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ORIGINAL ARTICLE

# Inguinal hernia repair in Nigeria: a survey of surgical trainees

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## Abstract

**Purpose** Africa's inguinal hernia burden is high with large numbers of untreated hernias. Mesh repair is recommended in developed countries, but the best repair in developing countries is unknown. Little is known about knowledge and practice of surgeons in Nigeria performing inguinal hernia repair. Surgical trainees can provide this information.

**Methods** A questionnaire-based survey was administered to surgical trainees from all over Nigeria who had attended the West African College of Surgeons' integrated revision course in Jos, on their practice and recommendations concerning elective inguinal hernia repair.

**Results** One hundred and nine surgical trainees (90.8%) consisting of 78 (71.6%) registrars and 30 (27.5%) senior registrars responded. Thirty-two (29.4%) used antibiotics routinely for inguinal hernia surgery. Ceftriaxone was the most widely used antibiotic (45%). Ninety-two (84.4%) respondents will perform this surgery as day case. Forty (36.7%) respondents stated modified Bassini repair as their preferred method of repair. Mesh repair was recommended by 93 (85.3%) respondents while 65 of 100 respondents (65%) recommended laparoscopic surgery. Of 103 respondents, 93 (90.3%) had performed inguinal hernia repair and 34 (33%), mesh repair. For 56 (51.4%) respondents, the most difficult part of open hernia surgery was sac dissection.

**Conclusions** Surgical trainees in Nigeria perform more tissue-based inguinal hernia repair than mesh but majority would recommend both mesh repair and laparoscopic surgery. Majority found sac dissection as the most difficult part of open hernia surgery.

**Keywords** Inguinal hernia repair · Surgical trainees · Nigeria

## Introduction

Inguinal hernia repair is commonly performed worldwide [1]. In Africa, the burden of inguinal hernia is high, but inguinal hernia surgery has not met the need [2–4]. A large number of repair methods have been described for inguinal hernia [5]. Mesh repair via open or laparoscopic approach is now recommended for the inguinal hernia repair in developed countries [6]. The preferred hernia repair for developing countries where cost and availability of meshes are a problem is largely unknown [7], and little is also known about knowledge, attitude and practice of surgeons regarding inguinal hernia repair in Nigeria.

A survey of surgeons in Nigeria who repair inguinal hernia or a nationwide compilation of inguinal hernia repairs may provide a clearer picture of the situation in Nigeria.

Trainee surgeons play an integral role in the assessment and management of patients especially in large teaching hospitals under the supervision of experienced consultants. Trainees' opinion may provide one of the strategies to achieving quality improvement in healthcare. Knowing surgical trainee opinion regarding care can provide information relevant to quality improvement in surgical care and different aspects of inguinal hernia repair.

Surgical trainees through residency training become specialists in the treatment of surgical diseases, including inguinal hernia repair. Often trainees' techniques and methods are determined by what they learn from surgeons. One way of finding out current surgical practice in relation to management of inguinal hernia is to ascertain what surgical trainees from all over the country know. It is also important to determine what steps of inguinal hernia surgery, trainees find most difficult.

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This knowledge will enable trainers to ensure that these parts are understood.

The objective of this study was to assess the knowledge, attitude and practice of surgical trainees (by extension surgeons) in Nigeria to management of uncomplicated inguinal hernia repair, as well as to determine which part of inguinal hernia surgery is found most difficult by surgical trainees.

## Materials and methods

This was a self-administered questionnaire based study on knowledge, attitude and practice of inguinal hernia management, conducted among surgical residents from all over Nigeria who attended the West African College of Surgeons integrated revision course in Jos, Nigeria, in September 2016. The questionnaires were filled anonymously by individual residents after informed consent was obtained.

The questionnaire divided into four parts comprised of closed- as well as open-ended questions and is a modification of a previous study by Shamim et al. [8]. The first part required information about the respondent's qualification, year of graduation, current level in training and institution. The second part required the respondent to specify his or her procedure of choice, reason for the choice and management of a young man with an uncomplicated inguinal hernia. The third part of the questionnaire was concerned with respondents' preference regarding mesh hernia repair and laparoscopic surgical repair. The fourth part focused on the part of hernia surgery considered most difficult by the respondents. The open-ended questions were to enable the respondents to elaborate more on different aspects of their responses and ensure that their opinions were not entirely limited by the questionnaire. These included areas such as choice of antibiotics and recommendation of laparoscopic approach to hernia repair.

