

Shoelace Darn Repair of Abdominal Incisional Hernias

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ABSTRACT:

BACKGROUND:

Abdominal incisional hernias are a common condition in practice. Numerous surgical procedures have been used to repair them with different results.

OBJECTIVE:

This study aims to find the place of shoelace darn in the repair of incisional hernias.

METHOD:

One hundred patients with abdominal incisional hernias have been managed by a shoelace darn repair. The details of the operative technique have been described.

RESULTS:

shoelace darn repair was an easy procedure associated with some complications, and followed by recurrence in 4 patients. The age, sex, clinical presentation, the type of previous surgery, the type of incisional hernia, the body built of the patients were discussed.

CONCLUSION:

Shoelace darn repair have got a good place in managing abdominal incisional hernias.

KEY WORDS: Incisional hernia, Shoelace darn, Repair.

INTRODUCTION:

An abdominal incisional hernia represents a failure of primary laparotomy wound healing or a failure of a previous hernia repair⁽¹⁾, due to many local and general factors^(2, 3). The hernia usually starts as a symptomless partial disruption of the deeper layers of a laparotomy wound during the early postoperative period⁽¹⁾. In the best centers the incidence of abdominal incisional hernia has been at least 10 %⁽³⁾.

Repair of these hernias is a major undertaking^(2, 3, 4, 5) and requires careful preoperative assessment and preparation^(4, 5, 6). Three basic methods have emerged for the repair of these hernias (Resuture, darn repair and Synthetic nonabsorbable mesh repair). Recently laparoscopy and laparoscopy-assisted procedures^(7, 8, 9) are being used in the repair.

Jack Abrahamson the modifier and the developer of the shoelace darn repair started using this technique in 1973. He reported the results in 1984, 1985, 1987, and finally the operative technique was detailed in a paper published in 1988^(10, 11, 12).

PATIENTS AND METHOD:

A prospective study of one hundred patients with abdominal incisional hernias who have been managed by a shoelace darn repair in governmental and private hospitals in the period 1997-2006. The shoelace darn repair was adopted by us, and our experience with this repair is the subject of this paper.

Anesthetist and physician consultation

All patients were seen by the anesthetist. 14 patients were seen by the physician (8 hypertensive, 6 diabetic) for preoperative assessment and fitness.

Operative procedure

The patients were given a general endotracheal anesthesia with full muscle relaxation. The abdomen was thoroughly examined before the start of operation, and the defect, the scar, and the skin incision and flaps were marked with an indelible skin marking pen.

The operation starts after a wide abdominal painting (10% povidone iodine) and toweling by making an elliptical skin scar excision. Skin and subcutaneous tissue were dissected off the hernial sac, as well as off the anterior rectus sheath on both sides. An incision is made in each anterior rectus sheath 1-2 cm. from its medial edge. The incision is extended up and down the entire length of the hernial defect. The two medial strips are sutured together by a continuous No.1 monofilament nylon (polyamide) loop. This will create a new linea alba and will return the hernial sac and its content to the abdominal cavity. The gap remaining between the lateral cut edges of the anterior rectus sheaths is then sutured using 2-3 No.1 nylon loop beginning at the top end taking good bites of the anterior rectus sheath in a vertical manner 2 cm away from the lateral cut edges and incorporating the newly created linea alba thus restoring the rectus sheaths and rectus muscles to their normal position. This

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nylon suture pass to and fro in front the rectus muscles and through the new linea alba for the whole length of the hernial defect in a manner of a shoelace tightening a boot. Excess skin and

subcutaneous tissue excised if any. Wound closed with two vacuum drains. (fig1)



fig1. Shoelace darn repair

RESULTS:

Age and sex

The mean age was 36.9 with range of 21 to 67. There were 66 males and 34 females. Table (1)

Table 1: Age and sex of the patients

Age (years)	No. of patients	Male	Female
21-29	28	23	5
30-39	39	26	13
40-49	20	9	11
50-59	11	7	4
60-69	2	1	1

Clinical presentation

All patients complained of a bulge at the site of a previous laparotomy scar, associated with recurrent abdominal pain and discomfort in 23 patients, with lower back pain in 18 patients, and with an ulcerating scar in 3 patients. Table (2)

Table 2: Clinical presentation

Clinical presentation	No. of patients
Bulge alone	56
bulge + abdominal pain	23
Bulge + back pain	18
Bulge + ulcerating scar	3

Type of previous incision

The previous incision was a midline or paramedian in 91 patients, and it was a transverse incision above or below the umbilicus in 9 patients.

Type of previous surgery

The previous surgery varied a lot. Table (3)

Table3: Type of previous surgery

Previous surgery	No. of patients
Penetrating abdominal injury	47
Blunt abdominal injury	9
Cholecystectomy	9
DU surgery	3
Hiatal hernia repair	3
Perforated appendicitis	6
Gynecological operation	14
Para-umbilical hernia repair	9

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Type of incisional hernia

All hernias were carefully examined with the abdominal muscles in action and out of action

(relaxation) looking for the size and number of the abdominal wall defects, as well as to the reducibility of the hernia. Table (4)

Table 4: Type of incisional hernia

Type of hernia	No. of patients
Wide neck, reducible	66
Narrow neck, reducible	12
Narrow neck, irreducible	9
Multiple narrow neck, reducible	8
Multiple narrow neck, irreducible	5

Body built

All patients have their weight and height measured and their BMI calculated. Table (5)

Table (5) Body built

Body built	No. of patients
Under weight	0
Normal	37
Over weight	59
Obese	4
Grossly obese	0

The mean time of surgery was 104 min. with a range of 70 to 130 min.

