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Day case groin surgeries in children in Ibadan, Nigeria: spectrum of cases, trends over time and role of residents.

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Abstract

Background: Childhood groin lesions are mostly treatable in ambulatory settings. However, in view of inadequate paediatric surgical manpower in developing countries, there is a long waiting time to surgery that may result in untoward sequelae. The aim of this study was to review the spectrum of groin surgeries in a major teaching hospital in Nigeria, evaluate the timing of surgery and assess the cadre of surgeon operators.

Methods: This was a cross-sectional study conducted by retrospectively reviewing the surgical records of patients who had elective groin surgeries in a single unit between January 2003 and December 2014. Data was analysed using SPSS version 21 with $p < 0.05$ considered statistically significant.

Results: A total of 833 patients aged 2 weeks to 15 years (782 males) had 960 elective day case groin surgeries during the period. The groin lesions were inguinal hernia in 427 (51.3%), congenital hydrocele in 250 (30.0%) and undescended testis in 156 (18.7%) patients. May (101, 12.1%) and September (96, 11.5%) recorded the highest monthly averages of groin surgeries. The residents performed 55.8% of orchidopexies and 68.5% of herniotomies ($p = 0.002$). The proportion of surgeries performed by residents increased during the study ($p < 0.001$).

Conclusion: The commonest groin lesion requiring day case surgery in children is inguinal hernia. The highest proportions of groin surgeries are done in May and September at the beginning of school terms. The residents performed 56% of orchidopexies and 69% of herniotomies.

Keywords: *Day case, groin lesions, hydrocele, inguinal hernia, paediatric surgery, undescended testis*

Résumé

Contexte: Les lésions de l'aine à l'enfance sont principalement traitables dans les milieux ambulatoires. Cependant, compte tenu de l'insuffisance de la main-d'œuvre chirurgicale pédiatrique dans les pays en voie de développement, il y a un long temps d'attente pour intervention chirurgicale qui peut entraîner des séquelles désastreuses. L'objectif de cette étude était d'examiner le spectre des chirurgies de l'aine dans un majeur hôpital d'enseignement au Nigéria, d'estimer le temps de la chirurgie et d'évaluer le cadre des opérateurs de chirurgie.

Méthodes: Il s'agissait d'une étude transversale menée en examinant rétrospectivement les dossiers chirurgicaux des patients qui avaient des chirurgies électives de l'aine dans une seule unité entre janvier 2003 et décembre 2014. Les données ont été analysées à l'aide de SPSS version 21 avec $p < 0,05$ considéré statistiquement significatif.

Résultats: Un total de 833 patients âgés de 2 semaines à 15 ans (782 garçons) ont eu 960 cas de chirurgies électives d'un jour de l'aine pendant la période. Les lésions de l'aine étaient la hernie inguinale chez 427 (51,3%), l'hydrocèle congénitale chez 250 (30,0%) et les testicules non descendus chez 156 patients (18,7%). Mai (101, 12,1%) et Septembre (96, 11,5%) ont enregistré les moyennes mensuelles les plus élevées des chirurgies de l'aine. Les résidents ont effectué 55,8% d'orchidopexies et 68,5% d'herniotomies ($p = 0,002$). La proportion de chirurgies effectuées par les résidents a augmenté au cours de l'étude ($p < 0,001$).

Conclusion: La lésion de l'aine la plus commune nécessitant un cas de chirurgie d'un jour chez les enfants est la hernie inguinale. Les plus grandes proportions de chirurgies de l'aine sont effectuées en mai et septembre au début des trimestres scolaires. Les résidents ont effectué 56% des orchidopexies et 69% des herniotomies.

Mots clés: *cas du jour, lésions de l'aine, hydrocèle, hernie inguinale, chirurgie pédiatrique, testicules non descendus*

Introduction

Groin surgeries are among the most commonly performed elective procedures in children [1]. The most prevalent groin lesions that require surgery are inguinal hernias, hydroceles and undescended testes [2,3]. Less common lesions that are operated on elective basis include femoral hernias, inguinal lymph node enlargements and cystic lymphangiomas

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[2]. Groin surgeries are short procedures that are done under general anaesthesia, mostly with inhalational agents in paediatric surgical practice; hence most children with groin lesions can be operated on an ambulatory basis [4].