The data collected were codified, entered into Microsoft Excel 2007 and analyzed with Statistical Package for Social Sciences (SPSS) version 23 (Chicago IL USA). Non-categorical data were expressed as means and categorical data as percentages. Regional differences in management of hernia were explored by dividing the respondents into groups based on location of institution. Choice of hernia repair was also analyzed based on the number of years post-graduation. Differences between groups were analyzed using $\chi^2$ as appropriate. A value of $P < 0.05$ was considered statistically significant.

## Results

There were 109 respondents out of the total 120 approached (90.8%). They were from every region in the country. Eighty-nine (80%) respondents graduated from medical school 5–10 years before the study. There were 78 (71.6%) registrars, 30 (27.5%) senior registrars and one respondent did not state his status. Of the 78 registrars, 5 were from orthopaedics. Seventeen of the senior registrars were in general surgery, 6 in urology, 5 in paediatric surgery and 1 each in cardiothoracic and neurosurgery.

Sixty-six (60.6%) respondents use prophylactic antibiotics only in mesh repair, 32 (29.4%) use it routinely, and of the remaining respondents, 11(10.1%) never use antibiotics for uncomplicated inguinal hernia surgery. Ceftriaxone (45%) was the most widely used antibiotic used, followed by quinolones (10.1%), cefuroxime (7.3%) and amoxicillin–clavulanate (6.4%).

Spinal anaesthesia was the choice of anaesthesia for uncomplicated inguinal hernia by 55 (50.5%) respondents while 48 (44.0%) favoured local anaesthesia and 4 (3.7%) respondents general anaesthesia.

Majority, 92 (84.4%), of the respondents will perform this surgery as a day case procedure while 17 (15.6%) chose to perform it on inpatient basis.

Modified Bassini repair was chosen by 40 (36.7%) respondents as their preferred method of repair followed by mesh repair 31 (28.4%) and darning 24 (22%) (Table 1). The choice of repair was based on ease of performance for 52 (47.7%) respondents, while for 32 (29.4%) respondents, it was personal preference. Only 8 (7.3%) chose a repair because it was cheap.

Of 93 respondents (85.3%) who recommended mesh repair, 83 recommended it because it gives better results. Of the 64 respondents who do not recommend mesh, the commonest reason given by 45 respondents (70.3%) was the cost. There was no significant difference between the respondents that graduated earlier from medical school and those that graduated later in the choice of tissue approximation or mesh repair for uncomplicated inguinal hernia repair ($\chi^2 = 0.57$).

In response to the question: "Would you recommend laparoscopic approach to hernia repair?" 65 out of 100 respondents answered in the affirmative. They recommended laparoscopic repair mainly because of less pain and better cosmesis. Those who did not recommend it felt that it was expensive, took longer time, and expertise was not available. There was no difference in recommending laparoscopic

**Table 1** Preferred type of inguinal hernia repair ($n = 109$)

| Preferred type of repair | Number of respondents | Percent |
|---|---|---|
| Bassini | 11 | 10.1 |
| Modified Bassini | 40 | 36.7 |
| Shouldice | 3 | 2.8 |
| Darning | 24 | 22.0 |
| Mesh | 31 | 28.4 |

repair based on earlier or later year of graduation from medical school (1999–2005; 2006–2012; $\chi^2$ test, $P = 0.79$).

Out of 103 respondents, 93 (90.3%) had performed inguinal hernia repair before while 10 (9.7%) had not. Only 34 (33%) had performed a mesh repair while 69 (67%) had not.

In response to the question: "Which part of open hernia repair do you consider the most difficult?", fifty-six respondents (51.4%) considered dissection of the sac as the most difficult (Table 2).

When the participants' institutions were analyzed according to their geopolitical zones, there was no relationship between these zones and preferred repair. When individual institutions were analyzed, in some institutions, certain repairs were more popular.

There was no relationship between year of graduation and preferred surgery.

