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The results of incisional hernia repair: a twelve year review

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Summary

A series of 81 incisional hernia repairs is presented. Two main types of repair were performed, the 'keel' repair and a mass closure repair. In both repairs monofilament nylon was used.

The recurrence rate was 46% (37 patients), the major predisposing factor being postoperative wound infection or haematoma formation. Subsequent repairs were no more successful. These poor results are compared with other published series.

Introduction

Incisional hernias complicate 5–11% of abdominal wound closures *(1–4)*. Sixty one per cent of patients who develop an incisional hernia are aware of its presence either because of its appearance or because of symptoms of discomfort or subacute obstruction *(4)*. This represents a considerable morbidity and may mar an otherwise successful operation.

It is generally accepted that the repair of incisional hernias is difficult and often unsuccessful. Numerous ingenious techniques for incisional hernia repair have been described, yet the results of few large series have been reported. This retrospective study of 81 repairs using conventional suturing techniques was undertaken to establish the efficacy of these standard repairs.

Methods

The records of patients undergoing an incisional hernia repair in this unit between 1970 and 1982 were reviewed. Patients who had undergone a previous repair were excluded leaving 81 patients for study.

For each patient, information was collected into five categories: personal details, the operation preceding herniation, the incisional hernia, the repair and follow-up.

The retrospective nature of this study made it difficult in some cases to determine whether postoperative wound discharges were sterile or infected. In the data presented those patients recorded as having wound infections, haematomas, seromas or unspecified wound discharge are grouped together as wound complications.

Statistical analysis of the data was performed using the Chi-square test and the Mann-Whitney U test.

Results

Two main repair techniques were used. Between 1970 and 1977 most repairs were of the 'keel' type using two or three layers of suture. After 1977 the majority of repairs were performed using a mass closure technique. In both, monofilament nylon (gauge no. 1) was used. Three patients had hernias repaired by other techniques.

Ninety five per cent of repairs were performed by surgeons of senior resident or consultant status. Suction drainage was used after most repairs. No patient received prophylactic antibiotics.

Of 81 patients who underwent a primary incisional hernia repair 37 (46%) developed a recurrence. There were no postoperative deaths. Patients who developed a recurrence are compared with those who did not in Table I.

In this study a significantly ($P=0.0004$) higher proportion of patients who had a postoperative wound complication developed a recurrent hernia. No significant difference was demonstrated between the two groups with regard to age, sex, weight or smoking habits. Surprisingly, neither the size of the hernia nor the type of repair affected the outcome of surgery.

The length of follow-up of patients with a sound repair was significantly ($P=0.0252$) longer than the time postoperatively at which recurrent hernias appeared. Recurrent hernias appeared at a similar time after surgery (6 months median) as did the original hernia (7 months median). Recurrent hernias were generally smaller than the original hernia.

The subsequent management of patients who developed a recurrence is shown in Fig. 1.

Twelve patients underwent further repair on one or more (maximum 5) occasions with an overall recurrence rate of 42% (5 patients). The 30 patients in whom surgical repair was unsuccessful were managed conservatively with or without a corset.

Discussion

In this series of primary incisional hernia repairs performed by experienced surgeons using standard techniques the recurrence rate was 46%. The major factor implicated in recurrence was the development of postoperative wound complications (wound infection, haematoma or seroma).

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TABLE I Incidence of recurrent herniation related to possible causal factors (numbers of patients or median and range)

Factor	*Patients without recurrence (n=44)*	*Patients with recurrence (n=37)*	
Patient			
Age	58.5 (31–76)	60.0 (37–80)	M-W U * NS
Sex M	28	19	χ^2 † NS
Sex F	16	18	
Weight (Kg)	74.5 (54–120)	74.0 (50–105)	M-W U NS
Smoker	25	19	χ^2 NS
Original incision			
Midline	22	24	
Paramedian	16	7	χ^2 NS
Others	6	6	
Hernia			
Time noted after laparotomy (months)	7 (1–120)	6 (1–240)	M-W U NS
Maximum diameter (cms)	8 (1–20)	10 (2–30)	M-W U NS
Hernia Repair			
'Keel'	24	19	
Mass nylon	19	16	χ^2 NS
Others	1	2	
Postoperative wound complications	4	17	P=0·0004
Follow-up			
Duration (months)	13.5 (1–156)	—	
Time to recurrence (months)	—	6 (1–120)	
Maximum diameter (cms)	—	5 (2–15)	

* Mann-Whitney U test
† Chi-square test

The major contemporary series comparable with this study are listed in Table II.

Similar recurrence rates were found by Mudge *(4)*, Horton *(5)* and Maguire *(8)*. Our study did not confirm the conclusion of Horton *(5)* that obesity was the major cause of recurrence. Fischer *(7)* in a detailed retrospective study of 169 repairs found that 89% of recurrences were preceded by wound complications, similar results were reported by Maguire *(8)*.

Jenkins *(9)* using a mass nylon repair in which bite depth, stitch interval and suture length : wound length ratio were strictly defined, achieved a recurrence rate of 8%. However, the size of the hernias was not recorded and very large hernias may have been excluded.

Young *(10)* and Maguire *(8)* using lateral relieving incisions in the anterior rectus sheath to repair upper midline incisional hernias have reported recurrence rates of 7% and 19% respectively.

The two series from the Shouldice Clinic require critical appraisal. Akman *(11)* reported 8 recurrences following 500 repairs performed between 1945 and 1960, whilst Obney *(12)* reported 24 recurrences following 192 consecutive repairs performed between 1946 and 1954. No centre has managed to reproduce Akman's recurrence rate of 1.6% using a layered steel wire repair.

