Outcomes of giant inguinoscrotal hernia repair with local lidocaine anesthesia

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ABSTRACT

الأهداف: رفع تقرير عن نتائج إصلاح الفتق الأربي الصفني العملاق باستعمال التخدير بعقار ليدوسين في المناطق ذات الموارد الضعيفة.

الطريقة: تمت دراسة المرضى المصابين بفتق أربي صفني كبير الذين تمت معالجتهم في مرفقين خاصين للرعاية الصحية في نيجيريا ما بين الفترة يناير 2004 حتى ديسمبر 2008م.

النتائج: أجريت عملية الإصلاح للفتق الأربي الصفني العملاق لإجمالي عدد 134 مريض تتراوح أعمارهم ما بين 13 و70 عام (يبلغ متوسط العمر 32±7.6 عام). بلغت نسبة البالغين الذين تمت معالجتهم من الفتق 51.3% بلغت عملية إصلاح الفتق الأربي الصفني الكبير لعدد 136 باستعمال عقار ليدوسين. بلغ متوسط فترة الأعراض (14.5 عام). تم تحمل الإجراءات بشكل جيد باستعمال عقار ليدوسين لوحده لدى 124 (92.5%)، ولكن 10 من المرضى (7.5%) الذين تعرضوا لأعراض انسحابية تطلبت حالتهم التسكين باستعمال عقار ديازيبام و/أو عقار كيتامين مع عدم التداخل مع التخدير العام أو العمود الفقري. لم تكن دورة العلاج بعد العملية ملحوظة بالمضادات الحيوية والباراسيتامول وقد أعطى ذلك نتائج طيبة. أولئك الذين لم يتعرضوا لأعراض انسحابية تم نقلهم وأعطوا السوائل بعد 24 ساعة. أدخل جميع المرضى لمدة تراوحت مابين 48-72 ساعة قبل إخراجهم من المستشفى وعادوا إلى أعمالهم بعد شهر. شفي الورم الدموي الصفني لدى 18 مريض (13.5%) والتهاب الجرح لدى 6 مرضى (4.5%) خلال شهر وبدون التعرض لمعاودة لظهور المرض خلال المتابعة من عام إلى 5 عام.

خاتمة: تم إصلاح الفتق الأربي الصفني العملاق باستخدام عقار ليدوسين بشكل موضعي وأعطى نتائج متقاربة للتخدير العام ولتخدير العمود الفقري في المناطق ذات الموارد الضعيفة.

Objectives: To report outcomes of giant inguinoscrotal hernia repair using local lidocaine anesthesia in a resource-poor subregion.

Methods: Patients treated with giant inguinoscrotal hernia at 2 private healthcare facilities in Nigeria were studied between January 2004 and December 2008.

Results: A total of 134 patients aged between 13 and 70 (mean 32±7.6) years, accounting for 51.3% adults treated for groin hernias, had open repair of 136 giant inguinoscrotal hernia using lidocaine. Average duration of symptoms (14.5 years) before presentation was influenced by lack of awareness in 82 (61.2%) and financial constraint in 34 (25.4%). The procedure was well tolerated as local lidocaine alone was used in 124 (92.5%), but 10 (7.5%) patients who had incarceration-required sedation using diazepam and/or ketamine with no conversion to spinal or general anesthesia. Postoperative courses were uneventful as prophylactic antibiotics and paracetamol gave good results, those without incarceration ambulated and commenced oral intake after 24 hours. All were admitted between 48-72 hours before discharge and returned to normal vocation after a month. Scrotal hematoma(13.5%) and wound infection (4.5%) resolved within a month with no recurrence so far on 1-5 years follow-up.

Conclusion: Giant inguinoscrotal hernia repair using local lidocaine was well tolerated and obtained comparable results to spinal or general anesthesia in resource-poor regions.