All senior registrars in the survey had performed inguinal hernia repair. Of 17 senior registrars in general surgery, ten chose mesh repair, while four chose modified Bassini repair and the remaining three chose nylon darn.

## Discussion

Although the exact incidence is unknown, inguinal hernia is a common condition in Africa including Nigeria [2, 3, 9]. Elective inguinal hernia repair has been shown to be cost effective; however, different methods of inguinal hernia repair have been described [5, 10, 11]. Available evidence suggests that mesh-based repairs result in less recurrent rates, quicker return to work and perhaps less persistent pain [1, 12]. Thus, in developed countries, open or laparoscopic mesh repairs are recommended [6]. There are currently no such guidelines for Nigeria. Furthermore, in Nigeria, there is little information on the commonly performed repairs for hernias. It is important to know how inguinal hernia is managed in Nigeria. Knowledge of the commonly used methods of hernia repair in Nigeria will be valuable in determining how to solve efficiently the heavy inguinal hernia burden in the country, and whether there is even the surgical capacity to do so. Evaluating what surgical trainees know about inguinal hernia repair can serve as a surrogate measure of the methods used. Trainees are likely to know about and use techniques they have been taught or have observed.

**Table 2** The most difficult part of open inguinal hernia repair ($n = 109$)

| Most difficult part | Number | Percent |
|---|---|---|
| Identifying the sac | 28 | 25.7 |
| Dissecting the sac | 56 | 51.4 |
| Posterior wall repair | 20 | 18.3 |
| Non-respondents | 5 | 4.6 |

In our study of doctors undergoing specialist surgical training from all parts of Nigeria, Bassini repair or its modification was the recommended repair by the highest number of respondents for uncomplicated inguinal hernia in a young man. This was followed by mesh repair and nylon darn, respectively. If we consider that modified Bassini is relatively easier to perform, it is understandable that it would be the preferred method of repair for surgeons in training. Not surprising, Shouldice repair which is more difficult to learn was the least preferred [5].

Most of these trainees will perform the hernia repair under either spinal or local anaesthesia as day care surgery. About half the respondents chose spinal anaesthesia which might reflect the confidence that these trainees would have if the whole region was anaesthesized before the hernia repair. The relative ease of administration as well as the lower cost of spinal anaesthesia compared to general anaesthesia may also be factors for the choice of spinal anaesthesia. Local anaesthesia use for inguinal hernia surgery will require more confidence and a gentle technique. Local anaesthesia is a common form of anaesthesia for inguinal hernia repair in Nigeria [7, 9, 13–16].

Most of the respondents believed that mesh repair was associated with better results. Those that did not recommend mesh repair had understandable concerns about the cost. Majority of the respondents will recommend laparoscopic surgery due to patient benefits of less pain and cosmesis. Those that did not recommend laparoscopic surgery were concerned that the procedure was longer, more expensive and there was limited expertise in Nigeria.

Few of the respondents do not use antibiotics routinely in uncomplicated inguinal hernia repair while most will give prophylactic antibiotics for mesh repair. The most commonly used antibiotic was ceftriaxone. Majority of the respondents in our study will recommend prophylactic antibiotics only for mesh repair. Less than a third recommended its use routinely. The use of antibiotics for elective inguinal hernia repair is controversial [17, 18]. There are no national guidelines for Nigeria. The answers given by the respondents show that majority will use antibiotic prophylaxis, especially for mesh-based repairs.

Although over 90% of the respondents in our study had performed inguinal hernia repair, fewer (33%) had performed mesh repair for inguinal hernia. This suggests that while inguinal hernia repair is a common surgical procedure that surgical trainees perform in Nigeria, most of the trainees had not performed mesh repair. This may indicate a potential hiatus in the training of specialist surgeons in the country. With the world as a global village, Nigerian trainees must be exposed to more modern surgical techniques and methods that are relevant globally.

Dissection of the sac was the most difficult aspect of inguinal hernia repair for more than half of the respondents. In the experience of the authors, this could be a formidable part of the procedure especially in our patients who commonly present with longstanding hernias. The hernia sacs in these patients are usually difficult to dissect from surrounding structures. Dissection and identification of the sac along with posterior wall repair constitute the major difficulty trainees have in inguinal hernia repair. Surgeons teaching hernia repair should ensure that trainees understand these steps. Adequate attention should be given in training programs and texts to these aspects of inguinal hernia repair.

