Suture versus mesh repair for incisional hernia

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ABSTRACT

Objective: To compare suture with mesh repair, for incisional hernia in terms of early and late outcomes.

Methods: We reviewed the records of all the patients who presented with primary or recurrent incisional hernia in the Department of General Surgery, Riyadh Medical Complex, Riyadh, Kingdom of Saudi Arabia, from January 2000 to December 2004. We divided patients, who underwent repair, in 2 groups: Group A (suture repair) and Group B (mesh repair). The information recorded for both groups included gender, age, associated systemic illness, site of hernia, initial surgery, number and type of previous hernia repairs, size of hernial defect, techniques of repair, and hospital stay. The principal early and late outcome measures studied were septic complications and recurrence.

Results: A total of 123 patients qualified for the study, 72 in group A and 51 in group B. Wound infection was 5.5% in group A versus 3.9% in group B (p=0.51). Follow up ranged between 6-58 months (mean 37.5 months) for both groups. Fifteen patients (20.8%) developed recurrence in group A, while the recurrence rate in group B was only 5.8% (p=0.04).

Conclusion: Mesh repair resulted in a lower recurrence rate, and is not associated with increased incidence of wound complications compared with suture repair.

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Incisional hernia constitutes a significant clinical problem for patients undergoing abdominal surgery. Advances in anesthesia, improved surgical techniques, and the use of new synthetic suture materials has reduced the incidence of incisional hernia.[1] Yet, incisional hernia still occurs in 0.5-11% of all laparotomies performed.[1,2] There are many techniques currently in use for incisional hernia repair with variable results.[3] Primary suture repair has been widely used, but has a high recurrence rate.[4-8] This could partly be due to re-incision and re-approximation through less vascular scar tissue and excessive tension on the suture line.[9] With the development of new synthetic materials and better understanding of antibiotic prophylaxis, prosthetic mesh repair gained popularity for ventral hernia.[1] It facilitates closure, minimizes tension on suture line, and assures a high wound strength.[10,11] The recurrence rates with mesh prostheses range from 2-36%.[5-7,12-15] However, the technique may be associated with significant complications such as mesh infection, entero-cutaneous fistula, and small bowel obstruction.[3] Recurrence of the hernia is among the more problematic adverse outcomes following incisional hernia repair, with progressively higher rates of recurrence after subsequent repairs.[3,16,17] The objective of this study was to compare suture with mesh repair for incisional hernia in terms of early (wound infection) and late outcome (recurrence rate).

Methods. This retrospective comparative study was carried out in the Department of General Surgery

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of Riyadh Medical Complex (RMC), Kingdom of Saudi Arabia over a 5 year period from January 2000 to December 2004. After approval from the Hospital Research and Ethical Committee, data were collected from the medical record of all patients who underwent suture or mesh repair for primary or recurrent incisional hernia. Patients were divided into 2 groups, suture repair (group A) and mesh repair (group B). The incisional hernia was defined as a palpable fascial or muscle defect at the site of previous abdominal operation. All patients who could not be operated upon due to being unfit for general anesthesia, those presenting with obstruction and managed conservatively, and patients requiring other surgery as a part of hernia repair, were excluded from the study. The information collected for both the groups included: age, gender, associated systemic illness, site of hernia, initial surgery, number and type of previous hernia repairs, size of hernial defect, technique of repair and hospital stay. The principal early and late outcome measures analyzed were septic complications and recurrence. Wound infection was defined as systemic features associated with tender swelling, with and without apparent discharge, necessitating open drainage. For the purpose of this study, recurrence was defined as any fascial defect, palpable or detected on CT scan and located within 7 cm of the site of hernia repair. Chemoprophylaxis included cefuroxime sodium (1.5 gm) at induction of anesthesia and continued postoperatively for 48 hours, unless otherwise needed. All operations were performed under general anesthesia employing a scar excising elliptical incision. The hernial sac was dissected free from surrounding structures by standard operating technique. In cases of suture repair, the edges of the fascial defect were approximated with continuous polypropylene suture No 1 (Prolene, Ethicon®) in a tension free manner. In cases of mesh repair the fascial defect was closed first with non-absorbable suture. An on-lay polypropylene mesh technique was used with at least 5 cm overlap from the margin of the initial defect employing 2/0 polypropylene (Prolene, Ethicon®) suture for fixation. Suction drain was retained in all cases for 3-4 days. Prophylactic heparin was administered in all moderate to high risk cases. Patients were encouraged to move as soon as possible after surgery. The wound was inspected daily for signs of infection. All patients were provided with printed instructions upon discharge to avoid factors predisposing to recurrence. Follow up was carried out in the outpatient clinic, 2 weeks after discharge, every 3 months for the first year, every 6 months for the next 2 years, and yearly thereafter for a minimum period of 5 years. A thorough history and physical examination, with particular attention to the operative site, were undertaken on every visit. Investigations, including relevant imaging studies, were carried out if clinical features were suggestive of a possible recurrence. The data were analyzed by using SPSS software (Version 11). Categorical data comparison was made by Chi Square and Fisher exact tests. Numerical (continuous) variable comparison was made by student-t test.

