CONTINUOUS MONOFILAMENT POLYAMIDE (LOOP) SUTURE IN THE REPAIR OF RECURRENT AND COMPLICATED INCISIONAL HERNIA

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ABSTRACT

Surgery for recurrent incisional hernia is followed by further recurrence in nearly half the patients. Majority of these failures are due to wound complications and factors which give rise to an increased strain on the suture line. In an effort to counter the risk factors, continuous monofilament nylon loop suture was used in the anatomical repair of 15 patients with recurrent and complicated incisional hernia. After a median follow up of 14 months only one patient (6.6%) developed a recurrence, despite selecting only poor-risk patients. This technique for anatomical repair of incisional hernia seems safe and dependable.

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KEY WORDS : Incisional hernia; Monofilament nylon; Suture material.

Introduction

Incisional hernia have a recurrence rate of 9 to 25% [1,2]. Surgery for recurrent hernia is more often followed by further recurrence in nearly 50% [3]. 50-80% of these are due to wound complications such as seroma and infection [4-6]. The other factors being obesity, abdominal distention, violent cough and vomiting (15-50%) [7,8], all of which throw an increased strain on the suture line.

In the closure of abdominal wounds, which are at a high risk of wound failure, better results have been achieved with the use of synthetic monofilament sutures of nylon or polypropylene [9]. In an effort to counter the risk factors, continuous monofilament nylon polyamide (loop) suture was used in the anatomical repair of recurrent and complicated incisional hernia. Our experience with the use of this suture material forms the basis of this report.

Material and Methods

Fifteen patients underwent anatomical repair of incisional hernia which were either

recurrent, complicated by strangulation or had other associated surgery performed at the same time, at Command Hospital (WC) Chandimandir from December 91 to June 93.

The repair in all these patients was performed using continuous black double strand monofilament polyamide loop suture, (Ethilon No 1-0. USP; 3.5 metric on a half circle round bodied 40 mm needle, Code No NW 3340; Ethicon), in a layered manner. The sutures were placed close and deep; 1 cm apart and 1 cm from the wound edge (after Jenkins) [10], interlocking every fourth stitch. The length of the suture used was at least four times the length of the wound. If two lengths were required the second suture was begun at the other end of the wound. Being a loop suture the initial anchoring was done by passing the suture through the loop obviating the need for a securing knot at one end. The final knot at the other end, or in the middle if two lengths were used, was given two additional throws (a total of four throws). Both the posterior and the anterior rectus sheath were approximated with the same suture material, leaving negative suction drains between the

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layers of the repair, and subcutaneously in the obese, for 24 to 48 hours. A short course of prophylactic antibiotics was used in the perioperative period for 3 days, the first dose being administered on the morning of surgery.

The condition of the wound was reviewed 3 and 7 days after surgery, again at the time of discharge from hospital and at 3-monthly intervals thereafter. The parameters recorded were wound infection, formation of a sinus and evidence of recurrence of incisional hernia.

Results

There were 6 males and 9 females. The mean age was 49.8 years (range 31-73). Six patients (40%) were operated through a paramedian incision and 9 (60%) through a midline incision. Four patients underwent emergency surgery. Seven patients were operated for recurrent incisional hernia (5 for a first recurrence and 2 for a second recurrence). Three others underwent surgery for strangulation. In 5 more patients the hernia repair was done along with surgery for, either, duodenal ulcer (n=3), ruptured ovarian cyst (n=1), or uterine fibroids (n=1). The risk-factors perceived as likely to give rise to recurrence are listed in Table 1.

TABLE 1
Perceived risk-factors for recurrence in 15 patients with incisional hernia

Factor	n#	(%)
Obesity	7	29.2
Chronic obstructive airway disease	3	12.5
Emergency surgery	4	16.6
Wide abdominal wall defect (> 10 cm)	5	20.8
Recurrent hernia	7	29.2

Most patients had more than one risk factor

The median follow up period was 14 (range 6-24) months. Two of the 15 patients developed superficial wound infection and one obese 65-year-old woman, who underwent repair for a second recurrence, developed further recurrence of her incisional hernia. None

of the patients complained of any discomfort due to the suture or developed a sinus requiring removal of the suture material.

Discussion

Most incisional hernias are satisfactorily repaired using the patients own tissues and conventional surgical techniques [10]. Besides the technique of abdominal wound closure, the suture material used has an added significance. Apart from suture breakage and knot slippage, the most important cause of wound failure is the tearing through the tissues by intact suture [11].

In this study we have attempted to evaluate the efficacy of monofilament polyamide nylon loop suture in the anatomical repair of recurrent or complicated incisional hernia instead of using a polypropylene mesh with its attendant risk of infection and sinus formation.

Comparing polyamide and polypropylene, the two commonly used suture in wounds at a high risk of failure; both have the lowest yield stress, the highest values in terms of breaking strain and "work of rupture". However the wide range of stress-strain behaviour, observed among the commonly used suture materials, suggests that besides the USP size specification, stress-strain curves give more useful and complete information in terms of overall performance [12]. The modulus of elasticity (extracted from the stress-strain curves) is a measure of the resistance of the material to elongation before yield point. A suture with a low modulus of elasticity (hence more compliance) is more likely to yield to the swelling pressure of the wound due to postoperative oedema and less likely to cut through the tissues [13]. The order of increasing modulus of elasticity is Ethilon (20.0), Mersilene, Dexon, prolene (58.5), Vicryl and silk [12].

Thus both polyamide and polypropylene have the highest values of all the physical parameters which are a measure of strength except that polyamide has a low yield stress, which has been compensated by using a doubled suture thus distributing the load on each

strand. It has the lowest modulus of elasticity and is thus the least likely to cut through oedematous tissues. It retains all its strength for three months and only 16% is lost after one year [14]. It causes the least tissue reaction [15] and has been reported to be better than polypropylene in reducing the tissue susceptibility to infection in contaminated wounds [17].

The results of this study compare favourably with other series. Despite selecting patients with high-risk of wound failure, incisional hernia has recurred in only one of the 15 patients (6.6%) as compared to 9-25% reported recurrence following first repair [1,2] and 50% following recurrent hernia [3]. Although the follow up period of this study is relatively short, since most reported recurrences related to wound closure techniques are found in the first few months of follow up [18], the comparison appears to be valid.

The use of continuous double strand monofilament polyamide loop suture to close the posterior rectus sheath increases the strength of the repair. Since the material is inert, the excessive suture material left in the wound is of little consequence. The material is easy to handle and the knots do not slip if four throws of a double knot are used. It has not caused any discomfort to the patients or given rise to any sinus. A zero wound-failure rate is perhaps impossible to achieve, however, this technique of anatomical repair of incisional hernia seems safe and dependable.

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