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Inguinal hernia is very common, especially in developing countries where it constitutes a major surgical workload.[1,2] Early detection and appropriate surgical treatment either by open or laparoscopic methods are the gold standard of management.[3] The indirect inguinal hernia progresses through various grades of severity. These include bubonocele, a fluid hernia that may or may not contain easily reduced

knuckle of a bowel segment; through funicular, complete inguinoscrotal, and giant inguinoscrotal hernia that contains many viscera or a very long segment of bowel loop.[1-3] In developed countries and sophisticated centers in Africa where there is a high level of awareness, patients often present early with little or no preoperative morbidity. Surgical treatment of small hernia is a minor procedure that is often performed under local anesthesia with excellent outcomes.[3-6] The availability of facilities in many centers makes laparoscopic surgery feasible with the patient discharged few hours after surgery. In addition, the absence of postoperative morbidity allows early return to work.[4,5,7,8] In many African subregions, lack of awareness and financial constraints make many patients present very late. A long-standing history of inguinal hernia is common and presentation during bubonocele and funicular stages are rare.[1-3,9,10] Uncomplicated inguinal hernia may progress to giant inguinoscrotal variety, which is a serious life threatening morbidity. Prolonged extra abdominal location of the viscera may result in hypoplasia of abdominal cavity, which makes reduction and repair difficult.[3,11,12] This requires general anesthesia with adequate muscle relaxation or use of spinal anesthesia which are administered by skilled anesthetists who are very few in this subregion. In few centers where these are feasible, they are exorbitantly expensive above the reach of the poor who present mainly with giant inguinoscrotal hernia. The provision of readily available and cost effective surgical management of giant inguinoscrotal hernia in this subregion is a major challenge. Lignocaine reserve for minor surgical procedures are readily available and cheap local anesthetic agent that has been reported to reduce the cost of small hernia repair considerably.[4-7] Here, we report a 5-year experience with open surgical repair of giant inguinoscrotal hernia using local infiltration of lidocaine in a resource-poor African subregion, which may be useful to surgeons working in similar settings.

Methods. This 5-year prospective experience on outcome of giant inguinoscrotal hernia repair using local infiltration of lidocaine was undertaken between January 2004 and December 2008 at 2 private health institutions, Leadeks Medical Center and Time Hospital, both in Edo State, Nigeria. The biodata, side affected, duration of symptoms, cause of late presentation, hernia contents, type of repair, safety profile of lidocaine, pain assessment score, and outcome of surgery were collated on a structured proforma. The study centers are located in sub-urban communities that have a combined population of approximately one million people. Excepting 10 private health facilities, including the study centers, there were no government health facilities in the communities during the period. The majority of residents belong to the illiterate and low socio-economic groups who are unable to afford the cost of general and spinal anesthesia, use of mesh and/or laparoscopic repair. Both study centers are fully staffed with highly skilled medical and paramedical personnel and render general adult and pediatric surgical services to the people.

Consecutive patients aged between 13 and 70 years who were diagnosed with giant inguinoscrotal hernia were included after the local ethical approval was obtained from the Leadeks Medical Center and a consent form that met WHO-Helsinki[13] declaration standard was duly signed by each patient. In the context of this present study, 'giant inguinoscrotal hernia' refers to a direct or indirect inguinoscrotal hernia that is estimated to contain more than one viscus and/or long segment of bowels (**Figures 1 & 2**). We excluded other hernias such as bubonocele, funicular or inguinoscrotal hernia that was estimated to contain a knuckle of bowel segment, which are normally, repaired using local anesthesia. Also, patients (n=6) that included those with hypertension, cardiac diseases, history of allergy to lidocaine/adrenaline, those compromised due to strangulated hernia contraindicating local anesthesia and those who refused to sign informed consent form were excluded.

Patients were seen in outpatients' clinic, certified fit and counseled for the procedure. All patients fasted overnight, intravenous line was secured in the anesthetic room using a large bore cannula, and facilities for general anesthesia were put in place in case there was a need for conversion. Also, intravenous diazepam, ketamine, and atropine were made available in the theater. Thereafter, 1% lidocaine in 1:2000 adrenaline at a dose of 5-6 mg/kg, which was diluted to increase the volume when necessary, was used. For a 70 kg adult, this equated approximately to 35-40 ml of 1% lidocaine in 1:2000 adrenaline. Following a formal skin preparation and draping, the anterior superior iliac spine was identified and approximately 5 ml of the 1% lidocaine in 1:2000 adrenaline was injected just medial to it to block the ilioinguinal nerve. Another 10-15 ml was injected subcutaneously/deep into subcutaneous tissues on the medial 2/3 of a line joining the anterior superior iliac spine and pubic tubercle approximately 2 cm above the inguinal ligament. The injection was repeated in obese patient after dissecting the subcutaneous tissues, taking care not to exceed the calculated total dose. A 4-6 cm

