Early Outcome Of Inguinal Hernia Repair Using Ultrapro® Mesh In University Of Calabar Teaching Hospital, Nigeria

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Citation

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Abstract

In this prospective study, we aimed to determine the acceptability, practicality, effectiveness, and safety of inguinal hernia repair using lightweight monofilament mesh in our environment. Twelve consecutive adult patients aged 19-60 years with 14 inguinal hernias had repair with Ultrapro® (Monocryl®-Prolene®-Composite) mesh as a tension-free onlay patch, Lichtenstein-style. The surgeons had no previous 'hands-on' experience in the use of meshes. The patients were informed of the nature of the procedure, and were not charged for the meshes. All patients had prophylactic antibiotics, and were followed for surgical wound infection, induration, pain, recurrence, and any other complications. We found that no patient objected to the procedure. Nine (75%) were done entirely under local anesthesia (local infiltration and/or spinal). All the procedures were completed safely. No patient had a complication directly attributable to or affecting the implanted mesh. One patient developed scrotal hematoma which was drained. One patient had serous discharge from a skin suture on 5th day post-op, which resolved completely in 24 hours on removal of all skin sutures and antibiotic administration. Ten patients were free of complications post-op; they had no need for analgesics after 5-7 days and were discharged between 3-7 days post-op. Induration was generally minimal, and absent by 3 weeks to 3 months post-op. No recurrence and no wound complications were found. Lightweight monofilament mesh appears quite acceptable, practical, effective and safe for inguinal hernia repair in our environment. There is virtually no 'learning curve' for the surgeons. However the cost of meshes was not considered. Also, a larger sample size and further studies are needed to compare outcome of mesh repair in our environment more objectively with traditional inguinal hernia repair.

INTRODUCTION

Traditional suture repair of inguinal hernia is fast giving way to routine tension-free mesh repair. In many countries, mesh repair is now more common than suture repair (such as Bassini's, Darning, and Shouldice). [1] This is mainly because many studies have demonstrated fewer recurrence with meshes than with traditional suture repair. [1,2] Furthermore, mesh repair is reported in some studies to reduce operating time and hospital stay. [1]

Lichtenstein presented his open mesh repair technique for inguinal hernia in 1986. [1,3] The Lichtenstein technique has since become the most commonly used [4] (with various modifications) on account of its ease of operation and because it provides a tension-free repair with good long-term results. [2]

Mesh repair is nevertheless associated with complications such as foreign body reaction, infection, pain, fistula formation, migration, shrinkage, and recurrence. [5] Some of these problems are more usually seen or are more severe with certain types of meshes e.g. chronic pain necessitating re-operation, high recurrence and complication rate, all associated with the use of mesh plugs. [6,7]

Traditional “heavyweight” meshes (like Prolene ®) are now giving way to partially absorbable lightweight meshes, which are less dense, apparently more physiological in their flexibility, and associated with less acute and chronic post-op pain and discomfort. [4,8,9] Post and co-workers suggested that lightweight mesh may be preferable to conventional mesh for Lichtenstein repair of inguinal hernia. [4]

A recent innovation in lightweight meshes is Ultrapro ®, a Monocryl ®Prolene ® -Composite monofilament mesh, designed for easier handling and better tissue integration to form a flexible “scar mesh” (instead of the rigid “scar-plate” of conventional meshes). [1] In this prospective study, we aimed to determine the acceptability, practicality, effectiveness and safety of using Ultrapro ® for Lichtenstein repair of inguinal hernia in our environment.

PATIENTS AND METHODS

Twelve consecutive adult patients seen in the surgical outpatient department with inguinal hernias were scheduled for elective mesh repair. Patients below 18 years, emergency cases, and immuno-compromised patients were excluded. All patients were informed of the use of the mesh and informed consent sought and obtained pre-op. Patients were not charged for the mesh, and were promised free care in case of recurrence. All patients were scheduled for either local infiltration or spinal anesthesia. Prophylactic antibiotics were prescribed for all, intravenously just before surgery and continuing for 24 hours or until removal of a drain if used.

