

Original Research Article

Demographic study of congenital talipes equinovarus deformity in central India

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ABSTRACT

Background: Congenital idiopathic clubfoot is the most common birth defect of the musculoskeletal system affecting 1 in every 1000 live births each year. Aim of our study was to determine the demographic variables, risk factors associated with CTEV in central India.

Methods: A retrospective study was conducted from January 2019 to August 2020 using data of 200 patients with CTEV registered at department of orthopaedics, Netaji Subhash Chandra Bose medical college, Jabalpur, Madhya Pradesh, India were included in our study.

Results; Out of total of 200 patients, 167 patients belong to age group <1 year (83.5%) with range from 10 days -7 years. Males were twice (65%) likely affected and (53.5%) clubfoot cases had both feet affected. Right side was more affected in unilateral cases. 189 patients (94.5%) were idiopathic, whereas 11 patients (5.5%) were non-idiopathic. there were 58 (29%) children out of 200, born of consanguineous marriage of parents. Risk factors like anemia, jaundice, asphyxia, obstructed labor, history of miscarriage had positive correlation with clubfoot. CTEV patients of low birth weight <2.5 kg associated with maternal risk factors like smoking, alcohol, anemia.

Conclusions: Demographic study is useful tool for determining birth prevalence and risk factors associated with CTEV. There are significantly higher proportion of consanguinity in clubfoot patients. Cultural differences may lead to differences in our findings with respect to the previous studies. These preliminary findings will help in the future for similar studies in central India as well as in the general Indian population.

Keywords: Demographic, Congenital talipes equinovarus, Idiopathic

INTRODUCTION

Congenital talipes equinovarus (CTEV), is more commonly known as clubfoot, was introduced in the medical literature by Hippocrates et al around 400 BC.¹ Congenital TEV has estimated incidence of 1-2 per 1000 live birth.² CTEV is most common congenital anomaly of the musculoskeletal system. One of the most common structural and visible birth defects and is responsible for major disability in children.² CTEV can be easily recognized at birth and can present in two forms.

Idiopathic CTEV and non-idiopathic CTEV in which other malformations are present such as arthrogyrosis, spina bifida, congenital dislocation of the hip, spinal muscular atrophy. In various studies the prevalence of associated congenital anomalies in patients with CTEV varied from 10 to 40%, depending on the population and method of study.² The Central India, part of our study was demographically lagging, behind in country.³

The purpose of our study is to provide an overview of clubfoot, classified by using Pirani score and to

determine demographic characteristic of CTEV with respect to gender, laterality, presence of other congenital anomalies and maternal obstetric history in central India.⁴

METHODS

This study entitled “demographic study of CTEV in Central India” was retrospective study done at department of orthopaedics, Netaji Subhash Chandra Bose medical college, Jabalpur, Madhya Pradesh, India from January 2019 to August 2020. After approval from ethical committee, the sample size of 200 patients with congenital talipes equines varus deformity in central India was included in this study. In our study statistical tool SPS 23.0 is used for data analysis.

All the patients of CTEV presenting at outpatient department were registered. Parents of all the clubfeet children were found informed in their language, about the treatment protocol and all consented. All cases were initially evaluated by Pirani score to grade the severity of deformity.⁴ Detailed data includes maternal history regarding age, parity, antenatal history, maternal education, ethnicity, family history, birth weight, order, mode of delivery. Exposure of mother to illicit drugs or alcohol and occurrences of infection during pregnancy. Detail case history including age, sex, birth weight, birth month, parents name, address, date of reporting, age at presentation, any prior treatment history etc. Examination includes Inspection look for laterality, position of the sole of the foot and its borders, condition of the foot skin and skin creases and other associated congenital malformations like Spina bifida, arthrogryposis multiplex congenita, polydactylism/syndactylism etc. The position of talus, calcaneum, the malleoli, tendon achilles and tendon of tibialis posterior were palpated. Both active and passive movements were found out whether its reducible or not.

Inclusion criteria

All patients of CTEV presenting at out patient’s department of orthopaedics were registered and patients previously operated for CTEV were included in the study.

Exclusion criteria

Patients with other foot deformity like congenital vertical talus, metatarsus adducts and patients with acquired equinovarus deformity likes cerebral palsy, poliomyelitis were excluded from the study.