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groin crease incision placed a finger breadth above and parallel to the medial 1/3 of inguinal ligament was used. Having opened the hernia sac to identify and reduced its contents, it was dissected, transfixed, and excised. In patients >18 years, the procedure was completed by performing a conventional Bassini's herniorrhaphy using monofilament non-absorbable suture. The deep ring was approximately 0.5 cm with size 2/0 polyglactin suture in those <18 years. All patients had prophylactic antibiotics using a single dose (75 mg/kg) of cefuroxime at induction because the massive sacs were opened to identify and reduce the contents in all cases. At the end of the operation, which lasted between 40 and 65 minutes (average 50 minutes), they were observed in the waiting area for an hour before they transfer to the ward. Owing to lack of facilities to measure intra-abdominal pressure, the bowels were rested for 24 hours before oral feeds were commenced with the addition of nasogastric bowel decompression for 36 hours in those with preoperative features of intestinal obstruction. Postoperative analgesia was provided using 600 mg 8-hourly paracetamol for 5 days. All were admitted for observation for 48-72 hours before discharge to follow-up in surgical outpatient clinic. Follow-up protocol in surgical outpatient clinic included seeing each patient for wound inspection and removal of stitches on the fifth postoperative day. Then, they were seen and examined for complications every 2 weeks for 6 months, followed by every 2 months for one year, and then yearly. They were also taught to examine the operation site and report to the clinic if any swelling was noticed. Intra- and post- operative pain assessment was carried out using a locally adapted visual analogue scale that has a score of 0-10mm. A patient with a score of 0-1 has no pain; 2-4 as having mild pain, 5-7 as moderate and >7 as severe.

The data obtained was analyzed using SPSS version 13 software package (SPSS, Chicago, IL, USA) and presented as count, frequency, and percentage. Continuous data were expressed as mean ± standard deviation while categorical data were analyzed using Chi-square tests were considered significant ($p<0.05$) and non-significant ($p>0.05$).

Results. One hundred thirty-four male patients with a mean age of 32 ± 7.6 years had repair of giant inguinoscrotal hernia using local lidocaine anesthesia. They accounted for 51.3% of 261 adult patients treated for groin hernias with a prevalence rate of giant inguinoscrotal hernia in the 2 communities, including the 6 patients that were excluded from the study, being 140 per one million people during the period. Bilateral lesions were uncommon, accounting for only 2 (1.5%), but on the right side, the involvement was 79 (58.9%) of cases. Average duration of symptoms before presentation was 14.5 years (range 5-39 years). Giant inguinoscrotal hernia affected mainly the poor illiterate manual laborers, 101 (75.4%), compared to others ($p<0.0001$). Therefore, lack of awareness in 82 (61.2%) and financial constraint in 34 (25.4%) were the major causes of late presentation (P<0.0001) as shown in **Table 1**. Consequently, the mass effects and discomfort made more than half, 77 (57%) patients sought medical attention, while 5 (3.7%) presented as intestinal obstruction.

Before presentation, all patients applied traditional remedy including the use of improvised truss, ingestion of native concoctions, and scarification with herbal massage of the swelling without success. Two other patients presented during the period in endotoxic shock following strangulation and obvious bowel gangrene. They died shortly after surgery using general anesthesia at a referral center. Of the 134 patients treated, 10 (7.5%) that included the 5 with features of intestinal obstruction, had incarcerated hernia which necessitated emergency surgery. The contents of their hernia sacs were congested, but with no feature of gangrene on inspection. Ninety-one (67.9%) had hernias that were reducible preoperatively by special maneuvers by the patients themselves. The remaining 33 (24.6%) had no features of intestinal obstruction or incarceration but their hernia could not be completely reduced until after the inguinal canal was opened (**Table 2**). Intraoperative inspection of the hernia sac contents revealed multiple organs that are normally located in different abdominal quadrants. Despite the hernia sacs contents depicted as shown in **Table 2**, the local infiltration of lidocaine alone was successfully used in 124 (92.5%) patients who had no incarceration as they scored between 0-4 mm on the

