

MODIFIED SHOELACE REPAIR OF LARGE ABDOMINAL INCISIONAL HERNIAS

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Abstract

This study aimed to evaluate modified shoelace darn repair. An abdominal incisional hernia represent defect in the musculo-fascial layers of the abdominal wall. It considers one of the commonest hernia in middle aged women. surgical site wound infection is the most common causative factor and there are different method of surgical repair.

This prospective study was conducted on 127 patients of incisional hernia who were managed by modified shoelace darn procedure, they had reinforce the repair by onlay mesh to bridge the defect in anterior rectus sheath.

The highest proportion of patients aged 41-50 years (37% with a mean of 43.6 years). Regarding distribution of gender, the pattern was similar in both sexes. Most of the patients were overweight (76.4%). Further 14.9% were obese and only 7.9% were normal, 29.9% developed some kind of complication. The recurrence rate was 1.6%.

In conclusion, modified shoelace darn repair is simple, safe, extra-peritoneal with less tissue damage and it seems a good surgical technique for management of large ventral incisional hernia.

Introduction

An abdominal incisional hernia represent defect in the musculo-fascial layers of the abdominal wall through which intra-abdominal or preperitoneal content can protrude¹⁻³. Hernias have been reported in 10-20% of open abdominal surgery and 1-5 per cent of laproscopic port-site incisions²⁻⁸. The incidence depends on a number of risk factors, some of these are patient related like old age, obesity, malnutrition, immune-compromise, chronic bronchitis, diabetes mellitus and asthma. Other factors are related to surgical technique and post operative complications like wound infection which is by far the most common cause of incisional hernia^{4,9-12}. There are many techniques for surgical repair of incisional hernias like primary repair, primary repair with onlay mesh reinforcement, onlay mesh, inlay mesh placement, retro-rectus and

intraperitoneal mesh placement. Shoelace darn repair was first described in 1988^{13,14}, based on creation new linea alba and restore the functional anatomy of the anterior rectus sheath by two suture lines. This study aims to evaluate modified shoelace darn repair by using onlay mesh to bridge the gap between the lateral strips of the anterior rectus sheath instead of shoelace like polypropylene darning suture.

Patients and Methods

A prospective study was conducted on 127 patients of incisional hernia who were admitted and managed in Missan Governmental Teaching Hospitals over a period between September 2012 to January 2015. After detailed history and examination, the following data were obtained for each patient: age, sex, body weight, body height, type of previous

surgery, complications and recurrence of hernia. All patients with strangulated, obstructed, associated with severe comorbid conditions, pregnant women and hernia in transverse incisions were excluded from the study. Patients who did not complied adequately with the follow up were also excluded from the statistical analysis.

An elliptical incision was done in the skin along the axis of scar and hernia ring, extended down to free the hernia sac and anterior rectus sheath 3-4 cm around the hernial neck. An incision is made 2-3 cm away from medial edge of anterior rectus sheath, extended up and down beyond the upper and lower limit of the previous wound. Any defects created in the sac were closed by absorbable suture. The sac and its content returned back to the abdomen. The medial strips of the incision were elevated off the muscle rolled medially and sutured together in the midline by continuous non-absorbable monofilament nylon No.1, creating new

linea alba. Polypropylene mesh was used to fill the gap between the two lateral edges (on the rectus muscles). The mesh was fixed to the lateral cut edges and newly created linea alba, restoring the rectus muscle in their normal position. After securing hemostasis, wound was closed with two vacuum drains. Patients were followed up at one week, three months, six months, one year and two years intervals. Complications were assessed for postoperative seroma, hematoma, infection and recurrence. Statistical analysis was conducted using SPSS version 16, the level of $P < 0.05$ was considered as statistically significant.

Results

Regarding age and gender, table I shows that highest proportion of patients was in the age group 41-50 years (37.0%) and the pattern was similar in both sexes. The mean age was 43.6 years. Male patients represent 55.9% and female patients represent 44.1%.