RESULTS

The number of patients with CTEV registered in this study were 200 out of which 130 (65%) were male and 70 (35%) were female. Mean age of presentation was 14 months with range from 01days to 8years.107 (53.5%) out of 200 had bilateral clubfoot. 50 out of 93 unilateral

clubfoot had right foot involvement. 24 (12%) out of 200 cases reported a known family history of clubfoot. 46.5% clubfoot cases were first born children. 50 out of 200 patients with clubfoot were pre term out of which 4 had clubfoot associated with oligohydramnios, syndactyl. 189 (94.5%) out of 200 clubfoot cases were idiopathic, whereas 5.5% were non-idiopathic associated with other congenital anomalies. Neural tube defects and syndactyly, constrictions band of ring were the commonest anomalies.

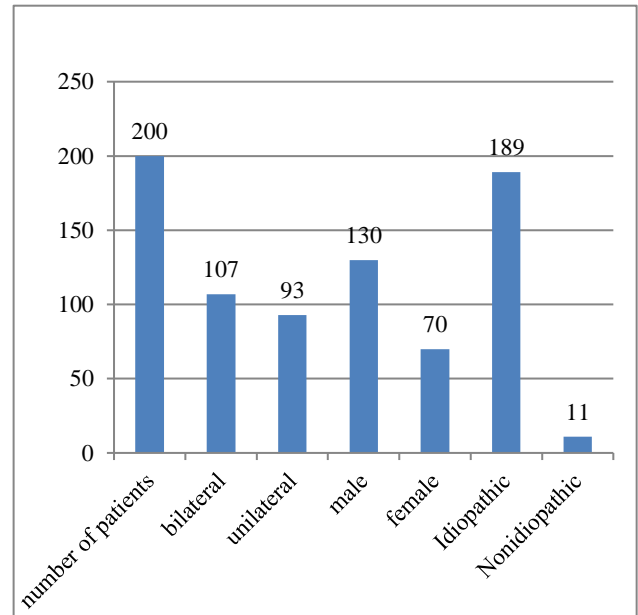


Figure 1: Demographic variables of CTEV.

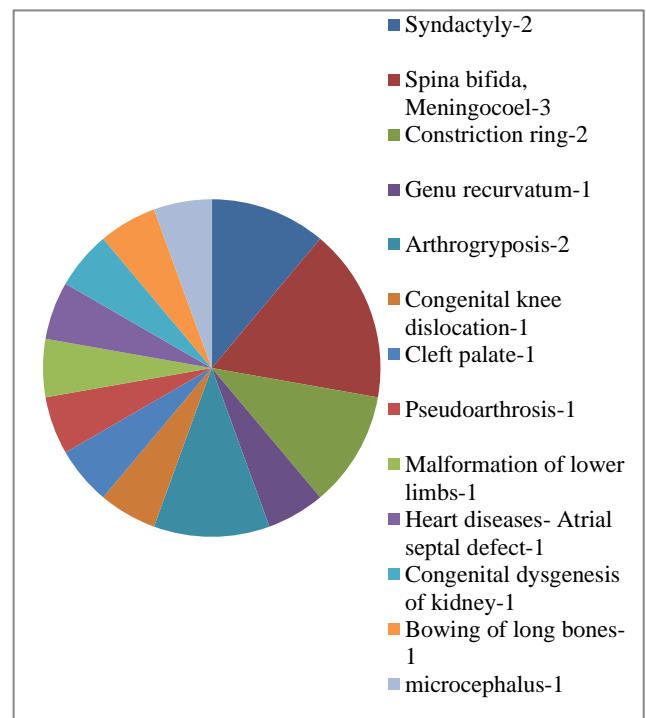


Figure 2: Various congenital anomalies associated with CTEV.