In view of the highly prevalent nature of these lesions and an inadequate paediatric surgical workforce, many paediatric surgical centres in Africa have a somewhat long waiting list [5-7]. Unfortunately, prolonging the interval between observation of a groin bulge and timing of surgery increases the likelihood of incarceration in inguinal hernia and may adversely affect the outcome of orchidopexy for undescended testis [8,9]. Compounding this is the wish of parents to have elective surgery for their children done at a time that one of them would be free from work [8] and also not lead to the child missing days at school. The time of the year that most of these elective groin surgeries are performed has, however, not been documented. Such information would be helpful in planning elective surgical lists and manpower needs by paediatric surgical units.

Furthermore, surgical registrars training in the West African sub-region require some degree of proficiency in paediatric surgery in view of the broad spectrum of congenital and acquired diseases encountered, the benefits of exposure to short cases that abound and the fact that most of the member countries have about 50% of their population being children and adolescents [10]. Additionally, it is an opportunity for senior residents to become more adept at performing rather delicate surgery in children in preparation for involvement in more complex surgical operations. Surgeons use groin surgeries, such as hernia repairs, to reinforce the process of teaching, training and mentoring of junior colleagues in the art and practice of surgery since the procedures are rather straight forward, of short duration and with minimal postoperative challenges.

The aim of this study was to review the spectrum of cases of ambulatory groin surgeries in a major tertiary hospital in Nigeria, evaluate the trends in the timing of surgery and assess the cadre of surgeons performing the procedures over time. The findings may influence our practice going forward from here as well as that of other surgeons.

Materials and methods

This was a cross-sectional study conducted by retrospectively reviewing the surgical records of patients who had open groin surgeries in the Division of Paediatric Surgery, University College Hospital, Ibadan between January 2003 and December 2014. Information was obtained on the socio-demographic details of the patients, the presenting complaints, diagnosis and side of lesion as well as associated conditions. Also recorded were the procedure performed, date of surgery, cadre of surgeon, the length of stay in the post anaesthesia care unit, outcome of treatment and details of follow up. Patients who had laparoscopy assisted groin surgeries, emergency surgery for incarcerated inguinal hernia or acute scrotum and those who had groin surgeries as secondary operations where the primary surgeries were not on the groin were excluded from the study.

Data were computed and statistical analysis performed using SPSS for windows version 21 software (IBM Corp, 2012, Armonk, NY). Descriptive variables were presented using proportions and percentages or medians and ranges as appropriate. Cross tabulation was done and bivariate analysis performed using Chi square statistics to test for associations between categorical variables – with groups compared based on diagnosis and side of lesion. The p value for statistical significance was < 0.05.

Results

A total of 833 patients had 960 groin surgeries as elective day case procedures during the period of the study with 782 (93.9%) males and 51 (6.1%) females with a male to female ratio of 15.3:1. The age of the patients ranged from 2 weeks to 15 years with a median age of 3 years. The right groin was operated in 400 (48.0%), the left in 306 (36.7%) and both sides in 127 (15.3%) patients. The diagnosis included: inguinal hernia in 427 (51.3%), congenital hydrocele in 250 (30.0%) and undescended testis in 156 (18.7%) patients. A hernia co-existed with the undescended testis in 20/156 (12.8%) patients and a hydrocele was present in 10/427 (2.3%) patients with a hernia. The right side was more commonly involved in patients with groin hernias, hydroceles or undescended testes, $p < 0.001$ (Table 1).

The number of groin surgeries performed each year ranged from 22 in 2009 to 110 in 2011 (Figure 1). The monthly averages of groin surgeries performed ranged from 46 in February to 101 in May (Figure 2); the highest volumes of cases were operated in May (101, 12.1%) and September (96, 11.5%).