Table I : Age & Gender distribution

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
20-30	9	7.0	6	4.7	15	11.7
30-40	13	10.2	16	12.6	29	22.8
40-50	18	14.2	29	22.8	47	37.0
50-60	14	11.0	17	13.4	31	24.4
60-70	2	1.6	3	2.4	5	3.93
Total	56	44.1	71	55.9	127	100.0

Regarding body mass index, most of the patients were overweight (76.4%) in nutritional status as indicated by their BMI (Table II). Further 14.9% were obese and only 7.9% were normal.

Table II: Body Mass Index of the studied patients

Category	BMI range kg/m ²	No.	%
Undernutrition	<18.5	1	0.8
Normal	18.5-25	10	7.9%
Overweight	25-30	97	76.4%
Obese class I	30-35	14	11.0 %
Obese class II and III	35-40	5	3.9%
Total	27.9	127	100.0

Regarding previous incisions: To give an idea about the types of previous surgical incisions which were later associated with hernia, data are presented in table III. The most frequent cases were those of exploratory laparotomy (22.8%) followed by trauma (16.5%), ovarian and uterine surgery (13.4%) and perforated appendix (11.0%)

Table III: Types of previous incisions and surgery

Type of incisions	Type of operations	No.	%
Upper midline and paramedian incisions	Trauma (penetrating & closed injuries)	21	16.5
	Liver hydatid cyst	9	7.0
	Perforated D.U & D.U surgery	6	4.7
	GB and CBD operations	5	3.9
	Splenectomy	4	3.0
	Stomach surgery	2	1.6
	Colonic surgery	2	1.6
	Sub-total	49	38.9
Lower midline and paramedian incisions	Explorative laparotomy	29	22.8
	Ovarian and uterine surgery	17	13.4
	Perforated appendix	14	11.0
	Ectopic pregnancy	10	7.9
	Cesareans section	7	5.5
	Bladder and prostatic surgery	1	0.8
	Sub-total	78	61.2

Overall outcome: Just under three quarters of patients, 70.1% experienced no undesired outcomes after repair. The remaining 29.9% developed some kind of complications as demonstrated in table IV.

Table IV: Complications and mortality

Complication	No.	%
Seroma	13	10.2
Hematoma	9	7.0
Wound infection	7	5.5
Wound sinus	6	4.7
Recurrence	2	1.6
Mortality*	1	0.8

*One old female patient died in the tenth postoperative day due to pulmonary embolism.

Discussion

Elective incisional hernia repair is one of the most common surgical procedures performed in surgical practice. There is no consensus on the best surgical technique for the non-obstructed incisional hernia. In general the proper repair should cover the whole length of the wound, tension free and prosthetic mesh should be used if the defect was larger than 4 cm^{2,15}. Various methods have been described for surgical

treatment of incisional hernia either by primary fascial repair or placing tension free synthetic mesh at open operation or laparoscopically. Simple approximation is not recommended today because it carries high incidence of recurrence rates up to 25-55%^{16,17}, prosthetic mesh implants is utilized to decrease the incidence of recurrence to 5-15%¹⁶⁻¹⁸, so it became the standard in management of large ventral incisional hernia. Many authors

described the use of large retro-rectus mesh repair^{4,19}, this procedure carry low recurrence rate (3%) which is comparable to recurrence rate of our surgical approach, but this technique carries high morbidity due to extensive abdominal wall dissection required to create a bed for the mesh behind the rectus muscle leading to increase post operative pain, significant seroma (20%) and wound infection⁴, while the repair technique we used was simple without extensive tissue damage and carries lower incidence of seroma(10.2%) and wound infection (5.5%). Also the rate of complications in the present study is comparable to the result of other onlay mesh techniques²⁰⁻²². Recurrence rate (1.6%) was much lower than the rates reported by others^{23,24}. In large ventral incisional hernia, the

recti muscles loss their midline anchor and its pulled laterally during their tonic contraction. In this study, the function of anterior abdominal wall was restored through the by reconstitution of a new strong linea alba (new midline anchor) and keep the recti muscle in their normal anatomical position in addition to onlay mesh which offer additional support to the surgical repair.

In conclusion, modified shoelace darn repair is simple, safe, extra-peritoneal, less tissue damage. It restores the anatomical position and function of the anterior abdominal wall, with relatively low complications and incidence of recurrence. It seems good surgical technique for management of large ventral incisional hernia .

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