Indirect hernial sacs were excised while direct sacs were inverted; the defects were either narrowed (indirect) or closed (direct) with Nylon 1, taking only the transversalis fascia in a tension-free manner. Ultrapro ® (Monocryl ® - Prolene ® -Composite) mesh, about 6x12 cm with the medial edges rounded off to fit the inguinal canal anatomy, was implanted Lichtenstein-style $_{10}$ as a tension-free onlay patch under the external oblique. The external oblique was peeled off the underlying tissue superiorly by blunt dissection to accommodate the mesh and increase the area covered, and the pubic tubercle was overlapped by 1-1.5 cm. An end-slit was made in the mesh for the spermatic cord (or round ligament in females) laterally, the superior tail being crossed to overlap the lower tail and fit the cord snugly (Figure 1). The inferior edge of the mesh was secured to the inguinal ligament with interrupted Nylon 2/0 (instead of running sutures as in true Lichtenstein repair $_{10}$) from the pubic tubercle to a point beyond the deep ring laterally; the superior edge was sutured to the underlying internal oblique also with interrupted Nylon 2/0, to a point just beyond the internal ring laterally. Lateral to the deep ring we placed one suture passing through both tails where they overlap near the spermatic cord to secure them to the underlying tissue. The lower edge of the superior tail was not sutured to the inguinal ligament as it would be in true Lichtenstein repair. $_{10}$ A slight bulge in the middle of the mesh indicated adequate laxity and a true tension-free repair. $_{10}$ Closure was as in routine herniorrhaphy. Closed suction drain or scrotal bandage was used in cases of large complete hernia.

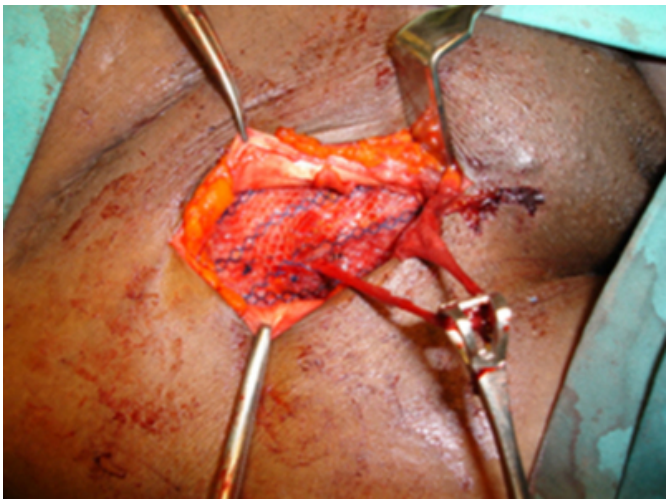
For post-op analgesia, intramuscular Tramadol or Pentazocine for 24-48 hours followed by oral acetaminophen (paracetamol) was used. Pain was assessed by Verbal Rating Scale daily while patients were on admission. All wounds were opened on 3 rd day post-op, examined for signs of infection, and left open thereafter. Discharge from hospital was scheduled for either 3 rd day post-op or 7 th day post op. Follow-up visits were scheduled for 3 weeks, 6 weeks, and 3 months post-op. Patients were followed for pain, surgical site infection, induration, recurrence, and any other complications or complaints. Microsoft Access ® and Microsoft Excel ® were used for data storage and analysis.

RESULTS

All 12 consecutive patients with inguinal hernia consented to mesh repair and follow-up. All had their hernias repaired with Ultrapro ® using the Lichtenstein technique.

Figure 1

Figure 1: Ultrapro In Place For Lichtenstein Repair Of Right Indirect Inguinal Hernia In A Female Patient (End-Slit Around Round Ligament)



PATIENT AND DISEASE CHARACTERISTICS

No patient was aged 26-46 years in this study, even though the mean age of our patients was 38 years (Table 1); the Standard Deviation was ±17.4. Fifty percent were aged 19-25 years, and the other 50% were 46-60 years.

Only one patient's duration of hernia was in weeks; 50% were more than 2 years.

All the patients in the age group 19-25 years had indirect hernia; 1 of them had a combined (pantaloon) hernia.

Predisposing factors were identified in 83% of patients. Lifting heavy weights was incriminated in all, mostly occupational, only 1 recreational (body building). Half of these also had some other predisposing factor(s) e.g. multiparity in 3 out of 4 females in the study (mean parity

8). The sole patient with recurrent hernia had 4 predisposing factors: lifting heavy weights, multiparity (parity 9), previous contralateral hernia, and previous bilateral herniorrhaphy.

PERIOPERATIVE INTERVENTIONS AND PROCEDURES

All 12 patients were operated upon by a consultant surgeon, assisted by a house-officer in 6 cases and a resident in 6 cases. Neither the surgeon nor the assistants had any previous "hands-on" experience in mesh repair.

All the patients had prophylactic antibiotic therapy and 4 patients received antibiotics beyond 24 hours (Table 2) – the first had scrotal hematoma, the second had a drain in situ, the third was in error, and the fourth had serous discharge from a suture track on 5 th day post-op, whereupon antibiotics were re-instituted.