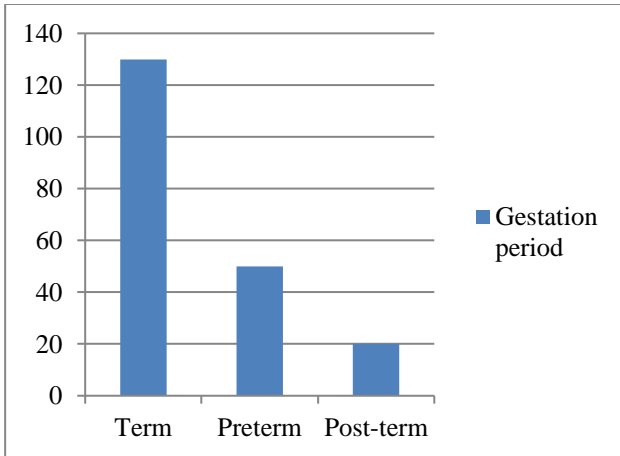


Figure 3: Relations of gestation period with incidence of CTEV.

75 patients out of 200 CTEV were of low birth weight <2.5 kg having associated with maternal risk factors like smoking, alcohol, anemia.

In our study, there were 58 (29%) children out of 200, born of consanguineous marriage of parents.

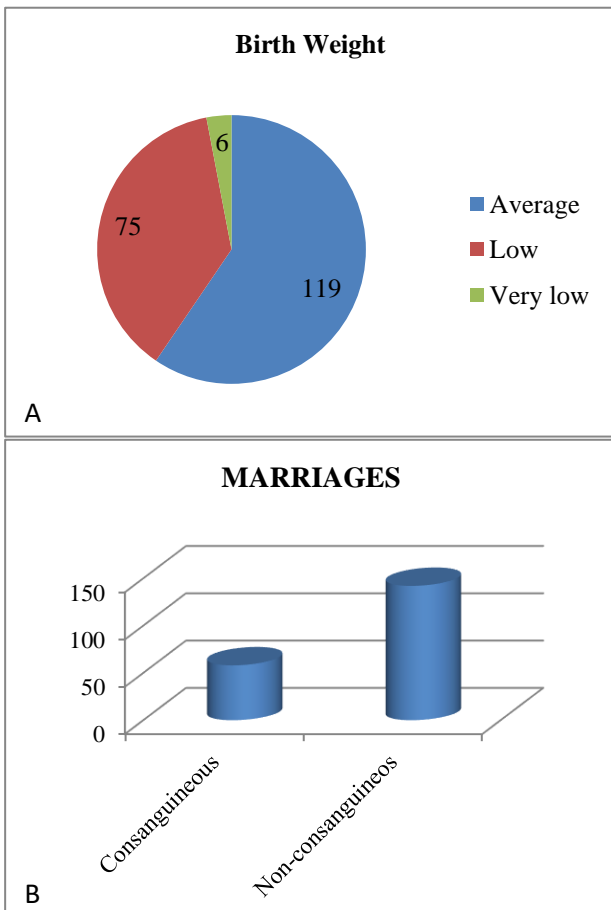


Figure 4: Relations of birth weight and consanguineous marriage of parents with incidence of CTEV.

In our study, mother of CTEV patients had positive history of tobacco chewing, cigarette smoking and alcohol consumption.

In our study, associated risk factors are anemia, jaundice, asphyxia, obstructed labor, history of miscarriage had positive correlation with clubfoot.

In our study, no mother had associated history of diabetes.

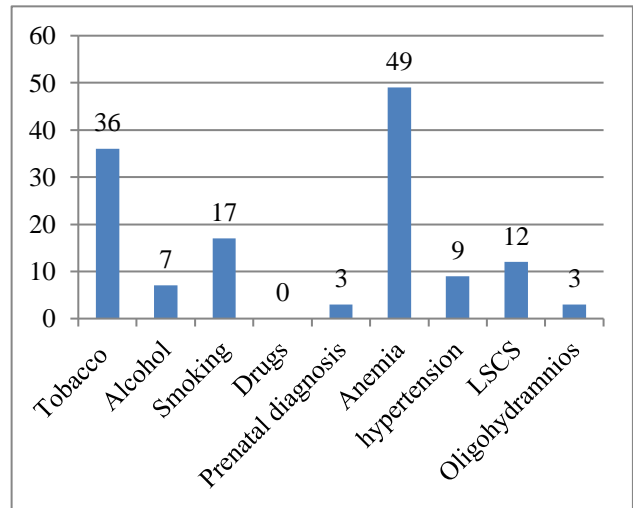


Figure 5: Various risk factor associated with CTEV.

