

Pattern of congenital orthopaedic malformations in an African teaching hospital

*B. Omololu, S. O. Ogunlade and T. O. Alonge

College of Medicine, University of Ibadan
Ibadan

E-mail; badelolu@skanet.com, bade57@hotmail.com

Summary

Background: Congenital Orthopaedic malformations are common malformations that are usually unacceptable to the common populace in the West African sub-region. There is paucity of knowledge about the common types of Orthopaedic congenital malformations in our environment

This study was undertaken to determine the pattern of congenital Orthopaedic malformations in a Teaching Hospital.

Study design: This was a prospective study of all the Orthopaedic congenital malformations seen in our surgical outpatient departments and the inpatient referrals from the wards between January 1995 and December 2003.

Result: There were 284 patients in total with a male to female ratio of 2:1 and age range between two days to nine years.

Clubfoot (CTEV) accounted for 52.8% of all the malformations while Congenital knee dislocation (CDK) and calcaneovalgus deformity accounted for 8%.

Congenital hip dislocation (CDH) accounted for only 2.2% of all the cases.

Conclusion: Congenital talipes equinovarus deformity is the most common congenital orthopaedic malformation in this environment while congenital hip dislocation (CDH) is rare when compared with the Caucasians.

Keywords: Congenital malformations, Orthopaedic, Environment.

Résumé

Introduction: Malformations orthopédiques congénitales sont des malformations courantes qui sont normalement unacceptable pour la populace vulgaire dans la sous région de l'Afrique de l'Ouest. Il y a la pénurie de connaissance sur les types ordinaires des malformations Orthopédiques congénitales dans notre milieu. Cette étude a été effectuée afin de décider la tendance des malformations Orthopédiques congénitales dans un centre hospitalier universitaire.

Plan d'étude: Il s'agit d'une étude en perspective de toutes les malformations Orthopédiques congénitales vues dans notre service des consultations chirurgicales externes et envoi des patients internes des salles entre janvier 1995 et décembre 2003.

*Correspondence

Résultat: Il y avait 284 patients dans l'ensemble avec une proportion sexe masculin sexe féminin de 2:1 et tranche d'âge entre deux jours au neuf ans. Pied bot (CTEV) constitue 52,8% de toutes les malformations tandis que la dislocation congénitale du genou (DCG) et la déformité calcaneovalgus constitue 8% dislocation congénitale de la Hanche (DCH) recensée pour 2,2% seulement de tout les cas.

Conclusion: Déformité talipes equinovarus congénitale est la malformation orthopédique congénitale la plus fréquente dans ce milieu tandis que la dislocation congénitale de la hanche (DCH) est rare par rapport avec ce qui arrive chez les Blancs.

Introduction

Paediatric Orthopaedics constitutes a major workload in Orthopaedic practice in the world⁽¹⁾. Apart from trauma, culminating in fractures, the literary meaning of orthopaedics was derived by Nicolas Andry (1658-1724) from two Greek words; Orthos (straight, free from deformity) and "paideia" – a child⁽¹⁾. Unfortunately, little or no work has been done or reported in Nigeria and indeed Africa on this important aspect of orthopaedics..

There is a dearth of information on the pattern of congenital Orthopaedic malformation (COM) in Paediatric orthopaedics in this environment. It is therefore difficult to know the common deformities in the Nigerian environment.

A review of the English literature and other literature did not reveal any information as to any study in West Africa or Africa that has actually looked into the pattern of congenital Orthopaedic malformations. Thus the present study provides a benchmark of the pattern of congenital malformations in Nigeria.

Materials and methods

The prospective study covers an eight-year period from 1995-2003 in the Department of Orthopaedic Surgery of the University College Hospital, Ibadan. All Paediatric Orthopaedic referrals that have congenital malformations were included in the study. Paediatric patients with acquired deformities from fractures or infections were excluded from the study. The age and sex of the patients were compiled and the antenatal history obtained from the parents, medical records, and case notes, and in some instances from very close relatives. Birth histories were obtained from mothers with majority of mothers alluding

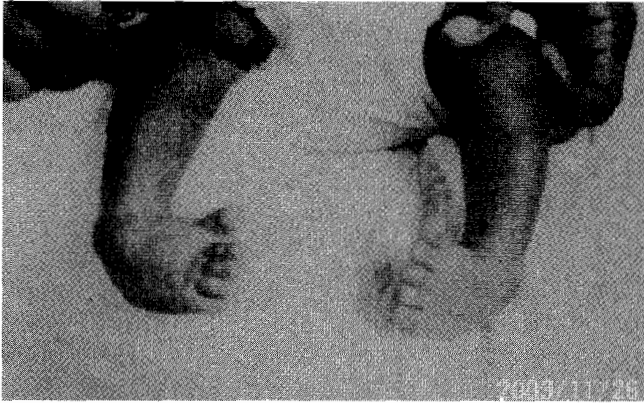


Fig. 1 Clubfoot (CTEV) – 52.8%

obtained from mothers with majority of mothers alluding to non-assisted spontaneous vagina deliveries, while few