Nine surgeries were done entirely under local infiltration and/or spinal anesthesia. Two cases had spinal anesthesia supplemented by local infiltration because spinal wore out in one, and failed from the outset in the other. Three cases were converted to general anesthesia because spinal anesthesia wore out in one (bilateral hernia), another could not tolerate local anesthesia after start of surgery, and the third had failed spinal and local anesthesia in sequence.

The 2 bilateral hernias were repaired by the same team in sequence. Total duration of surgery for each of these cases was divided by 2 to calculate the mean duration of surgery in Table 2.

Figure 2

Table 1: patient and disease characteristics at time of operation

No. of patients	12
No. of hernias	14
Mean age in years (range)	38 (19-60)
Sex ratio (M:F)	2:1
Side of hernia	
• Left	4 (33.3)
• Right	6 (50.0)
• Bilateral	2 (16.7)
Mean duration of hernia in years (range)	2.8 (3 weeks – 10 years)
Type of hernia clinically	
• Inguinal	8 (57.1)
• Complete	6 (42.9)
Type of hernia at operation	
• Indirect	9 (64.3)
• Direct	2 (14.3)
• Combined	2 (14.3)
• Recurrent	1 (7.1)
Predisposing factors	
• Solitary	5 (41.7)
• Multiple	5 (41.7)
• Nil identifiable	2 (6.6)

(Values in parenthesis are percentages unless otherwise indicated)

Figure 3

Table 2: peri-operative interventions and procedures

Prophylactic antibiotics	12
• 24 hours	8 (66.7)
• >24 hours	4 (33.3)
Anesthesia	
• Local infiltration	6 (50.0)
• Spinal anesthesia	4 (33.3)
• Spinal + Local	2 (16.6)
• Conversion to GA	3 (25.0)
Drain	1
Scrotal Bandage	3
Mean Duration of Surgery (minutes)	90

(Values in parenthesis are percentages)

PERIOPERATIVE OUTCOME

All the procedures were completed safely. Scrotal hematoma developed post-op in our very first patient in this series who had bilateral inguinal hernia, the right side being inguino-scrotal (Table 3). He also had testicular infarction. We kept him 28 days in hospital and his case is excluded from the calculation of Mean Hospital Stay. His mesh repair was completely unaffected and remained that way at 6 months post-op (outside this study).

One patient had serous discharge from a skin suture track on 5 th day post-op (Table 3) which resolved completely within 24 hours on re-institution of antibiotics and removal of all skin sutures on 6 th day post-op. He was discharged 8 th day post-op free of problems.

Even though 11 patients (91.7%) had no need for analgesics by 3 rd -7 th day post-op (Table 3), only 2 (16.7%) were discharged on 3 rd day post-op, while the rest (75%) were discharged on 7 th /8 th day post op because of not having easy access to health care at home, or due to social circumstance.

All patients reported no pain at discharge, but the patients discharged on 3 rd day post-op were nevertheless given oral analgesics to cover 4 days.

OUTPATIENT FOLLOW-UP

Drop-out rate increased with the period post-op (Table 4). None of the patients seen had pain or infection throughout the outpatient follow-up period. Induration was generally minimal, regressing with time, and 2 patients had no induration by 3 weeks and 3 months post-op respectively. No patient had severe induration (i.e. beyond what is expected for the duration post-op).

Four patients reported spontaneous extrusion of catgut from their wounds between 4-10 weeks post-op. No further wound complications arose from this and the spots from which the sutures were extruded healed almost immediately.

There was no recurrence observed.

PROFILE OF 'DROPOUTS'

Five out of the 6 patients who dropped out of the study by 3 months post-op were contacted by phone and all reported that they had no pain, infection, recurrence, or any other problem. They all promised to make the next visit (6 months post-op); one did and had no complications.