DISCUSSION

► The current study is based on patient treated in orthopedic tertiary referral center, Jabalpur, Madhya pradesh. In our study, incidence of clubfoot is 1.25 per 1000 live birth. Pavone et al found an incidence of CTEV of 1.03 per 1000 live birth.⁵ Shylaja et al incidence of CTEV is 1.9 per 1000 birth in Karnataka, India.⁶ Difference in incidence of clubfoot occurs mainly due to genetic disproportion and population density of that area. 167 (83.5%) out of 200cases belongs to age group <1 year with range of age of presentation of CTEV were from 01 day to 8 year with mean value is 14 months. Gunalan et al 2016 reported mean age of presentation of pts was 4.9 month.⁷ Age of presentation of patients decide whether club foot is reducible, flexible or not.

► In our study, there was a male preponderance with 130 (65%) of Cases were males and 70 (35%) cases were females, with ratio of 1.85:1. Ponseti et al reported the ratio to be 1.8:1, Charles et al reported 3.17:1, Bhaskar et al reported ratio of 3:1.⁸⁻¹⁰ Gunalan et al 2016 there were numbers of boys close to three times the number of girls, with ratio 2.8:1.⁷The difference is because parents having more affection towards male child that brings male child earlier to clinics for seeking treatment. Our study found a bilateral preponderance with a frequency of 53.5%, more common on right side. Shylaja et al. estimated occurrence of bilateral CTEV is more with 75% and 25% were

unilateral and McConnell et al study concluded that it had approximately 50% of children had bilateral clubfoot and its statistically significant.^{6,11} Our study can be comparable with above study except Dalai which shows unilateral involvement more common than bilateral.¹² We found that patients having associated risk factor like smoking, alcohol or having congenital anomalies are at risk of low birth weight <2.5 kg, McConnell et al. We found no significant associations between clubfoot and low birth weight (<2500 gm) or preterm birth (<37 weeks) both of which have been shown to have associations with clubfoot in previous studies.¹¹ Our study provides association of causal role of smoking, alcohol consumption in clubfoot. Cardy et al and Parkar et al implicated maternal smoking as a risk factor for CTEV.^{13,14} Pavone et al concluded that risk factors for clubfoot found to be A positive family history of clubfoot, gender, and maternal smoking.⁵ Our study find out 3 patients out of 200 were diagnosed by antenatal ultrasound. Shylaja et al find out 41.4% case were diagnosed by antenatal ultrasound.⁶ Differences in both study due to because our study mainly consists of new born cases present in orthopaedic OPD. In our study, rate of caesarean delivery is 6%. McConnell et al study did find a significant association between caesarean section delivery and clubfoot.¹¹ Issue of patient care indicate that physicians are likely to elect for a caesarean section if they are aware of a child clubfoot malformation. We did not find any association of pregestational and gestational diabetes with clubfoot. In our study 29% of patients belongs to consanguineous marriage of parents. Gulati et al 2011 reported, consanguineous marriages are more prevalent in rural areas than urban and an increased incidence of autosomal recessive disorders is reported.¹⁵ Kulkarni et al 2016 in their study find out 34.4% of patients with consanguineous marriage of parent.¹⁶ There are significantly high proportion of consanguinity in clubfoot patients. There is need to inform the people, properly about the anticipated deleterious effects of inbreeding in societies where inter-relation marriage is widely practiced.

Limitations

Its hospital based retrospective study in which analysis were based on data that did not includes all the details for risk factor analysis. Paternal characteristics like paternal age at conception, paternal smoking was not considered in this study. Our study consists of small sample size.

CONCLUSION

- ▶ There are significantly high proportion of consanguinity in clubfoot patients. There is need to inform the people, properly about the anticipated deleterious effects of inbreeding in societies where inter-relation marriage is widely practiced. In our study majority of patients with CTEV (84%) are idiopathic, 16% were non-idiopathic. Prenatal ultrasonography is valuable in diagnosis of CTEV due to which it is possible to reliably visualize non

ossified bones and their relationships, to illustrate progress of initial treatment. Cultural differences may have led to differences in our findings with respect to the previous studies. These preliminary findings will help in the future for similar studies in central India as well as in the general Indian population.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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