resection / Surgical site infection.

INTRODUCTION

In the late decades, many new techniques have been used in hernia repair in order to reduce postoperative complications including pain and tension at the site of the repair of the hernia which is considered one of the most important causes of recurrence of hernia.⁽¹⁾ Prosthetic mesh including prolene mesh producing a strong foreign body reaction at the site of repair is

associated with severe inflammation and fibrosis that covers the mesh, and results in a very strong fibrous sheath.⁽²⁾ Repair of hernia using prosthetic mesh is not uncommonly associated with surgical site infections (superficial surgical site infection, or deep surgical site infection in the form of deep abscess), and sometimes needs the removal of the mesh to eliminate the infective process, which increases the risk of recurrence. The risk of these infective complications

increase in the presence of contaminated field associated with bowel resection, thus most literatures show that even in obstructed, or strangulated hernia, it is preferred to use a prosthetic mesh in a clean field (no bowel resection), and an elective hernia repair. ^(3, 4)

It is still doubtful by many studies, and some surgeons whether or not it is wise to use prolene mesh in acute obstructed and strangulated hernia especially if associated with bowel resection. ^(2,5) The explanation for such controversy in using prosthetic mesh in obstructed and strangulated hernia is related to the expected high rate of infectious complications. In our study we were not hesitant to use a mesh in all our patients presenting with complicated hernias. A hernia becomes obstructed when the lumen of the bowel within the sac becomes occluded due to a narrow neck. Irreducibility is the common predisposing factor for obstructed hernias, and if obstruction of the hernia is not relieved, it will lead to interference with the blood supply of the bowel, at first the venous blood supply, and finally the arterial blood supply resulting in strangulation. If this strangulation is not treated, the viability of the bowel will be affected and may end with ischemia, and gangrene which necessitates resection of the bowel. ⁽⁶⁾

Expected complications in hernia repair surgery include surgical site infection (SSI). And this could be a Major superficial Surgical Site Infection (SSI) which can be defined as a wound that either spontaneously discharges a large amount of pus, or it requires surgical intervention to evacuate this pus. The patients with a major SSI usually have a disturbance in systemic signs including fever and tachycardia. Minor wound infections occur when a wound begins to discharge pus, or infected serous fluid, and usually there is no disturbance in systemic signs or delayed discharge of the patient from the hospital ⁶. This is related to possible contamination from a severe inflammatory process, and friability of bowel in cases of obstructed hernia, and translocation of toxic and contaminated fluid through the wall of the obstructed hernia into the peritoneal cavity, and also a high possibility of contamination of the surgical field following bowel resection. ^(7, 8)

In our study we assessed the effect of bowel surgery, and the type (site) of hernia on the postoperative wound related complications, and whether the use of prosthetic mesh is safe in a complicated hernia when bowel resection is necessary.

PATIENTS AND METHODS

A prospective cohort study including 43 patients admitted to the general surgery department at Al-yarmouk teaching hospital as acute obstructed or strangulated hernia for the period from the 1st of march 2011 to the 31st of march 2013. Prosthetic mesh (prolene) was used for the repair of the hernia in all patients whether bowel resection, and anastomosis was performed or not. Data were collected regarding age, sex, duration of symptoms, type of hernia, and its contents, associated bowel resection, and postoperative complications (infectious complications .recurrence, removal of mesh, death).

All patients were primarily managed as acute intestinal obstructions including nasogastric tube decompression, intravenous fluid replacement, and prophylactic antibiotics (ceftriaxone and metronidazole intravenously preoperatively). All these measures were done in order to optimize the general condition of the patients, and to reduce the risk of surgical site infections. Following dissection of the sac, before we open the sac we try to isolate the skin and subcutaneous plane, and muscular layers with packs soaked with povidone-iodine to prevent contamination of the field of the hernia repair. Suction of the toxic and contaminated fluid done, assessment of bowel viability is done. In cases of resection of nonviable bowel, and anastomotic we insert an intra-abdominal tube drain for follow up of any anastomotic leak and intra-abdominal sepsis.