Results. From January 2000 to December 2004, a total 169 patients with an incisional hernia were admitted to the Department of General Surgery. Out of these, 123 patients who underwent repair for both primary and recurrent incisional hernia qualified for the inclusion criteria and were entered in the study. Seventy-two patients belonged to group A, and 51 patients were included in group B. For base line characteristics, the patients in group A were statistically comparable to those in group B (Table 1). Four patients (5.4%) in group A and 14 (28%) in group B had recurrent incisional hernia. Midline incision was the most common site of hernia in both groups. Other baseline characteristics are shown in **Table 1.** Cesarian section was noticed as the most common individual initial procedure leading to incisional hernia in both the groups. The mean size of hernial defect was significantly higher in group B compared to group A. In the early outcome, 4 patients (5.5%) in group A and 2 patients (3.9%) in group B developed wound infection ($p = 0.51$). However, seroma formation was noticed more frequently in group B (9.8%) than group A (3.8%) ($p = 0.18$). Most of these patients (4 cases) were managed successfully by repeated aspirations. Prolonged ileus was also noticed more frequently in group B (5.8%) than group A (1.3%), and this was also the case for intestinal obstruction with 5.8% in group B and 2.7% in group A. Follow up ranged from 6-58 months (mean, 37.5 months) for both groups. Nineteen patients (12 in group A and 7 in Group B) were lost to follow up after 6-12 months of surgery. All of these patients were examined at least 2 times after surgery in the clinic. Fifteen patients (20.8%) in group A developed recurrence compared with 3 patients (5.8%) in group B (p=0.04). The mean hospital stay in group A was 6.4 days versus 8.2 days in group B (p=0.53).

Discussion. Incisional hernia is an important postoperative complication of abdominal surgery. Certain predisposing factors such as wound infection or dehiscence, site of incision, the type of surgery and surgical technique, selection of suture material, body habitus, and various co-morbid conditions influence

Table 1 - Baseline characteristics of patients with incisional hernia.

Variable	Group A n=72	Group B n=51	*P*-value
Age (mean) years	46.19 ± 14.16	47.74 ± 13	NS
Gender (Male:Female)	1:5.5	1:3	NS
Site of Hernia (%)			
Midline	45 (62.5)	36 (70)	NS
Transverse	11 (15.2)	4 (8)	NS
Others	16 (22.2)	11 (22)	NS
Intraoperative size of hernia, cm^2 (%)			
Range	2-140	4-220	
Mean	18 ± 2.8	26 ± 4.2	<0.001
Reason for first operation (%)			
Obstetric & Gynecology	43 (60)	28 (55)	NS
Gastrointestinal	12 (17)	11 (22)	NS
Open cholecystectomy	6 (8)	5 (10)	NS
Laparoscopic cholecystectomy	2 (2)	1 (2)	NS
Urological	9 (13)	6 (12)	NS
Number of previous repairs (%)			
None	68 (94.4)	37 (72)	<0.001
1	3 (4.1)	7 (13.7)	NS
2	1 (1.3)	4 (7.8)	NS
3 or more	-	3 (5.8)	NS

NS - Not significant

the likelihood of this complication.[18] Midline incisions are used more frequently in emergency surgery and are more prone to develop infection. The incisions therefore have higher recurrence rate than transverse incisions.[19-21] Sixty-six percent of patients in the present study had a midline incision, close to the reported figure of 71% by Korenkov et al.[7] Wound infection represents the most frequently associated predisposing factors in various studies.[22, 23]