Table 1 - Mode/reasons for late presentation and side distribution of giant inguinoscrotal hernia in 134 patients

Variables	Frequency (%)
Side distribution	
Right	79 (58.9)
Left	53 (39.6)
Bilateral	2 (1.5)
Reasons for late presentation	
Financial constraint	82 (61.2)
Lack of awareness	34 (25.4)
Financial constraint/lack of awareness	15 (11.2)
No reason	3 (2.2)
Mode of presentation	
Intestinal obstruction	5 (3.7)
Inability to cope with the mass/discomfort	77 (57.5)
Heard of cheaper management	38 (28.4)
Sponsored by well wishers	14 (10.4)

visual analogue scale intraoperatively. Of the 10 patients with incarceration, 6 (4.5%) required sedation with intravenous diazepam 10 mg stat (due to a score of 5-7), while 4 (3%) required additional intravenous ketamine at a dose of 2 mg/kg stat because they scored more than 7. No patient was, however, converted to spinal or general anesthesia requiring endotracheal intubation. The 124 (92.5%) patients without incarceration ambulated and commenced oral intake after 24 hours of surgery, but only after 36 hours for those operated on emergency due to incarceration. Paracetamol provided satisfactory postoperative analgesia as all patients scored <4 on the visual analogue scale. As shown in **Figure 3** and **Table 2**, scrotal hematoma, which resolved within a month on scrotal elevation was the most common postoperative complication recorded in 18 (13.5%) patients. All the patients were able to return to their vocation after a month and no complication has been recorded so far on 1-5 years follow-up in surgical out patients' clinic. Although 2 patients have been lost to follow-up, outpatient follow-up has been encouraging because the patients reside close to the hospitals and required no distant journey.

Discussion. Local anesthesia provided by using lidocaine in adrenaline for the repair of 136 giant inguinoscrotal hernias in 134 patients obtained encouraging results in this study. The anesthesia was well tolerated because apart from 10 patients who required diazepam and/or ketamine, there was no need for sedation, conversion to spinal or general anesthesia using endotracheal intubation. The outcome recorded compared with the use of general anesthesia for the repair

Table 2 - Reducibility/contents of hernia sacs, tolerability of local lignocaine infiltration, and postoperative complications.

Variables	Frequency (%)
Content of hernia sac	
Long loop of small bowels and omentum	27 (20.1)
Small bowels, omentum, sigmoid/transverse colon	85 (63.4)
Bladder, cecum, small bowels, omentum	17 (12.7)
Cecum, transverse colon, omentum, inferior portion of stomach	5 (3.7)
Reducibility	
Preoperative reduction possible	91 (67.9)
Intraoperative reduction on opening inguinal canal	33 (24.6)
Difficult, required lateral incision of deep inguinal ring	10 (7.5)
Anesthesia	
Local infiltration of lignocaine alone	124 (92.5)
Required sedation	6 (4.5)
Required addition of ketamine	4 (3.0)
Post-operative complications	
None	104 (77.6)
Scrotal hematoma	18
Abdominal tightness	5 (3.7)
Intestinal colics	7 (5.2)

Figure 1 - Giant left inguinoscrotal hernia that contained long loop of small bowels and omentum, but without incarceration in a 46-year-old farmer who carried the hernia for 21 years.

Figure 2 - A 47-year-old bricklayer with giant right inguinoscrotal hernia that contained small bowel, transverse colon, omentum and inferior portion of the stomach without intestinal obstruction. Note the giant hernia that was divided into 2 compartments by the superficial inguinal ring.

Figure 3 - During wound inspection 5 days after surgery of the same patient in figure 2. Note the scrotal hematoma that resolved within a month during follow-up.

of giant inguinoscrotal and local anesthesia for small groin hernias by other authors.[4-7] In similar study, poor regions also recorded successes by improvising methods aimed at reducing the cost of groin hernias repair.[4-14] The 48-72 hours admission that was also carried out by other authors[3,15] became necessary in this series due to the multiple viscera, especially long segment of bowels involved and the lack of facilities required to monitor intra-abdominal pressure.