Wash, and irrigation with warm normal saline, of the surgical field is done in all cases whether there is bowel resection or no bowel resection. Thereafter meticulous hemostasis was done, followed by applying the prolene mesh to cover at least 4 cm surrounding the edge of the defect. Prior to closure of the skin and subcutaneous layers we wash the operative field with normal saline, and povidone iodine and insert a redi-vac drain subcutaneously.

In the postoperative period the patients were followed up using a chart for vital signs, input and output, abdominal and local signs. Antibiotic therapy continued for at least 7- 10 days. In the 3rd postoperative day we explore the wound for signs of wound infection, cellulitis or abscess formation. Thereafter daily dressing was done for the wound, and the redi-vac drain was removed when there is no further drainage (<25 ml /day). All wound related complications including superficial surgical site infection, seroma, subcutaneous or deep abscess managed by antibiotics (ceftriaxone or meronim and metronidazole intravenously), opening the wound to

evacuate the pus or seroma, and irrigation of the wound with povidone- iodine, and normal saline, and packing of the wound, and leave it open to heal by secondary intention . To assess the mesh removal rate, and recurrence rate among our patients , we follow up them for at least 18 months.

Collected data were classified, tabulated and statistically analyzed using Chi- square test, and an independent sample t test. A P-value less than 0.05 was considered statistically significant.

RESULTS

The sample of 43 patients with obstructed and strangulated hernia included in the study, from those patients there were 23 patients (53.4%) with incisional hernia, 11 patients (25.5%) with Para umbilical hernia, and 9 patients (20.9%) with inguinal hernia.

The mean age for those patients was (52.8±16.7). Regarding the gender 24 patients (55.8%) were males and 19 patients (44.1%) were females. Nine patients(20.9%) presented to the hospital within the first 24 h, while 27 patients (62.7%) presented to the hospital between 24-48 h. Seven patients (16.2%) presented after 72 h. The contents of the hernia were small bowel in 41 patients (95.3%), and large bowel in 2 patients (4.6%) as shown in (Table 1) .

Table 1: The demographic data

Total number of patients(43)	
Age (mean)	(52.8±16.7)
Sex	Male
	24(55.8%)
Female	19(44.1%)
Duration	< 24h
	9(20.9)
	24-48h
>72h	27(62.7%)
	7(16.2%)
Contents	Small bowel
	41(95.3%)
Large bowel	2(4.6%)
Type of hernia	Inguinal
	9(20.9%)
	Paraumbilical
	11(25.5%)
Incisional	23(53.4%)

Bowel resection was performed in 12(27.9%) patients out of 43 including 2 cases (16.6%) of inguinal hernia , 5 cases (41.6%) of Para umbilical hernia, and 5 cases (41.6%) of incisional hernia with a p-value(0.669 , 0.133 , 0.334) respectively . The result was statistically insignificant concerning the type of hernia contrast the bowel resection as shown in (Table. 2) .

Table 2: Type of hernia contrast with bowel resection.

Type of hernia	Bowel resection No.12	No bowel resection No.31	Total	P-value
Inguinal	2	7	9	0.669
Para umbilical	5	6	11	0.133
Incisional	5	18	23	0.334
Total	12	31	43	0.323

Regarding the relation of postoperative complications and the type of hernia we observed that Superficial surgical site infection occurred in only 2 cases (22.2%) of inguinal hernia, and in Para umbilical hernia; superficial surgical site infection occurred in 3 patients (27%) , while in patient with incisional hernia superficial surgical site infection occurred in 1 patients (4.3%),and the total p-value is (0.142) which is statistically insignificant . Abscess occurred in 2 patients (18.1%) in Para umbilical hernia , while in patients with incisional hernia abscess occurs in 1 patient (4.3%) with a total p-value of (0.218) which is statistically insignificant. Recurrence occurred in 1 patient (9%) with Para umbilical hernia , while recurrence occurred in 1 patients (4.3%) with a incisional hernia with a total p-value of (0.627) which is statistically insignificant. Regarding the removal of the mesh in patients with Para umbilical hernia occurred in 2 patients(18.1%) ,while removal of mesh occurs in 1 patient (4.3%) with incisional hernia with a total p-value of (0.218) which is statistically insignificant. No death has been reported in our study as shown in (Table .3) .