Cesarian section was noticed as the most common individual operation associated with incisional hernia (58%). The probable cause, other than presence of co-morbid conditions may be the use of absorbable suture during fascial closure. Use of non-absorbable suture in fascial closure of all laparotomy wounds is recommended to reduce the incidence of incisional hernia. It also decreases the morbidity and cost associated with incisional hernia repair. Treatment of ventral incisional hernia is a challenging surgical problem. A variety of procedures have been designed but results are not encouraging. Primary suture repair has been widely used but has a reported recurrence rate of 12-54%.[4-8] We found a recurrence rate of 21% after suture repair, which is in the reported range.[3-8] The technique is stated to predispose to excessive tension and subsequent wound dehiscence due to tissue ischemia and cutting of the sutures through tissue. Surgical complications such as, wound infection, prolonged ileus, and dehiscence, are established causative factors for recurrence.[5] All 4 patients who had wound infection during the initial suture repair developed recurrence within one year.

The use of prosthetic material proved a big step towards definitive care of hernias from 1950.[12] These materials are used to reinforce the fascia or to bridge any existing defect between the borders of the abdominal wall aponeurosis. A variety of open techniques have been developed: such as, on-lay, sub-lay, in-lay, and intra-peritoneal mesh placement.[1] Mesh repair has been shown to reduce the long term recurrence rate to 2-36%.[5-7,12-15] We noticed recurrence in 3 patients (5.8%) after mesh repair, although 28% of our patients had recurrent incisional hernia. Berger et al[3] reported an unacceptably high recurrence rate

after suture repair even in patients with small hernia (67%). Korenkov et al[7] still believe that suture repair has a place in the repair of small incisional hernia. In the present series, the mean size of hernial defect was significantly higher in group B compared to group A. It reflects the tendency of mesh repair in recurrent, large, and complex incisional hernia with significantly low recurrence rate compared to suture repair. These results determine the superiority of mesh repair over suture repair due to its low recurrence rate.

The follow up period ranged from 6-58 months, with a mean of 37.5 months for both groups. The majority of the recurrences after hernia repair (66-90%) have been reported to develop within 2 years after operation.[24,25] Burger et al recently published their results of a randomized controlled trial of suture versus mesh repair of incisional hernia with a median follow up of 75 and 81 months.[3] Their 10 years cumulative recurrence rate was 63% for suture repair and 32% for mesh repair. These results suggest that recurrences continue up to 10 years after both types of repair. Mesh repair is considered to be associated with an increased rate of wound complications due to extensive dissection, raising the large skin flaps and prolonged intra operative time, and drain placement. The reported incidence of wound infection after mesh repair ranges from 3.7-8.5%.[3,6,7,12] However, in this study, there was no statistically significant difference in the infectious complications of both the groups. Two patients who developed wound infection after mesh repair needed only wound care and antibiotics. Both of them settled without removal of mesh. Careful intra operative handling and adequate antibiotic prophylaxis is recommended to reduce postoperative infectious complication.

Most studies revealed a high incidence of seroma formation after mesh repair.[3,6,7,12] We also found a higher incidence of seroma formation after mesh repair, however, this was not statistically significant. Extensive dissection for mesh placement and premature removal of the subcutaneous drain may contribute to this complication. In most of the patients, this may be managed by repeated percutaneous aspirations with or without antibiotics according to the culture reports. Mesh repair may result in serious complications such as enterocutaneous fistula, sinus tract, and bowel obstruction, causing deterioration rather than improvement in patient condition.[3] No incidence of enterocutaneous fistula or chronic sinus was recorded in this series. Burger and colleagues reported 3% incidence of enterocutaneous fistula, and 5% of patients had sinus tract after mesh repair.[3] In this study, the incidence of small bowel obstruction in the suture group was 2.7%, and 5.8% in the mesh repair group, which is less than the reported figures in an earlier study[3] (4.5% for suture and 11.6% for mesh repair). We can conclude from this study that mesh repair results in a lower recurrence rate, and is not associated with increased incidence of wound complications compared to suture repair. The retrospective nature of the study, leading to lack of control and patient randomization, may be regarded as a shortcoming of the study. However, our results provide some baseline observations, which need to be evaluated further with appropriate case controlled, double blind prospective studies.

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