

## Incisional Hernia: Experience in a Single Surgical Unit

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**Background:** Incisional hernias are a common problem in general surgery and they have a varied aetiology. The aim of this study was to document a single unit experience with the management of incisional hernias at King Edward VIII Hospital, Durban, South Africa.

**Patients and Methods:** This was a prospective audit of incisional hernias in a single surgical unit from January 2001 to May 2004. All patients underwent open repair. Clinical data and intra-operative findings were documented.

**Results:** A total number of 77 patients were seen of which 70 were female. Fifty three (68.8%) and 24 (31.2%) of patients underwent elective and emergency surgery respectively. A total of 56 patients had previously undergone gynaecological surgery compared to 21 who had undergone general surgery. There was a documented history of previous sepsis in 4 (7%) of patients. There was 1 sheath defect in 36 patients, 2 defects in 9 patients, 3 defects in 10 patients, 4 or more defects in 9 cases. In 55 patients the original suture could not be identified. Gangrenous bowel was present in 3 patients. Only 3 (3.9%) of the patients had a mesh repair. The rest (96.1%) underwent tissue repair. Morbidity rate was 17% and there were no deaths. Five patients needed management in the ICU. Hospital stay was 8 + 11 years

**Conclusion:** Most incisional hernias followed gynaecological surgery. There was no evidence of a non-absorbable suture having been used at the original operation in over half of the patients. We recommend that meticulous technique is essential in closing the abdominal incision.

### Introduction

Incisional hernias are a common problem in general surgery. They develop in 2-11% of patients undergoing laparotomy<sup>1-3</sup>. In 80-95% of patients, they develop within 6 months to 3 years after initial surgery<sup>2,4</sup>. Hernias that develop within three years of operation are more likely to be troublesome and larger in size than those that develop late<sup>5</sup>. The common risk factors include multiple abdominal procedures, wound infection, chronic cough, obesity, emergency procedures, early re-operation and surgical technique<sup>1,3,6</sup>. The aim of this study was to document our experience with the management of incisional hernias at King Edward VIII Hospital, Durban.

### Patients and Methods

This was a prospective study of patients with incisional hernias in a single ward at a tertiary teaching hospital over a period of 41 months (January 2001 to May 2004). Demographic data, nature of original operation, intra-operative findings and procedure performed were all documented in a standardised proforma. Documented intra-operative information included the identification of the original suture, the

number of defects and the type of repair done. There was selective mesh repair only if the defect could not be closed without tension. This was left to the preference of the surgeon. There was no standard protocol regarding repair and the type of repair was left to the preference of the treating surgeon. Generally a tissue repair was performed using loop nylon suture.

### Results

A total of 77 patients were treated for incisional hernia during this period, of which 70 were female. Their mean age was  $44.34 \pm 13.09$  years (range 22-81). Previous operations leading to incisional hernia are shown in Table 1. In 73% of cases the previous procedures were gynaecological (inclusive of gynaecology and obstetrics). The period between original operation and the development of symptoms was between 1 month and 15 years.

Indications for surgery are shown in Table 2 and predisposing factors and operative risk factors are shown in Table 3. Fifty three and 24 patients underwent elective and emergency surgery respectively. Table 4 shows patients stratified according to the number of defects and contents

of the sac. One patient had a Richter's hernia. The bowel was gangrenous in 3 patients. Tissue repair was undertaken in 74 patients (with loop nylon in 62, Polydiaxanone-S (PDS) in 9 and Polypropylene in 3) and mesh repair was undertaken in 3 patients. A drain was left in situ

in 27 patients. A total of 13 patients (17%) developed complications; 7 (10%) developed wound sepsis. Five patients needed management in the ICU. Hospital stay was  $8.13 \pm 10.72$  days (range 2-93 days).