All patients were having mild to moderate postoperative pain in the first day requiring an injection or two of analgesic. All patients recovered easily and they were ambulant and on oral fluid diet next day. Patients with co-morbid illnesses were managed during and after the operation according to the instruction of the physician.

Mean hospital stay was 4.6 days with a range of 3 to 7 days.

There was no mortality in this study .

Postoperative complications

Four patients developed atelectasis requiring intensive chest physiotherapy. Five patients

developed a wound seroma treated by repeated aspiration. Four patients developed wound infection requiring removal of some stitches and continuation of antibiotic therapy. Two patients developed partial flap necrosis requiring wound debridement under general anesthesia in one of them.

Recurrence of the hernia

Since the beginning of this study in 1997 till now four patients only came back with recurrence of their hernia. All of them were having a high BMI, two of them were diabetic, three of them were having wound infection, one was having flap necrosis requiring debridement, and two were having atelectasis. Table (6)

Table (6) Patients with recurrent hernia

Patients	BMI	diabetes	Wound infection	Flap necrosis	atelectasis
No.1	38	+ve	+ve	-ve	+ve
No.2	35	-ve	-ve	+ve	+ve
No.3	29	+ve	+ve	-ve	-ve
No.4	28	-ve	+ve	-ve	-ve

DISCUSSION:

With the development of modern synthetic non-absorbable materials, three basic methods have emerged for repair of abdominal incisional hernias:

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- Re-suture⁽¹³⁾
- Shoelace darn repair ^(10,11,12)
- Synthetic non-absorbable mesh repair⁽¹⁴⁾

A small hernia is suitable for repair by re-suture. Attempts at resuturing a big hernia will result in tension, and inevitably in recurrence. In this

method the sac is opened, and all adherent omentum and loops of bowel are dissected off its inner surface, and also off the inner surface of the abdominal wall. The sac is excised. The musculo-aponeurotic defect is then closed taking good bites, using interrupted or continuous non-absorbable monofilament suture.

The use of synthetic non-absorbable mesh repair is well established. The method involves the excision of the hernial sac, and the dissection of the adherent loops of bowel, with the risk of fistula

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formation. It is a time consuming procedure, often improperly performed by surgeons. The abdominal wall defect is bridged by a sheet of mesh inserted as an underlay, inlay, or as an overlay, fixed by interrupted non-absorbable sutures.

The shoelace darn repair is superior to the other two methods^(10,11,12) for the following reasons: -

1. Quick, easy, extra-peritoneal method that simply returns the unopened hernial sac and its contents to the abdominal cavity, and thus avoids the tedious and perhaps risky dissection of the adherent loops of the bowel on the inner surface of the sac required in the re-suture and in the mesh repair.
2. The repair restores the functional anatomy of the abdominal wall. It reconstructs a strong new linea alba and allows the rectus muscles to straighten and lie along side each other at the midline. It also reconstructs the anterior rectus sheaths and fixes them to the new linea alba.
3. Tension free repair.
4. Minimal suture material requirement.

The superiority of the shoelace darn repair was reflected on the mean time of surgery (104 min.), on the severity of the postoperative pain (mild to moderate), on the easy postoperative recovery, on the mean hospital stay (4.6 days), and on the relatively low incidence of the postoperative complications.

Jack Abrahamson in his series of 300 cases published in 1988 wrote that he has no deaths and 2% recurrence. He concluded that since the operation is entirely extra peritoneal, technically relatively simple and quick, it is eminently suitable for elderly patients with other general medical problems.⁽¹¹⁾

Comparing our result to the result of Solmi et al in which 170 patients with incisional hernia were enrolled in this study between September 2001 and December 2004. Of these, 85 underwent anterior-open repair (open group: OG), and 85 underwent laparoscopic repair (laparoscopic group: LG). The clinical outcome was determined by a median follow-up of 24.0 months for LG and OG.

Their results showed No difference was noticed between the two groups in age, American Society of Anesthesiologists (ASA) score, body mass index (BMI), and incisional hernia diameter. Mean operative time was 61.0 min for LG patients and 150.9 min for OG patients ($p < .05$). Mean hospitalization was 2.7 days for LG patients and 9.9 days for OG patients ($p < .05$). Mean return to work was 13 days (range, 6–15 days) in LG patients and 25 days (range, 16–30 days) in OG patients. Complications occurred in 16.4 % of LG

patients and 29.4 % of OG patients, with a relapse rate of 2.3% in LG and 1.1% in OG patients.⁽¹⁷⁾

Obesity, diabetes, wound infection, flap necrosis, and postoperative coughing were the obvious factors contributing to recurrence in our four patients. Many other factors might contribute to recurrence^(15, 16). The true incidence of recurrence in our practice is not known due to the lack of regular long term follow up.

CONCLUSION:

Shoelace darn repair has got a good place in managing abdominal incisional hernias

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