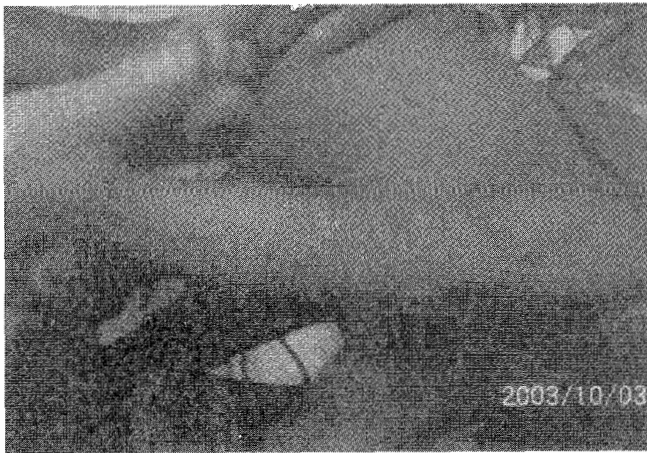


Fig. 2 CDK – 8%

had their deliveries in churches and only a few of our patients gave a history of breech deliveries.



Fig. 3 Calcaneovalgus

Information about drug ingestion during pregnancy was also obtained and parents were also interrogated about other congenital malformations in previous deliveries or of close relatives around them. A brief history was obtained from parents about their perception of the causative factor of the abnormalities.

Results

There were 284 patients over the eight-year period with different forms of congenital malformations. The male to female ratio was about 2:1 with the age range of two days (2 days) to nine years (9 years) with a median age of three (3 months). Infact the only few patients who were more than four years old before presentation were patients with Duchenne muscular dystrophy, achondroplasia, proximal focal femoral deficiency and limb length discrepancy that became apparent as babies started mobilising on their feet.

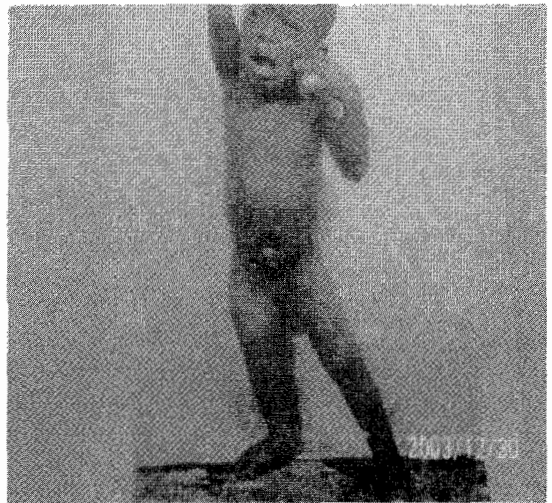


Fig. 4 Proximal focal femoral deficiency (PFFD) – 4.3%

There were fifteen (15) upper limb deformities, 260 lower limb deformities, and four (4) multiple deformities. Others like achondroplasia, osteogenesis imperfecta and Duchenne muscular atrophy accounting for five deformities.

Clubfoot or congenital talipes equinovarus (CTEV) accounted for 52.8% of all the congenital malformations (Fig 1), while congenital knee dislocation (CDK) accounted for 8% (Fig 2). Pes planus and calcaneovalgus deformity also accounted for 8% of all the malformations (Fig 3.) Proximal focal femoral deficiency (PFFD) Fig 4, accounted for 4.3% of all the cases while congenital hip dislocation accounted for 2.2%. Patients with Erbs palsy except one were those referred from outside clinics and all of them had history of either breech or difficult assisted deliveries. There was a positive family history of clubfoot in two of the patients while four (4) patients had associated congenital malformations like arthrogryposis, osteogenesis imperfecta and congenital hydrocephalus.

One of the patients with polydactyly also had a lineage history as an older sister and the mother have polydactyly.

The only patient with posterior-medial bowing was from a primiparous young woman.

A sizeable number of patients' mothers denied any history of drug ingestion during pregnancy but some alluded to the use of herbal concoctions. Few of the patients' mothers were found to have gestational diabetes although there was no particular pattern of congenital malformations associated with those groups of parents.

Discussion

The management of any disease in any environment can only be made better if much is known about the epidemiology of the disease. The University College Hospital, a tertiary level care where this study took place is the oldest referral center in Nigeria.

The result would no doubt give a broad pattern of the common congenital malformations in Nigeria.