Table 3: The relation between the type of hernia, and complications

Types of Complication	Inguinal No.9	Para umbilical No.11	Incisional No .23	Total No. 43	P- value
SSI	2(22.2%)	3(27%)	1(4.3%)	6(13.9%)	0.142
Abscess	0	2(18.1%)	1(4.3%)	3(6.9%)	0.218
Recurrence	0	1(9%)	1(4.3%)	2(4.65%)	0.627
Removal	0	2(18.1%)	1(4.3%)	3(6.9%)	0.218
Death	0	0	0	0	0

* significant chi-square test when p value is less than 0.05

** significant chi-square test when p value is less than 0.01

In our study from these 43 patients, 12 patients(27.9%) underwent bowel resection while there was no bowel resection in 31 patients (72%) . In cases of bowel resection ,superficial surgical site infection occurred in 2 patients (16.6%), abscess in 1 patient (8.3%) ,recurrence in 1 patient (8.3%), and removal of mesh was done in 2 patients (16.6%) from a total of 12 patients with bowel resection , while in patients without bowel resection, superficial surgical site infection occurred in 4 patients (12.9%), abscess in 2 patients (6.4%), recurrence in 1 patient (3.2%), and removal of mesh was done in 1 patient (3.2%) from a total of 31 patients without bowel resection. The total p-value of complications whether there is bowel resection or not is (0.280) which is statistically insignificant as shown in (Table .4) .

Table 4: Relation of postoperative wound related complications to bowel resection.

Complications	Bowel resection (total No :12)	No bowel resection (total No: 31)	P- value
SSI	2(16.6%)	4 (12.9%)	0.749
Abscess	1(8.3%)	2 (6.4%)	0.828
Recurrence	1(8.3%)	1 (3.2%)	0.476
Removal of mesh	2(16.6%)	1 (3.2%)	0.121
Death	0	0	0
Total	6 (50%)	8 (26%)	0.280

DISCUSSION

The most common type of an elective operation done in the general surgery department, is repair of hernia whatever the type of hernia. The main purpose of the operation is to repair the hernia with a very low risk of recurrence.⁽⁹⁾ Many techniques have been adopted in order to reduce this risk of recurrence and using prosthetic mesh in the repair of hernia provides the best result as documented by many studies. Although the use of mesh in obstructed or strangulated hernia is still controversial due to the high rate of infectious complications, this technique become widely used by many surgeons to reduce the rate of recurrence. Bowel surgery is still the main doubt about using such technique in obstructed or strangulated hernia especially when bowel resection is included.⁽¹⁰⁾ The present analysis evaluates the feasibility of the use of mesh repair when there is obstructed/strangulated bowel with or without bowel resection. We adopted the use of mesh repair in these patients and they were followed to assess certain targeted complications rate in different types of such hernias.

This study evaluates the rate of complications on using a mesh in obstructed or strangulated hernias in the form of SSI , deep abscess formation, recurrence or even the need for removal of the mesh. On comparison of the rate of such complications in relation to the type (site) of hernia a p-value of (0.142, 0.218, 0.627, and 0.218 respectively) was estimated according to ANOVA analysis, and these were statistically insignificant as shown in (Table. 3) . The results of our analysis reveal that there is no difference in the rate of complications with regard to the type of hernia when using mesh in obstructed and strangulated hernias. In contrast to other studies; Zafar H et al.⁽¹¹⁾ consider

that using mesh in obstructed or strangulated incisional hernia associated with a higher rate of complications. Mohammed E et al.,⁽¹²⁾ observed that there is no significant difference in the rate of complications with use of mesh in obstructed or strangulated incisional, Para umbilical and inguinal hernia while it was only significant in femoral hernia. Hentati H et al.,⁽¹³⁾, Kamto G et al.,⁽¹⁴⁾ D'Ambrosio R et al.,⁽¹⁵⁾ considered that the use of mesh in strangulated inguinal hernia is safe, and is associated with the least rate of complications in comparison to other types of hernia.