There are many published reports of ingenious repair techniques devised to improve upon the generally poor

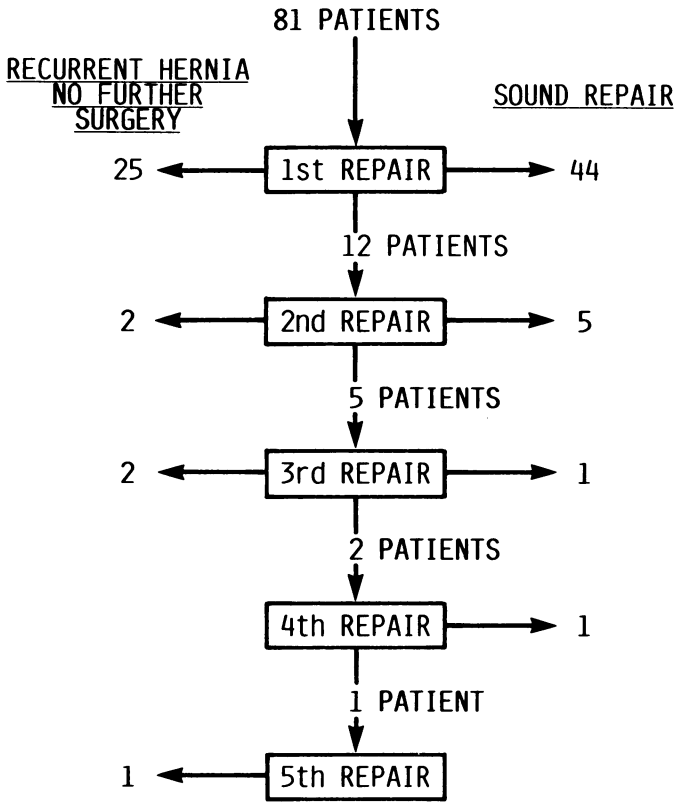

FIG. 1 The management of patients with recurrent incisional hernias

TABLE II Recurrence rates after incisional hernia repair

Author/year	*Centre*	*Technique*	*Number of patients*	*Recurrence rate (%)*
1 Suture Techniques				
Obney *(13)* 1957	Shouldice Clinic Canada	Layered steel wire	192	12.5
Young *(10)* 1961	Warrington UK	Rectus relieving incision	15	6.6
Akman *(12)* 1962	Shouldice Clinic Canada	Layered steel wire	500	1·6
Horton *(5)* 1969	Bristol UK	Various	36	44.0
Fischer *(7)* 1974	Edmonton Canada	Various	151	17·2
Maguire *(8)* 1976	Warrington UK	Rectus relieving incision	32	18.8
Jenkins *(9)* 1980	Guildford UK	Mass nylon	50	8.0
Present Authors	Westminster UK	Keel or mass nylon	81	46.0
2 Graft techniques				
Usher *(15)* 1962	Houston USA	Marlex	156	10.2
Hamilton *(14)* 1968	Louisville USA	Fascia lata	43	7.0
Usher *(17)* 1970	Houston USA	Marlex	48	0.0
Fischer *(7)* 1974	Edmonton Canada	Synthetic mesh	18	5.6
Larson *(6)* 1978	Providence USA	Marlex	53	11.3
Lewis *(16)* 1984	McGill University Canada	Marlex	50	6.0

results achieved using standard sutured repairs. Extractable prostheses, muscle transpositions, collagen implants, dermal grafts, skin strip reinforcement, fascia lata grafts and prosthetic mesh of various types have all been described. With the exception of fascia lata grafts and prosthetic mesh implants, these techniques are only applicable to specific types of incisional hernia or have failed to give reproducible results.

Many varieties of prosthetic mesh have been used in incisional hernia repair. Knitted polypropylene mesh (Marlex) being well tolerated by the body and having exceptional long term stability is currently the most widely used.

The major published series of results of incisional hernia repair using fascia lata graft or Marlex mesh are listed in Table II.

Hamilton *(13)* reported 43 incisional hernia repairs using fascia lata grafts with a recurrence rate of 7% despite a high wound complication rate. The main disadvantage of fascia lata is the need for a second incision over the donor site.

Consistently low recurrence rates have been obtained in those series using Marlex mesh for incisional hernia repair *(6,14–16)*. The reported incidence of wound complications was no higher than with standard suture repairs. The availability of Marlex in a wide variety of sizes makes it especially suitable for the repair of large or difficult incisional hernias.

Standard repairs aim to approximate the edges of the hernial defect and to hold them securely until healing is complete. No matter which technique is used this necessitates putting the tissues under tension and consequently increases the risk of tissue ischaemia and suture cut-out. If the defect cannot be closed completely herniation may occur through the interstices of the intervening suture material.

Conclusion

In this and other published series, standard suturing techniques of incisional hernia repair give unacceptably high recurrence rates even in the hands of experienced surgeons with an interest in the problem. Wound complications are important factors contributing to recurrence and any reduction in their incidence would probably be reflected in lower recurrence rates. We now believe that incisional hernia repairs using suture techniques are based on the unsound principle of approximation of the defect edges which leads to excessive tension and subsequent repair failure. Prosthetic mesh allows defects of any size to be repaired without tension with a reported lower recurrence rate.

This study has prompted us to undertake a prospective study of Marlex mesh in incisional hernia repair.

The prevention of incisional herniation is not yet possible but early experiences of the lateral paramedian incision *(17)* suggested that its incidence might be reduced to less than 1%. We have confirmed these results in a controlled trial *(18)* and now use it as our standard laparotomy incision. We are conducting further studies of the lateral paramedian incision and it is hoped that the prevention of incisional hernias will prove easier than their cure.

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