**Table 1.** Original Operations Leading to Development of Incisional Hernia

Procedure	Number of Patients	%
<b>Obstetric and gynaecological</b>	<b>56</b>	<b>73</b>
Caesarean section	47	61
Total abdominal hysterectomy	7	9
Tubal ligation	2	3
<b>General surgical</b>	<b>21</b>	<b>27</b>
Laparotomy for Gunshot abdomen	6	8
Laparotomy for unknown reason	5	7
Repair incisional hernia	4	6
Open cholecystectomy	3	4
Laparotomy for small bowel perforation	1	1
Laparotomy for splenectomy	1	1
Laparotomy for peritonitis	1	1

**Table 2.** Indications for Surgery in 77 Patients with Incisional Hernia

Indication	No of Patients	%
Pain	51	66
Intestinal obstruction	12	16
Cosmetic appearance	8	10
Cosmetic appearance + pain	3	4
Discomfort	1	1
Not stated	2	3

**Table 3.** Predisposing Factors and Operative Risk Factors In 77 Patients with Incisional Hernia

Predisposing factors	No of Pts	%
Obesity	27	35
Chronic cough	7	9
Previous wound infection	7	9
Laparostomy	1	1
Chronic obstructive airways disease	1	1
<b>Operative risk factors</b>	<b>n</b>	<b>%</b>
Hypertension	7	9
Diabetes mellitus	4	6
Hypertension + Diabetes mellitus	1	1
Ischemic heart disease	1	1
Chronic obstructive airways disease	1	1

**Table 4.** Intra-Operative Findings in 77 Patients with Incisional Hernia

Feature	Number of patients
<b>Number of defects</b>	
One	36
Two	9
Three	10
Four or more	9
Not stated	24
<b>Sac contents</b>	<b>Number of patients</b>
Omentum	25
Omentum + small bowel	10
Small bowel	6
Empty	36

Three patients died (4%), following emergency operations. One patient with asthma and chronic obstructive airways disease (COAD) developed wound dehiscence and required re-repair; the second patient with COAD had had intestinal obstruction for two months before admission to hospital; the third patient had gangrenous bowel at surgery. All three patients were ventilated post-operatively in the ICU and died from multiple organ dysfunction syndrome (MODS).

Twenty-nine patients (38%) had left contact details. When contacted later, 7 (25%) of the 29 patients agreed to come in for further review (follow-up 6 months to 4 years). One had hernia recurrence and one patient was not satisfied with the result even though her repair was still intact. Both had had tissue repairs and were reviewed 4 years after surgery. The remaining five patients were satisfied with their repair.

### Discussion

Incisional hernias are a common problem in general surgery and they develop in 2-11% of patients undergoing laparotomy<sup>1-3</sup>. While some studies have shown a male predilection<sup>1-3,6</sup>, others have found no sex predilection<sup>7</sup>. There was a female preponderance of 6:1 in this study.

The aetiology of incisional hernia is multifactorial and, despite numerous predisposing factors, the underlying cause of the development of hernias seems to be of a biological nature<sup>4</sup>. An abnormal

collagen metabolism has been ascribed an important role in the genesis of incisional hernia and the high recurrence rates after surgical hernia repair. It seems plausible that a mal-union occurs between the edges of the incised aponeurosis soon after operation and that the weak fibrous tissue forming that mal-union insidiously stretches, until the hernia becomes clinically detectable<sup>8,9</sup>. Sepsis inhibits collagen synthesis resulting in slowing of epithelialization and wound contraction<sup>9</sup>. Although many predisposing factors for incisional hernia are patient related, some factors may be influenced by the surgeon in the prevention of incisional hernia. These include the type of primary closure, wound infection rate and materials used<sup>4</sup>. None of these factors were controlled or standardised in our study.