Although many studies including, Machairas A et al.,⁽¹⁶⁾ Morris-Stiff GJ et al.,⁽¹⁷⁾ considered the use of mesh-repair of obstructed and strangulated hernia unsafe and contraindicated due to the high rate of infective complications and associated severe pain especially when bowel resection is necessary; the analysis of our results showed that there is no significant difference in postoperative complications in obstructed or strangulated hernia whether there is bowel resection or not as shown in (Table .4) . The rate of these complications with bowel resection or not are respectively: SSI (16.6%,12.9%) with a p-value of (0.749), abscess formation (8.3%,6.4%) with a p-value of (0.828), recurrence rate of (8.3%,3.2%) with a p-value of (0.476), the need for removal of the mesh (16.6%,3.2%) with a p-value of (0.121), with a (0%) death rate in both groups. These results were statistically insignificant with a total p-value of (0.280). The results of our study are consistent with other studies including Campanelli et al.,⁽²⁾ in which they used mesh in ten cases of obstructed and strangulated hernias. They also observed that there was no difference in wound related complication (minor or major) over a follow up period of 21 months even when there was a need for bowel resection, and they emphasized the use of non-absorbable mesh in contaminated operations (even with colonic resection) and the results were as good as in clean operations. Atila K et al.,⁽⁵⁾ Wysocki A et al.,⁽¹⁰⁾ D'Ambrosio R et al.,⁽¹⁵⁾ Papaziogas B et al.,⁽¹⁸⁾ confirmed the use of non-absorbable mesh in emergency operations for obstructed or strangulated hernias without significant difference in wound related complication if bowel resection was required which is consistent with our results. In contrast to our study, Temudom et al.,⁽¹⁹⁾ in their study operating on 50 cases of obstructing and strangulated hernia, 2 cases out of these 50 had bowel resection and in both there was a final need for removal of the mesh due to uncontrolled wound suppuration. In contrast to our study, Korenkov M et al.,⁽²⁰⁾ Temudom et al.,⁽¹⁹⁾ advised to interfere with bowel resection in case of nonviable and open bowel during operating a strangulated hernia and delay the mesh repair for a

second time surgery because of high rate of associated infection and suppuration if bowel resection was encountered, which may end finally with removal of that mesh.

The analysis of our study showed that most of the cases that were associated with infection can be managed by antibiotics, drainage of deep abscess and wound debridement and only 3 patients needed removal of the mesh, 2 cases (16.6%) out of 12 cases with bowel resection end with removal of mesh and 1(3.2%) case of mesh removal occur in patient without bowel resection which is statistically insignificant with p-value of (0.121) as shown in (Table .4) . This result indicates that despite of high rate of infection in emergency cases especially when associated with bowel surgery, removal of mesh is rarely required. The result of our analysis is consistent with other studies including Zafar H et al.,⁽¹¹⁾ in which their study, including 55 patients with strangulated hernia; 42 patients without bowel resection and 13 patients associated with bowel resection. Infection occur in 17 patients(31%) and only 12 patients(28.5%) out of 42 patients with obstructed hernia without bowel resection have infective complications, and only one patient need mesh removal, while the others need only debridement and local wound managements. In cases of strangulated hernia with concurrent bowel resection there is only 5 patients out 13 case of presented with infective complications and there was no need to remove the mesh.

The follow up of patients in our study continue over a period of 18 months. Two cases out of 43 presented with recurrence, one case with strangulated Para umbilical hernia with bowel resection and one case of obstructed incisional hernia without bowel surgery which is statistically insignificant with a p-value of (0.627) as shown in (Table .4) . Result of our analysis was consistent with Kamto G et al.,⁽¹⁴⁾ Melis P et al.,⁽²¹⁾ Derici H et al.,⁽²²⁾ studies which confirm that using of mesh in obstructed or strangulated hernia was associated with a low recurrence rate vary from 1% to 22% in comparison to the classical tension repair which associated with a high recurrence rate up to 40%. Hentati H et al.,⁽¹⁹⁾ also confirm the result of our study as showing that the hernia recurrence rate was lower in the mesh repair group (OR 0.2, 95 % CI 0.05-0.78; p = 0.02). Relation of recurrence rate in our analysis to whether there is bowel resection or not was statistically insignificant with p-value of (0.476) .

Conclusion:

The use of proline mesh in obstructed or strangulated hernia with concurrent bowel resection cannot be considered as a contraindication for mesh repair in cases of obstructed or strangulated hernia with an acceptable rate of infective complications and a low recurrence rate. The use of mesh in emergency cases of hernia also is not affected by the type of hernia .

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