The mild postoperative pains that responded to paracetamol, early ambulation, early return to normal vocation, and absence of recurrence during follow-up so far were similar to the results obtained following minimally invasive repairs of small groin hernias in other studies.[5,8,16] Satisfactory, postoperative analgesia recorded could be attributable to the vasoconstriction effect of adrenaline that retained lidocaine locally to the operation site; thereby, prolonging its duration of action. Also, the vasoconstriction helped in the control of intraoperative hemorrhage and lowered the occurrence of postoperative scrotal hematoma formation. General anesthesia was used for the repair of giant inguinoscrotal hernias by other authors perhaps due to the discomfort and anticipated reflex vomiting that may be triggered by rough handling of bowels. Additionally, the need for abdominal wall muscle relaxation during intraoperative reduction of giant hernia sac contents was emphasized.[3,9,11,12,15] These challenges were, however, not encountered following the use of local anesthesia in present study perhaps because sustained gentle reduction was adopted or the hernias in this series may not have contained as many contents as in those reports. Various types of inguinal hernia repair including Shouldice, use of prosthesis and silastic mesh (a gold standard for repair) have been described by many authors but were not feasible in this study.[8,12,17] The use of sterilized mosquito net as improvised mesh was avoided in this series to reduce cost and prevent wound infection that may increase the probability of recurrence. Inadequate intraabdominal volume requiring intra/postoperative intraabdominal pressure measurements was a problem owing to lack of facilities.[3,11,12,18] In present study, only few patients recorded postoperative tightness of abdomen and intestinal colics, which resolved spontaneously within a week. This could be a result of long period of bowels rest and decompression adopted.[19,20] The most common complication (minor) recorded in 13.5% patients was postoperative scrotal hematoma that resolved on scrotal elevation. This was similar to the experience of other authors following repair of giant inguinoscrotal hernia in more developed settings.[10,12] Minor wound infection recorded even among patients with incarceration was low perhaps because all patients received prophylactic antibiotic. Wound infection is a major cause of recurrence after hernia repair. This may be a reason for the low recurrence recorded so far on follow-up even though Bassini's repair with reported high recurrence rate was performed in the majority of patients.[11,15,17] The low recurrence recorded in present series corresponded with findings in similar studies from other subregion.[11,15,17] As shown in this study, the prevalence of neglected inguinal hernia that has progressed to giant inguinoscrotal variety was very high unlike in more developed society where it was rarely encountered.[3,10,15] Nevertheless, no female was diagnosed with giant inguinoscrotal hernia and only 2 male patients presented with bilateral lesions during this study. It is unlike what is diagnosed in those with smaller groin hernias where females and bilateral lesions accounted for a large proportion.[4-7] The reason for this is not clear. Strangulation of giant hernia though less common, often leads to infarction of many viscera which would culminate in the resection of a very long bowel segment and/or other vital organs as encountered by other authors.[20] Also, rapid development of bowel gangrene often result in overwhelming sepsis, which progresses to endotoxic shock and multiple organs failure as recorded in the 2 patients who died at a referral center during this study. Therefore, strangulated giant inguinoscrotal hernia is still a major cause of death in this African sub-region owing to irreversible clinical compromise that is compounded by a lack of facilities and shortage of personnel required to manage the patients on arrival.[9,20] The success recorded using local lidocaine in this study is, therefore, a welcome development as many patients can afford the cost of treatment; thereby preventing avoidable morbidities and deaths. Follow-up of these patients have been easy, because of the proximity of their residence to the treatment centers. This is a major advantage as it would make early detection and presentation with recurrence possible. Except for the 2 patients who were lost to follow-up and no further information, there is no clinical evidence of recurrence on examination of the patients during surgical outpatient clinic visit so far. Nevertheless, the limitation of this study is the short duration of follow-up carried out so far; considering high recurrence associated with Bassini's herniorrhaphy.

In conclusion, patients with giant inguinoscrotal hernia were very common in this African subregion owing to lack of awareness and financial constraint. The use of lidocaine for local anesthesia was safe, well tolerated and gave results that were comparable to the use of spinal or general anesthesia. Lidocaine is a cheap readily available safe drug that may have much to offer as local anesthetic agent for the repair of giant

inguinoscrotal hernia in resource-poor regions where other means of anesthesia are either not available or exorbitantly expensive.

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Related topics

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