The most common Orthopaedic congenital malformation seen in the tropics is said to be congenital talipes equinovarus (CTEV) with an estimated incidence of 1.25 per 1000 live births¹. Lower limb deformities especially congenital talipes equinovarus deformity accounted for the majority of the Orthopaedic congenital malformations. Similar studies in the United Kingdom found idiopathic clubfoot (CTEV) occurring in (0.89 per 1000 live births)⁽²⁾ 0.93/10000 in Sweden and 9/1000 in Polynesian races, whereas Japanese and Chinese rates is 0.5/10000.^{1,2} Racial and genetic factors are said to be influential in congenital Orthopaedic disorders as it is said that congenital dislocation of the hip is very rare in Africans as compared with Caucasians². The incidence of congenital musculoskeletal malformations in Malaysia is estimated to be in the range of 5-10 per 1000 live births². The finding that two of the cases in this study have family history of clubfoot is consistent with studies from other centres. In a genetic analysis of clubfoot in Hawaii, it is said that complex segregation analysis is a useful first step in the investigation of the etiology of congenital disorders with non-Mendelian clustering within families³.

It is tempting to speculate that axially oriented failures of formation are the result of teratogenic insults or genetic influences that destroy cells at specific locations on the apical ectodermal ridge or the supporting mesoderm of the embryonic limb bud⁴. The cause of clubfoot, which is common in our practice for example, is still unclear but a family history of clubfoot is said to be present in many cases.⁵

A large study of limb reduction defects in British Columbia gave an incidence of 597 per 10000 live births with 75% affecting the upper limb.⁶ There has been association between smoking during pregnancy and congenital limb deficiency⁷. However there must be some other environmental factors involved as none of our parents conceded to any history of smoking during pregnancy.

An interesting finding in this study was that majority of the patients with congenital Orthopaedic malformations were born to parents from low socioeconomic background. This however may be a reflection of the socio-economic levels of the hospitals catchment population. Acquired or modulating factors leading to a multifactorial inheritance pattern are reflected in congenital Orthopaedic malformations as in others^(8,9). Goldberg et. al⁽¹⁰⁾ has found that some associated hematological, cardiac or renal malformations may be overlooked initially because of the more obvious malformations of radial dysplasia and other congenital malformations.

From this study, it has been found that over the eight-year period CTEV accounts for 52.8% of the congenital malformations referred to the orthopaedic surgeon. This is in contrast to studies⁽¹¹⁾ from the Western World. Congenital knee dislocation was the second most common malformation accounting for 8%. First-born children are said to be more vulnerable for example to hip and knee dislocations explicable partly on the basis of greater abdominal and uterine muscle tone.¹²

Most of the obstetrical palsies are said to be due to difficult deliveries. Breech presentation particularly frank breech increases the risk of dislocation and Erbs palsy by a factor of ten.¹³ The study also supports the belief of the low prevalence of congenital hip dislocation (CDH) accounting for only 2.2% of all the cases. Surprisingly pseudoarthrosis of the tibia, and proximal focal femoral deficiency (PFFD) accounted for over 4% each of the referred cases.

Conclusion

It can be seen from this study that there is quite a significant difference in the pattern of congenital malformations in this environment as compared with the Caucasians.

References

1. Andry N: 1743 In: Orthopaedia. London; facsimile reproduction of the first English edn. Philadelphia, JP Lippincott 1961.
2. Wynne Davies R.: Family studies and the cause of congenital clubfoot, talipes equino-varus, calcaneovalgus and metatarsus varus. *JBJS* 1964 46B: 3 445-463
3. Yang HY, Chung CS, Nemecheck RN: A genetic analysis of clubfoot in Hawaii. *Genet Epidemiol* 1987; 4: 299-306.
4. Beatty E.: Upper limb tissue differentiation in the human embryo. *Hand Clin* 1985; 391-403.
5. Rogata EJ, Drummond DS, Gurr J: Scoliosis, incidence and natural history. A prospective epidemiological study. *JBJS* 1978 60A (173-176).

6. Froster-Iskenius UG, Baird PA.- Limb reduction defects in over one million consecutive live births. *Teratology* 1989 , 39 127-135.
7. Szeizel AE, Cdaj I, Lenz W .Smoking during pregnancy and congenital limb deficiency. *British Med. Journal* 1994, 308; 1473-1476.
8. Lochmiller C, Johnston D, Scott A, Risman M, Hecht JT. Genetic epidemiology study of idiopathic talipes equinovarus. *American Journal of Medical Genetics* 1998 79 90-96.
9. Feldbrin Z, Gilai AN ,Ezra E, Khermosh O, Kramer U, Wiengrab S. Muscle imbalance and the etiology of idiopathic clubfoot. An electromyographic study. 1995 *JBJS* 77B 596-601.
10. Goldberg MJ, Bartosheksy LE: Congenital hand anomaly, etiology and associated malformations. *Hand Clin.* 1985; 1: 405-415.
11. World Health Report 1998- Life in the 21st Century; a vision for all WHO, Geneva.
12. Dunn PM. Perinatal observations on the etiology of congenital dislocation of the hip. *Clin Orthopaedics and Related Research* 1976 119 ;11-15.
13. Gilbert A, Whitaker I, -Obstetrical brachial plexus lesions. *Journal of Hand Surgery* 1991 16B 489-491.