The authors did not find much literature on types of or attitude to inguinal hernia repair in Nigeria. Although in Africa, literature is scarce on types of repair, the evidence available suggests that Bassini repair is popular [4]. Majority (46.8%) of the respondents in our study chose modified Bassini repair or Bassini repair as their preferred method of inguinal hernia repair. This indicates that modified Bassini repair is still a popular method of repair in Nigeria. Mesh repair was recommended by 28.4% of the surgical trainees. This may mean that increasingly more residents are getting exposed to mesh repair techniques. This is supported by increased published reports from different parts of the country about mesh repairs of inguinal hernia [7, 13, 19]. Nylon darning was recommended by 22% of the respondents. This also may be a reflection of the relative frequency with which the repair is performed by surgeons in Nigeria [14, 16]. A sub-analysis of the senior trainees in general surgery who are expected to have more knowledge and would have performed more hernia repairs showed that majority (58%) will recommend mesh repair. It appears that inguinal hernia repair is evolving from tissue-based repairs which are chiefly modified Bassini and nylon darn to mesh-based repairs. Our study is a snapshot of this evolution. Currently, in developed countries, mesh-based repairs are recommended and are popular methods of hernia repair [6, 20]. However, it is important to note that the journey to current practice in these countries did not occur suddenly but was a process similar to what we are observing in Nigeria. In the recent past, even in developed countries tissue-based repairs were more popular [21].

In other countries, the attitudes of surgeons to inguinal hernia repair have been reported [8, 20–24]. However, more recent surveys have focused on newer methods of inguinal hernia methods and specific controversies relating to inguinal hernia repair [22–24]. Shamim and coworkers reported that general surgeons in Karachi chose mesh repair with prophylactic antibiotics done as day case procedures utilizing spinal anaesthesia, but not laparoscopic hernia repair as their preferred practice [8]. There are some similarities to our findings with regard to the use of prophylactic antibiotics, day case and spinal anaesthesia. However, while majority of the general surgeons in Karachi will not recommend laparoscopic surgery, surgical trainees in Nigeria would. Also a larger number of trainees in Nigeria chose Bassini method and its modification as their preferred method of hernia repair as opposed to mesh repair. These differences could be attributed to trainee surgeons in Nigeria being more favourably disposed to laparoscopic surgery and being more familiar with Bassini type repairs.

It appears that inguinal hernia surgery is in transition in Nigeria. From our survey of trainee surgeons in Nigeria, although traditional tissue-based repairs are commonly preferred, there is knowledge of mesh-based repairs and laparoscopic repair of inguinal hernia. The cost, availability of meshes and laparoscopic surgery, as well as expertise (especially for laparoscopic surgery), appear to be the major factors limiting the utilization of these more modern methods in Nigeria.

Sac dissection is considered by surgical trainees in Nigeria as the most difficult part of inguinal hernia surgery. This is important for surgeons and institutions involved in the training of surgeons.

Our study was susceptible to reporting bias. The respondents as trainees may want to impress trainers with their answers. Furthermore, since trainee surgeons are more likely to be conversant with surgical literature, they may state what they know from such literature rather than their actual practice. However, the findings from trends in published literature for inguinal hernia repair in Nigeria support our findings in this study.

In conclusion, although surgical trainees in Nigeria perform more tissue approximation surgery for inguinal hernia, they would recommend mesh repair for uncomplicated inguinal hernia utilizing regional anaesthesia as day cases. They would also recommend laparoscopic repair. However, they are concerned about the cost of mesh and availability of expertise for laparoscopic inguinal hernia repair. Most of the trainees also consider sac dissection as the most difficult part of inguinal hernia surgery and thus, trainers should place emphasis on this during surgical training.

## Compliance with ethical standards

**Conflict of interest** BI declares no conflict of interest. BA declares no conflict of interest. EO declares no conflict of interest. AS declares no conflict of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This experiment complies with the laws in Nigeria where this study was carried out.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

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