

Early outcome of incisional hernia repair using polypropylene mesh: A preliminary report

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ABSTRACT

Background: The use of prosthetics for open repair of incisional hernia is very recent in our practice. We highlight our experience repairing incisional hernias with polypropylene mesh. **Patients and Methods:** Patients presenting with incisional hernia >5 cm in length or width received open polypropylene mesh repair and were followed for two years. Data obtained included age, sex, primary surgery causing the hernia, the length of the fascial defect and previous attempts at repair. Post-operative wound complications were recorded. The integrity of the scar and patient satisfaction or concerns with the repair was assessed at each visit. **Results:** Nineteen females with a mean age of 35 years (range 30-54) underwent repair; most arising from obstetric or gynaecological procedures. Sixteen (82.2%) had midline, 2 (10.5) transverse and 1 (5.3) Pfannenstiel scars. One patient had no previous repair (R₀), 7 had undergone one repair (R₁), 9 had undergone two repairs (R₂) and 1 had three previous repairs (R₃). The length of fascial defects ranged from 8 to 18 cm and seroma collection and stitch sinus were the common problems encountered. Two (10.5%) recurrences were recorded in two years. **Conclusion:** Open mesh repair of incisional hernia carries a low risk of infection and recurrence in two years.

Key words: Incisional hernia, low recurrence, polypropylene mesh, seroma

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INTRODUCTION

Incisional hernia is increasingly adding to the workload of the general surgeon in our practice and presents enormous operative challenges on account of difficult scar tissue and extensive adhesions encountered. These hernias follow previous abdominal wall surgery and are common with midline incisions and, rarely, laparoscopic port¹ sites or ambulatory peritoneal dialysis cannula sites.²

Incisional hernias occur in approximately 5% to 15% of laparotomies^{3,4} and become apparent within the first five years;⁵ but could take as long as 15 years to manifest.⁶ Poor surgical technique and post operative wound infection are contributory. Midline scars are particularly vulnerable because of the poor healing properties of fascial tissue.^{1,4} Obesity, size of defect,⁷ advanced age, prolonged use of steroids, malnutrition, uraemia, diabetes, jaundice and raised intra-abdominal pressure from any cause are other known risk factors.^{4,8,9}

Long term recurrence is a parameter of interest for incisional hernia repairs.¹⁰ Open suture repair is popular in resource-poor settings due partly to non-availability or cost of mesh. Some workers report low clinical recurrence with this repair^{11,12} but ultrasound detected evidence of recurrence may be higher.¹³ Suture repairs for hernia defects exceeding 5 cm length is associated with recurrence as high as 43% because of raised intra-abdominal pressures which causes the sutures to cut through the fascia.^{3,7} Open prosthetic repair of large hernias, in particular recurrent incisional hernias, is documented to be tension-free with reduced recurrence.

PATIENTS AND METHODS

This is a prospective investigator-driven observational study of adults presenting to a general surgery clinic with incisional hernias.

Incisional hernia with fascial defects exceeding 4cm in length or width were included from the study.

Incisional hernia with fascial defects less than 4 cm, presence of obstructive and strangulating symptoms or co-morbidities which preclude general anaesthesia, intra-abdominal masses or chronic cough were excluded from the study.

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Approval for ethical clearance was obtained from the local institutional Ethical Review Board.

All patients satisfying the inclusion criteria underwent detailed abdominal, cardiovascular and respiratory examinations and did a minimum of full blood count, chest X-ray and urine analysis. The processes of mesh insertion and its possible post-operative complications were fully explained to each patient by the lead surgeon. Patients who were pregnant at presentation were scheduled for operative delivery at term by the obstetrician and hernia repair done concurrently. Consent was obtained from patients for an open repair using polypropylene mesh (PROLENE* Mesh, ETHICON Inc.) under general anaesthesia with endotracheal intubation. All patients received subcutaneous enoxaparin for venous thromboembolism prophylaxis pre- and post-operatively and 1g of intravenous ceftriazone at induction of anaesthesia.

The previous abdominal scar was carefully excised through an elliptical incision, with extensive dissection of the subcutaneous tissue to define the fascial margins. The peritoneum was routinely opened and adhesions, where present, lysed and redundant peritoneum excised. The fascial defect was clearly identified and its length measured. The medial border of the rectus sheath was opened and the posterior aspect was closed with Vicryl 1 while the anterior sheath was closed with nylon 1. Polypropylene mesh was then shaped and placed on the fascia as an on-lay with an overlap of 3-5 cm from the midline and fixed in position with nylon 3.0 suture. The anterior rectus sheath was not closed if doing so produced tension; in such instance the mesh was used to bridge the defect. A vacuum drain was placed through a stab in the wound and for 72 hours and effluent measured. Skin sutures were removed on the tenth day.