A total of 551 (66.1%) patients had their surgeries performed by residents – the remaining 282 (33.9%) were done by consultants; the proportion of cases performed by residents included 55.8% of orchidopexies for undescended testes and 68.5% of herniotomies for inguinal hernias and congenital hydrocoeles ($X^2 = 9.231$, $p = 0.002$). The proportion

Table 1: Distribution of lesions in relation to affected groin

Diagnosis	Side of the groin involved Right No (%)	Left No (%)	Bilateral No (%)	Total No (%)	X^2	p value*
Inguinal hernia	223 (52.2)	141 (33.0)	63 (14.8)	427 (100.0)	28.887	< 0.001*
Hydrocele	115 (46.0)	112 (44.8)	23 (9.2)	250 (100.0)		
Undescended testicles	62 (39.7)	53 (34.0)	41 (26.3)	156 (100.0)		
Total	400 (48.0)	306 (36.7)	127 (15.2)	833 (100.0)		

* – Statistically significant

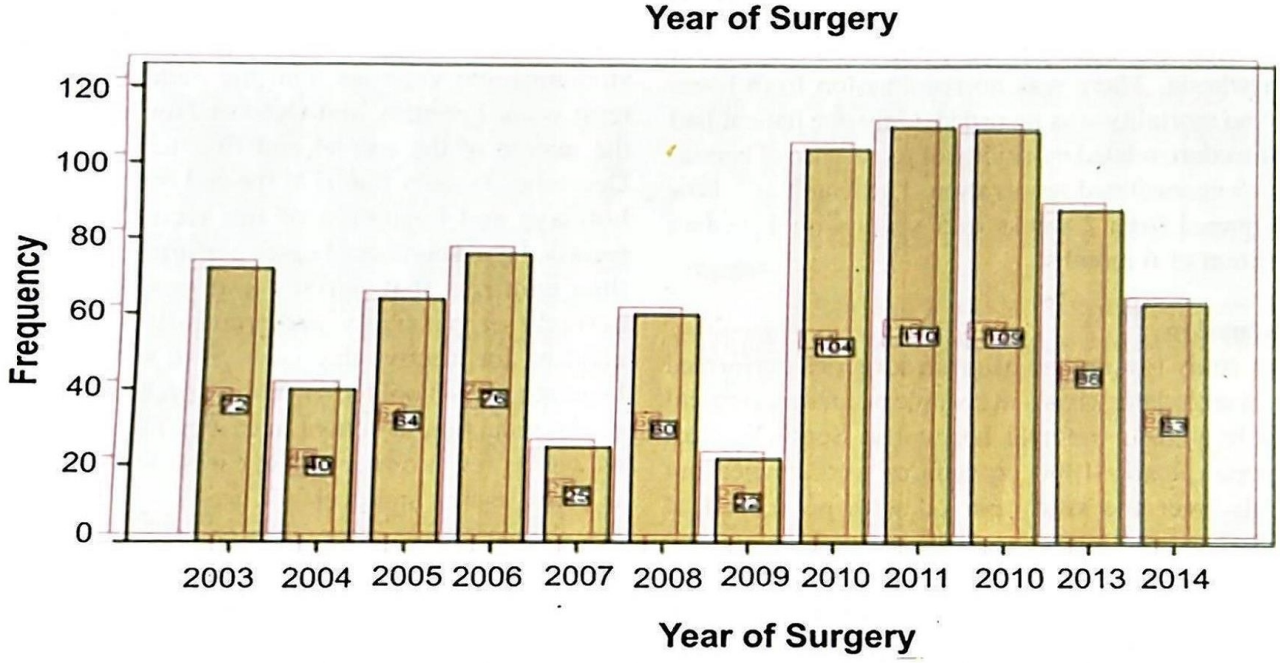

Fig. 1: The number of groin surgeries performed each year during the study (Industrial actions occurred over prolonged periods in 2009, 2013 and 2014)