The ideal suture material for closure of abdominal wound should have three important characteristics, namely retention of high tensile strength, monofilament structure so that bacteria cannot hide within any interstices and absorbable qualities so that the material is ultimately eliminated as a source of infection<sup>3</sup>. Experimental research has shown that one year after laparotomy the abdominal fascia retains only 70% of its original tensile strength<sup>9</sup>. Polyglactin (Vicryl) and Polyglycolic acid (Dexon) are degradable and they have the advantage of disappearing after 75 days but they have no tensile strength after 30 days. Polydioxanone-S (PDS) is a monofilament suture having the advantage of nylon and polypropylene with

smooth surface which slides easily through the tissues<sup>4</sup>. PDS is only absorbed after 180 days and retains 70% of its strength after 3 weeks; it seems to be associated with a lower rate of incisional hernia<sup>9,11</sup>. Studies comparing wound closure by absorbable and non-absorbable sutures have shown no difference in the overall incidence of incisional hernia<sup>9</sup>. In a meta-analysis by Hodgson et al<sup>12</sup> incisional hernia was 32% less frequent with non-absorbable sutures compared to absorbable. Furthermore non-absorbable sutures had an increased rate of cutaneous sinuses and wound pain.

In abdominal wound closure continuous suture closure is as effective and as safe as interrupted suture closure with the advantage of being more expeditious<sup>4,11,13</sup>. There is evidence to suggest that layered closure is associated with increased risk of infection, hernia and dehiscence compared to mass closure<sup>14</sup>. Weiland et al<sup>14</sup> also recommend that non-absorbable sutures should be used for continuous closure and that absorbable sutures should be favoured for interrupted closures.

In many cases with hernias of small to moderate size fascial defects, closure can be achieved by apposing the edges of the fascia and closing the wound in a continuous mass closure<sup>1,3,9</sup>. The likelihood of adequate and long-lasting repair can be increased by adherence to specific surgical principles<sup>1,3</sup>. Sutures are best placed about one centimetre apart in order to provide for incorporation of healthy fascia on either side of the edge and avoid protrusion of abdominal contents through the fascia<sup>3</sup>. Problems with the absorbable suture such as sinus formation or infection may have been the overriding concerns that have resulted in the use of non-absorbable suture<sup>4</sup>.

When the defect is sufficiently large to preclude the use of simple closure a number of other primary repairs have been proposed including relaxing incisions and prosthetic mesh repairs<sup>1,3</sup>. The use of synthetic mesh in incisional hernia repairs increased dramatically in the 1990s<sup>15</sup>. Some studies seem to suggest that mesh repair is superior to suture repair with regard to recurrence<sup>16</sup>, others contend that there is no one technique that best procedure for all patients<sup>17</sup>.

It is interesting to note that the major operations leading to incisional hernias were gynaecological in this series. This is difficult to explain. It would be unfair to suggest that the gynaecological nature of the operation predisposes to incisional hernia. Many factors need to be considered such as wound factors, patient factors, tissue factors and type of closure during the previous operation. A previous suture could not be identified in over half of the patients suggesting that an absorbable suture might have been used in the original operation. Up to 19% of hernias are preceded by wound infection<sup>1,3,6,9</sup>, which is much higher than the 7% observed in this series.

The complication rate was 17% with 10% wound sepsis rate and there was no seroma. These figures differ from those in the literature where seroma formation is reported in 3-6%<sup>2,18</sup> and wound infection in 1%<sup>18</sup>. There was no seroma formation in this series but superficial wound infection occurred in 10%. It is worth bearing in mind, however, that this study reflects a single unit experience and the findings cannot be generalised.

Incisional hernia repair is associated with cumulative rates of re-operative repairs<sup>15</sup> and recurrence rate after repair has been reported at 10-50%<sup>1,3,9,18</sup>. Interestingly with the advent of prosthetic meshes being used for incisional hernia repair, the recurrence rate has dropped to about 5%<sup>1,15,19</sup>.

Unfortunately follow-up was very poor in this series. A large number of our patients are from rural areas and transportation is both unreliable and expensive. Furthermore patients do not present to hospital unless they are having problems. Sometimes patients accept a small recurrent hernia as normal and do not present to hospital for medical attention.

### Conclusion

Most incisional hernias in this series followed gynaecological surgery. There was no evidence of a non-absorbable suture having been used at the original operation in over half of the patients. Whatever material or technique is used for abdominal wall closure it cannot and should not be a substitute for meticulous technique. This study was unable to elucidate clearly the

recurrence rates because of poor follow-up. Now that meshes are being used increasingly in our unit further prospective studies need to be done to assess recurrence rates.

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