All the patients were followed-up for two years; initially at three-monthly intervals for nine months in the clinic and subsequently by six-monthly phone calls. Those who had complaints were asked to return to clinic for re-evaluation.

Data obtained included patient age, sex, primary surgery that produced the hernia, the length of the fascial defect and the number of previous attempts at repair. Post-operative wound seroma, stitch abscess and wound infection was recorded. The integrity of the scar and patient satisfaction with the repair was assessed at two years.

Data analysis

Data obtained was analyzed with Statistical Package for Social Sciences 17 for Windows (SPSS Inc. Chicago, IL) and presented as mean, simple percentages and tables.

RESULTS

Nineteen females with a mean age of 35 years (range 30-65) underwent open incisional hernia repairs with

polypropylene mesh (Table 1). Nine (47.3%) were in the 30-39 year age group; 14 (73.6%) arose from Caesarean sections and midline incisions were employed in 17 (89.4%). All the initiating operations, excepting in one case, were done at secondary or private health facilities, and 17 patients (89.4%) had previously attempted suture repair of the hernias which failed (Figures 1 and 2). Seroma collection and stitch sinus were the primary complications observed; none progressed to develop wound infection. Two recurrences (10.5%) occurred in two years. The commonest concern of the patients was the long term effect of the presence of the mesh in their abdominal wall and its implications for subsequent pregnancies and surgery. All were satisfied with the outcome at two years.

DISCUSSION

Incisional hernia is a common complication of abdominal operations and its prevalence closely reflects the number and extent of abdominal procedures done in a locality.¹⁴

Table 1: Incisional hernias are common among young females receiving midline incisions for obstetrics or gynecological procedures and recurrence is frequent after suture repairs

Patients characteristics	Frequency (%) [n-19]
Age (Yrs)	
20-29	1 (5.2)
30-39	9 (47.3)
40-49	6 (31.5)
50-59	2 (10.5)
60-69	1 (5.2)
Sex	
Male	0 (0)
Female	19 (100)
Primary operation	
Caesarean section	14 (73.6)
Myomectomy	3 (15.7)
Epigastric hernia repair	1 (5.2)
Appendicectomy	1 (5.2)
SCAR	
Midline	16 (84.2)
Transverse	2 (10.5)
Pfannenstiel	1 (5.3)
SCAR length (cm)	
4-8	4 (21.0)
9-13	8 (42.1)
14-18	7 (36.8)
Complications	
Seroma	5 (26.3)
Stitch sinus	2 (10.5)
Recurrence	2 (10.5)
Previous repairs	
0	2 (10.5)
1	7 (36.8)
2	9 (47.3)
3	1 (5.2)



Figure 1: A young female presenting with multiple fascial defects and an ugly scar from three previous suture repairs of incisional hernia

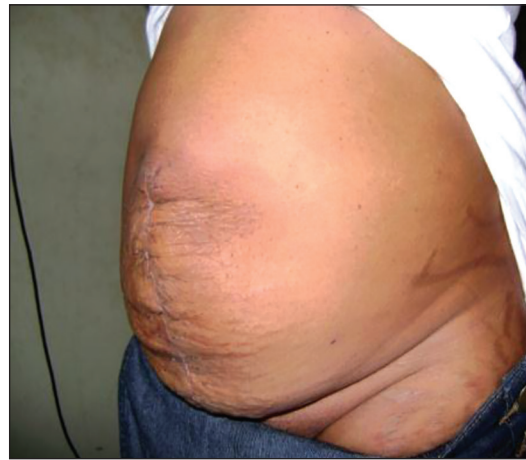


Figure 2: Same patient in Figure 1 six months after receiving open polypropylene mesh repair

The prevalence of this condition in our practice is unknown but observation in our out-patient clinic would suggest the condition is common among young women who have had abdominal surgeries. In the US incisional hernia constitutes 9% of 1 million abdominal wall hernias repaired annually.¹⁵ Only a few in our practice seek medical advice and fewer still procure a repair; perhaps, because of cost or frustration from previous failed repairs.

Failed technique is strongly associated with initiating the events that culminate in wound failure and subsequent hernia formation. In particular, use of absorbable sutures to close fascia, closing the abdomen under tension, passing a drain through the wound and wound infection are critical to hernia formation. Most incisional hernias in our practice arise from gynaecological or obstetrics procedures; these are common among females in the reproductive age group, similar to reports by Agbakwuru and Pilay¹⁶ *et al.*, in Ife South-West Nigeria. It would therefore appear incisional hernia is a disease of females in Nigeria, similar to findings by Memon¹⁷ and Pavan.¹⁸ However, the gynaecologic or obstetric nature of the primary operations could not be strongly implicated as predisposing factors; rather factors like technical execution of the procedures, type of closure and wound infection need be considered.