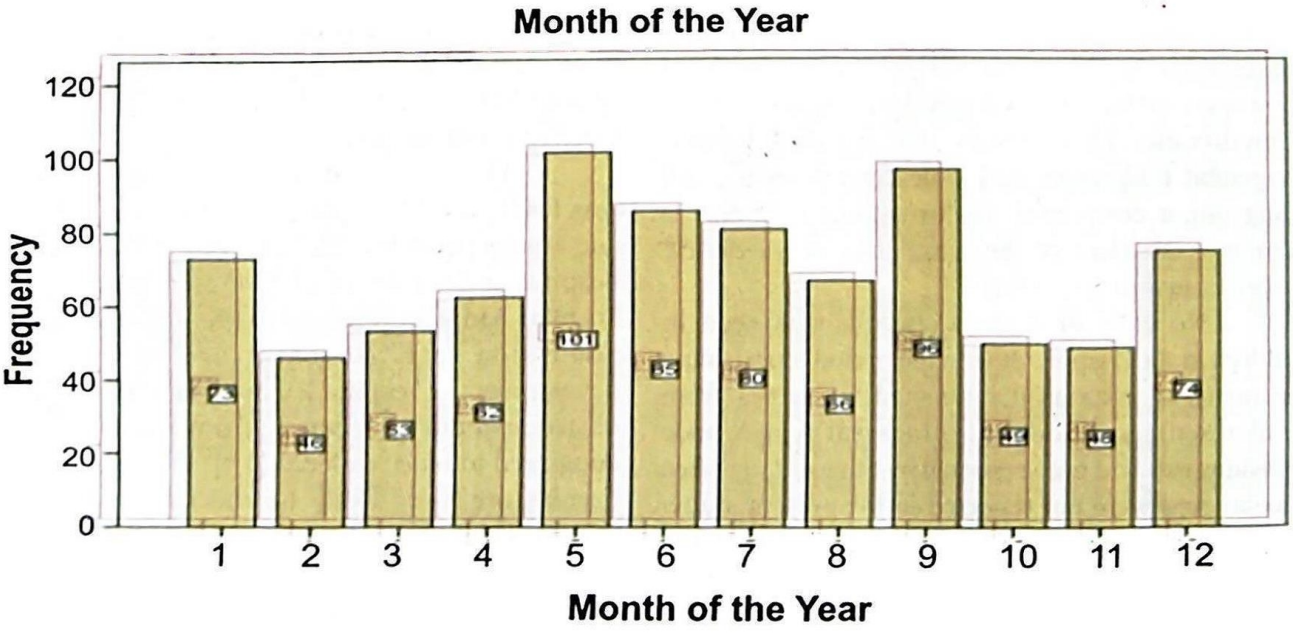

Fig.2: Monthly distribution of the groin surgeries performed (Months 1 to 12 = January to December in sequence)

of surgeries performed by residents over block periods of four years ranged from 51.7% between 2007 and 2010, through 62.3% between 2003 and 2006 to 77.0% between 2011 and 2014 ($p < 0.001$).

The patients were observed on the ward designated as the post anaesthesia care unit for day cases for 2 hours to 8 hours, median of 4 hours except in 12 (1.4%) patients who were admitted for overnight stays in the hospital. Four of these 12 had sickle cell anaemia and were admitted electively for parenteral analgesia and prolonged oxygenation to prevent hypoxia; five were neonates who had bilateral groin surgeries and three patients were admitted on account of poor recovery from anaesthesia. There was no readmission from home and no mortality was recorded. Only one patient had a procedure related morbidity of recurrence of hernia, which necessitated reoperation. The length of follow up ranged from 2 weeks to 5 years with a median duration of 6 months.

Discussion

This study is a review of groin surgeries performed on an ambulatory basis in a single paediatric surgical unit in a major referral hospital in South Western Nigeria. Nearly 1000 procedures were carried out safely over the study period with no record of mortality and with minimal procedure related morbidities. Inguinal hernias accounted for over half of cases that were operated and thus the most commonly encountered groin lesion in children. Abantanga [2] had previously shown that over 70% of children with groin swelling who had elective surgery in Kumasi, Ghana presented on account of inguinal hernias. Similarly, Abdur-Rahman *et al* [1] had reported from Ilorin, Nigeria that 71% of 449 children that had day case surgery in their hospital were operated based on a diagnosis of inguinal hernia or hydrocele. This implies that inguinal hernia, congenital hydroceles and undescended testis – all being minor congenital malformations continue to dominate the elective day case lists of paediatric surgeons in similar settings.