Figure 4

Table 3: perioperative outcome

• Total no. of hernias repaired	14	
• Scrotal hematoma/testicular infarction	1	
• Serous discharge from skin suture track	1	
• No complaints at all	10	(83.3)*
• Mean hospital stay post op in days (range)	6.4	(3-8)
• Mean removal of sutures in days post-op (range)	6.9	(6-8)
• Mean duration of analgesics in days (range)	6	(4-7)
• Pain-free at 3-7 days post op	11	(91.7)*
• Pain at discharge	0	

**Percentages*

Figure 5

Table 4: outpatient follow-up

	3 WEEKS POST-OP	6 WEEKS POST-OP	3 MONTHS POST-OP
No. of patients seen	10 (83)	9 (75)	6 (50)
Pain	0	0	0
Infection	0	0	0
Induration			
• Nil	1	1	2
• Minimal	3	4	4
• Mild	3	2	0
• Moderate	2	2	0
• Severe	0	0	0
• Not recorded	1	0	0
Hypertrophic scar	0	0	0
Extruded catgut	0	1	3
Recurrence	0	0	0

(Values in parenthesis are percentages)

Figure 6

Table 5: profile of 'drop-outs

Total number of patients	12
Number of 'drop-outs'	6 (50%)
• Contacted by phone	5
• "No problem"	5
• Promised to make next visit	5
• Living outside Calabar	3
• Showed up at 6 months post-op	1
• Could not be reached	1

DISCUSSION

Patients all over the world are happy when they learn that their surgery is being performed using a technique or material that is shown to produce better results than usual with few or minimal side effects. Patients in this study were no exception, and mesh repair gained immediate acceptance among all in the series (Table 2 and 3).

The mean age of our patients (Table 1) was 12-24 years less than that found in studies in Western countries, [4,6] and 50% of our patients were less than 26 years old. The younger the patient, the more important the biocompatibility of the mesh used, since it will be in the patient for longer. Lightweight composite meshes are reported to have better biocompatibility than traditional "heavyweight" polypropylene meshes, being less dense, with bigger pores and having greater flexibility. [1,4,5,9] The Monocryl ® -Prolene ® -Composite mesh we used in this study is a new lightweight partially absorbable monofilament mesh, and this study shows that it is a practical choice for our patients who may have to carry it for many years.

The Lichtenstein repair used in this study is practical for our surgeons because there is virtually no 'learning curve'. In the words of Amid, "the open tension-free repair is a typical example of 'see one, do one, teach one'". [11]

In our view, closing the defect (direct hernias) or narrowing it (indirect hernias) is a crucial step in preventing recurrence. We use Nylon 1 for this, taking only the transversalis fascia so that there is virtually no tension. However, the posterior wall tends to be weakened and breached again by persistent predisposing factors e.g. lifting heavy weights occupationally (which predominated in this study), multiparity, or ageing. Furthermore, a significant proportion of our patients come late with complete hernia (42.9% in this study), which are bigger and have wider defects than simple inguinal hernia. Hence the need to reinforce the posterior wall with a repair [1] – bracing up for future challenges, as it were. Seen in that light, a mesh is an obvious improvement over traditional suture repair. Its effectiveness is demonstrated by absence of recurrence in this study.

The safe completion of all the surgeries in this series is a positive comment on the safety of the technique. Subsequently, no patient in this study developed a complication directly attributable to or affecting the mesh (Table 3 and 4). Prophylactic antibiotics for 24 hours was adequate to keep the infection rate at 0% for routine cases, while few days extension served for cases at increased risk. This is quite an accomplishment in an environment where maintaining asepsis at surgery is challenging, and shows that Ultrapro ® does not cause an increase in infection rate, in agreement with other studies on mesh repair. [12] Pain was also adequately controlled with aggressive pre-emptive management using opiates initially followed by acetaminophen. Rather than troublesome pain with the mesh, we saw remarkable early recovery in this study, with 91.7% of patients being completely pain-free by 3-7 days post op (Table 3). Most of our patients could have been discharged safely before 3 rd day post-op but we chose to err on the side of caution because of their distant residence and social

circumstances. The safety profile was maintained post-op (Table 4).

The high drop-out rate in this study is mitigated by the ready availability of cell-phones in Nigeria now. Even when patients failed to visit, useful information could still be obtained by phone about pain, infection, and recurrence (which were absent). In future, we hope to make use of this facility more effectively by calling the patients to remind them ahead of the scheduled visit.

The cost of lightweight meshes is not considered in this study. Also, we do need a larger sample size and further studies for a more objective comparison of outcome between mesh repair and traditional suture repair in our environment.

CONCLUSION

Lichtenstein-style inguinal hernia repair using lightweight monofilament mesh appears quite acceptable, practical, effective, and safe for our environment. Pain was well controlled in this study, peri-operatively and up to 3 months post-op. There was no significant evidence of infection in the same period, and no recurrence. The clinical evidence weighs in favor of adopting routine use of lightweight monofilament mesh for inguinal hernia repair in our environment. However, the cost of meshes needs to be considered, and a larger sample size and further studies are needed for a more objective comparison of outcome between mesh repair and traditional suture repair in our environment.

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