Incisional hernia is a surgeon dependent variable and the techniques involved in the primary surgery, repair of hernia or recurrence plays a major role in re-herniation. We could not verify the experience of the surgeons performing the primary procedures but we are aware most practitioners at secondary and private care are not gynaecologists or obstetricians. Midline incisions are preferred in many gynaecological and obstetric procedures because it is technically simple and fast to execute. The resulting wounds, however, heal poorly because of low vascularity of fascia, forming weak scars

which easily fail. Sub-umbilical scars from Caesarean section (CS), which in this study was the primary operation in 90% of the patients, produced the highest incidence of incisional hernia. Adesunkanmi¹⁹ in Ile-Ife made similar observations and noted that the patients' age, parity and indication for sectioning did not influence the development of the hernias.

Our patients were in their prime economic and reproductive ages; this carries implications on their economic productivity, quality of life²⁰ and subsequent pregnancies. Many were scared of developing serious obstetric emergency.²¹ Many erroneously linked the hernia to pregnancies and were indeed scared of carrying another pregnancy with the hernia in place. Their primary complaint was a loss of form particularly during pregnancy and this had a profound psychological effect on them. Four repairs were undertaken immediately after elective Caesarean sections; this practice carries the dreaded risk of mesh infection but we were compelled into instituting the repairs primarily to avoid the complications of multiply exposing these patients to general anaesthesia, minimize the cost of surgery and most importantly, losing the patients to care after delivery only to re-appear with a larger and more complex hernia with the next pregnancy. These set of patients received combination intravenous post-operative antibiotics to reduce the risk of infection.

That most patients in our series presented with recurrent hernias within six months of a previous suture repair strongly suggests technical failure of such repairs; late recurrence occurs at five years and is usually caused by defective healing.^{3,22,23} Suture repair of incisional hernia is still practiced²⁴ but often leads to fascial tension with the suture eventually cutting through the fascia and ultimately leading to recurrence rates of 30-50%. It was our observation that all the failed repairs did not show evidence of having dissected and employing the fascial layer.

Adequate repair of incisional hernia requires dissecting out the ugly scar and redundant tissue, the sac where present and also identifying the healthy fascial margins which is used in the repair. We routinely open the peritoneum in our practice even in patients without features of intestinal obstruction because we had previously found many patients to harbour adhesions. These processes are usually bloody and technically difficult particularly in recurrent hernias.

Advocacy for synthetic mesh repair of abdominal wall hernias is based on its low recurrence rate when compared with suture repair. The mesh provokes an intense inflammatory reaction, the extent of which depends on the amount and structure of mesh inserted.²⁵ The inflammatory processes lead to invasion of its pores by fibroblasts, culminating in the laying down of collagen which forms a sheet of scar tissue that integrates the substance of the mesh and reinforces the abdominal wall. Polypropylene mesh has been used longest; it is cheaper than other available synthetic prosthesis, porous, semi-rigid and gets incorporated into surrounding fascia by fibroblast infiltration of the pores. It has a low infective potential, good stability and elasticity. Ammar *et al.*,²⁶ reported more than 90% repair rate using mesh. Mesh placement may be on-lay or sub-lay; with the latter being technically difficult but more effective with a lower complication and recurrence rate.²⁷

Complications with mesh repair include seroma collection, wound/mesh infection, recurrence, stitch sinus and chronic pain. Seroma collection was the commonest complication encountered in our series; it is partly due to the intense inflammatory response to the presence of the mesh in the tissues as well as the extent of subcutaneous tissue dissection to raise skin flaps.²⁸ We observed the seroma tended to be more in volume and of prolonged duration when the dissection of the subcutaneous tissue was done with electrocautery. We routinely drained the wounds for 72 hours while further collections were aseptically aspirated. Vacuum-assisted closure devices are potentially promising in managing seroma in patients at high risk of this complication.²⁹

The cases of stitch sinuses resolved without active management. We recorded a 10.5% recurrence rate similar to figures reported in other studies; one recurrence occurred in a patient who received composite mesh which is not recommended for on-lay hernia repair. We did not record any incidence of wound or mesh infection. Infection of the mesh is dreaded and is more likely if the repair is done alongside an intra-abdominal surgery³⁰ and may require removal of the mesh; adherence to surgical principles and prophylaxis adequately eliminates this complication.

CONCLUSION

Midline Caesarean section is the commonest cause of incisional hernia in our practice, with many patients' further developing recurrences from failed repairs. Open prosthetic repair of these hernias with polypropylene mesh is strongly advocated as it carries a low risk of post operative morbidity and leads to good patient satisfaction in two years. We encourage its adoption as a standard for repairing these hernias in Nigeria.

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