

Prevalence and Degree of Consanguinity in Idiopathic Clubfoot in India

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Abstract

Background: In India, clubfoot is quite commonly seen. Consanguineous marriage is one of the etiological factors associated with clubfoot deformity. Consanguineous marriage is a fairly common sight, especially in rural areas in India. As there is no study from India which mentions relationship of consanguinity and clubfoot, the present study was conducted.

Aim: The aim of the study was to find if there was any significant correlation between relationship of consanguinity and clubfoot, and divide them based on degree of consanguinity.

Material and Method: The study was conducted from 2010 to 2015 at tertiary institute. The total number of cases which were considered of idiopathic variety of clubfoot was 406. Out of these, the cases were divided into presence or absence of consanguinity, and also the degree of consanguinity. A detailed history about consanguinity was taken.

Result: According to the data and classification, 140 patients were born out of consanguineous marriage. This states that about 34.4% of the cases had consanguineous marriage. After classification into degrees, it was found that there were no cases of first degree consanguinity, 25 cases of second degree and maximum number of cases i.e. 115 cases with third degree consanguinity.

Conclusion: Thus it can be concluded that consanguinity is significantly seen in cases with idiopathic clubfoot. So, we need to create awareness regarding consequences of consanguineous marriages, particularly in rural and developing areas.

Keywords: Consanguinity, clubfoot

Introduction

India, being a culturally diverse nation, with various religions and castes, is a land with people following different customs. With various backgrounds, follow various belief systems and mind-sets. People from rural places, tribes, and low socio-economic areas, believe that marriage of their son/daughter within the family would make them safer and secure in life and thus getting them married to their relatives.

Clubfoot is one of the commonest congenital anomalies seen in orthopaedic practice. Prevalence of Clubfoot in Asian countries is about 1.5/100 children. According to a study from India, in Sindhudurg District of Maharashtra, India, the prevalence of Clubfoot is 1.8/1000 new borns. (1) One of the etiologies mentioned in the literature of Clubfoot, is consanguineous marriage. Although

Clubfoot is quite common in India, there are very few studies mentioning the prevalence of consanguinity in Clubfoot cases.

Aims

To determine the prevalence and degree of consanguinity in patients with idiopathic congenital talipes equinovarus.

Material and Method

This study was done in a tertiary care hospital, with a dedicated Pediatric Orthopaedic unit. We do see large number of cases here, of clubfoot, coming from backward areas, rural places and low socio-economic statuses, where the literacy and education is low.

We collected data from the year 2010 to 2015, of clubfoot cases that came to the

hospital for advice and treatment. In all these cases, we selected the cases of idiopathic clubfoot. They consisted of treated and untreated cases of idiopathic clubfoot. At the time of consultation, detailed history of child with perinatal period, and also marital history of parents was taken. Any consanguineous marriage found in the history was noted and mentioned in detail.

We omitted all the cases other than idiopathic variety, such as Arthrogyrosis, Meningomyelocele, and Syndromic cases. We included all the cases of treated or untreated cases of idiopathic clubfoot and divided them by presence or absence of consanguinity. Then the cases with consanguineous marriage were further classified into degrees.

For classification of degrees of

consanguinity, we referred to the NHS National Genetics and Genomics Education Centre (4) through their website (www.geneticseducation.nhs.uk). From this source, we found information about classification of consanguinity into degrees. Degree of consanguinity is

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determined by the degree of relationship between the two individuals. That in turn is determined by the shared amount of genes in the relatives. As half of the genes in a person are inherited from each parent, and shared with the sibling, marriage with parent, sibling or child, is first-degree consanguinity. Sharing one-quarter proportion of genes with aunt/uncle, niece/nephew, grandchild/grandparent, marriage with one of these relations is second-degree consanguinity. The third degree of consanguineous marriage is with the relations sharing one-eighth proportion of genes, i.e. with first cousins, or great grandparents.

Following is the classification of consanguinity into degrees:

- First Degree: marriage with Parent, Child, or Sibling.
- Second Degree: marriage with Aunt/Uncle, Niece/Nephew, Grandparent/Grandchild
- Third Degree: marriage with First Cousins.

Result

From the years 2010 to 2015, at our institute we saw 457 cases of clubfoot. Out of these, 39 were cases of non-idiopathic variety. So we excluded them. Out of the remaining 418 cases, 240 cases had come at neonatal age and 178 cases had come at different ages, for treatment. Out of these 418 cases of idiopathic clubfoot, 12 parents were not willing to share their marital history. So, after excluding them, our final data

comprised of 406 cases, which were then classified into degrees of consanguinity. So with the final sample size of 406 cases, 230 cases were presented to us at neonatal ages while 168 were late presenters (Age 3 months to 10 years).

In this study, out of 406 cases, there were 272 males and 134 females. Out of these patients, 282 had unilateral clubfoot, and 124 cases had bilateral. With respect to consanguinity, there were 140 children born out of consanguineous marriage. This accounts to about 34.4% of patients with consanguineous marriage of parents. According to the above-mentioned classification, there were 0% cases of first-degree consanguinity, about 18% i.e. 25 cases with second-degree consanguinity. Majority of them 82% i.e. 115 cases had third-degree consanguinity. This way, the commonest degree was the third, and within the third degree of consanguinity, all the marriages were found to be between respective children of brother and sister. Consanguineous marriages are more prevalent in rural areas than urban. These have been very commonly associated with low age at marriage, low educational level of mother, and low occupational status of the father.

Association of consanguinity and pediatric disorders is well established. Parental consanguinity has been linked with various risks including stillbirths, perinatal mortality, congenital birth defects [DDH, CTEV], malformations, mental retardation, and neonatal diabetes mellitus.

Parental consanguinity increases the autosomal recessive conditions through the expression of the recessive deleterious alleles, especially in the offspring of first-degree consanguineous marriages.

In our study, we have attempted to establish the correlation of clubfoot and consanguineous marriage. In previous study made by Shrinivas and Nataraj (3) they have established consanguineous marriage as one of the factors causing clubfoot.

Our study demonstrates, that almost one-third of the cases of CTEV that came to our outpatient clinic have consanguineous marriage of parents. These findings are similar to the study done by Sahin et al. (2), which demonstrated similar percentage of cases of clubfoot and consanguinity.

There is no direct relation of sex or number of feet affected (unilateral or bilateral), with consanguinity.

Conclusion

The result of the presented study reveals that there is a significantly high proportion of consanguinity in clubfoot patients. There is an urgent need to inform the people, properly about the anticipated deleterious effects of inbreeding in societies where inter-relation marriage is widely practiced. Further etiological studies that look into the association of consanguinity and clubfoot are needed to support the finding and clarify the significance of such an association.

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