No case of femoral hernia was seen in children in the hospital during the period, confirming the rarity of such as documented in studies from similar settings as ours [1]. Inguinal lymph node excisions that had been reported by others [2] as often encountered were not reported in the present study; majorly because those were done either in the treatment room on the wards for in-patients or in the minor procedure theatre in the surgical outpatients clinic in the hospital hence were not captured in this series.

The number of cases seen each year varied quite widely from as low as 22 to as much as 110 in a year. The yearly variation is not unlikely to be related to the extent of industrial actions that affected service delivery at the hospital, which were more intense over some years than others while 2011 was relatively free of such events. The monthly distribution of groin surgeries performed as day cases showed a preponderance of cases in May and September and the least number of procedures were done in February, October and November. May and September represent the beginning of the school term, third and first terms in schools in Nigeria respectively, when academic work is likely to be less strenuous and vigorous than the middle/end of the term while February and October/November are in the middle of the second and first term of school. December/January that is at the end of the first term holidays and beginning of the second term also recorded good number of cases performed. The study thus confirms that parents and guardians either actively or passively preferentially bring their children for elective day case groin surgery at the beginning of school terms. This is probably because of the reduction in school activities that are missed as well as fewer challenges in caring for a child who is convalescing and does not need to go to school a few days or weeks afterwards compared to one who had surgery during the busier part of the school year. Work and scheduling conflicts have been noted to influence the choice of patients in selecting the timing of surgery [11;12]. Arising from the findings of the present study, the paediatric surgical workforce in Nigeria and other developing countries with similar socio-cultural settings as the study site can modify operative schedules and perhaps increase their elective lists during the months of May and September to reduce the long waiting time for elective groin surgery.

The unplanned admission rate in this study was 1.4%, notably in patients with sickle cell disease and among neonates. Elebute *et al* [13] in a teaching hospital and Calder *et al* [14] in a district general hospital had also reported a 1% – 1.4% unplanned admission rate. Neonates are more prone to development of respiratory distress and have airway obstruction during recovery from anaesthesia when compared to older children [15]. On the other hand, hernias are more likely to undergo obstruction in neonates and infants [16], hence delaying herniotomy in them is not recommended. Further studies are required to evaluate the subset of neonates requiring groin surgery to determine factors that may predict unplanned admission.

Residents performed two-thirds of procedures carried out in this study. This proportion is lower than 90% reported from Idi-Araba, Lagos in a study on day case procedures in 381 children [13]. The lower figure in our series may be due to the exclusion of circumcisions from the study whereas the study conducted in Lagos included those, which accounted for nearly one-sixth of the surgeries done. The residents perform circumcisions in our hospital in most instances. The proportion of cases performed by the residents in this study was inversely proportional to the complexity of the surgery; they performed 56% of orchidopexies, which tend to be the more complex, compared to 69% of herniotomies in this study. Orchidopexy is the most challenging groin surgery for residents and over 50% of graduates completing an accredited general surgery residency programme in the United States were not comfortable with performing the procedure [17]. Furthermore, orchidopexy in addition to oesophagectomy and adrenalectomy were the only surgical procedures in the logbook of the graduates in which surgical volume correlated significantly with proficiency of the trainees [17].

The residents over time performed greater proportion of groin surgeries in the present study. At the beginning of the study period, residents did 62% of the procedures whereas they did 77% of the groin surgeries in the last four years. This significant increase in the proportion of cases performed by the residents occurred in spite of a progressive increase in the consultant staff strength of the division from one to three. It would thus be expedient to say that day case groin surgery is a veritable procedure for surgical residents to be trained to become more involved in surgical operations. The surgical volume of trainees is a determinant of proficiency in performance of surgical operations [18,19]. Surgical training regulatory bodies such as the Accreditation Council on Graduate Medical Education in the United States, while recognizing that surgical training is largely done in an experiential model, has recommended minimum volumes of surgical procedures required to attain proficiency [20]. Similar concepts underlie the recommendations of the West African College of Surgeons and the National Postgraduate Medical College of Nigeria on training of residents in surgery.

In conclusion, the commonest groin lesion requiring day case surgery in children is inguinal hernia. The highest proportions of groin surgeries are done in May and September at the beginning of school terms. The residents performed 56% of orchidopexies and 69% of herniotomies.

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