

Demographic Characteristics of Congenital Talipes Equinovarus in Bundelkhand Area of Madhyapradesh

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Abstract

Background: Most authors reported the prevalence of congenital anomalies in patients with CTEV from 10 to 40%, depending on the population and method of study. The aim of our study was to determine demographic characteristics of CTEV in Bundelkhand area of Madhya Pradesh. The second purpose of this study was to determine whether the Ponseti method can correct non-idiopathic CTEV with low recurrence risk, with Null hypothesis stating there was no difference between the two groups treated by Ponseti method.

Material & Methods: One hundred eight patients with one hundred and fifty-seven feet who had been treated with Ponseti's method of casting at our institution between November 2012 to March 2016 were enrolled in this study. All the relevant data was collected that includes patient's clinical profile including precast and post cast Pirani's score, post treatment complications.

Results: Out of total of 159 feet in 108 patients (44 females, 64 males), 131 feet were idiopathic in 91 (84%) patients, whereas 28 feet were non-idiopathic in 17 (16%) patients. Idiopathic variety had 7.6% recurrence whereas non-idiopathic variety had 28.5% recurrence. On applying Chi-Square Test we concluded that null hypothesis is wrong and non-idiopathic CTEV has more recurrence rate compared to idiopathic variety.

Conclusions: In our study majority of patients with CTEV (84%) are idiopathic, 16% were non-idiopathic. We found that Ponseti method is an excellent method of correction for idiopathic clubfeet in infants. We demonstrated here that non-idiopathic CTEV can be treated with the Ponseti method with higher recurrence rates as compared to non-idiopathic variety.

Key-words: CTEV, Non idiopathic CTEV, Ponseti method of Casting

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Introduction

Congenital Talipes Equino Varus (CTEV), more commonly known as clubfoot, with

estimated incidence 1-2 per 1000 live births is most common congenital anomaly of the musculoskeletal system. The 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 arthrogyriposis, spina bifida, congenital dislocation of the hip, spinal muscular atrophy, ray anomalies of the foot, sacral agenesis, the absence of some tarsal bones, or joint laxity, tibial torsion. Various theories have been proposed including effect of the position in utero, anatomical, viral infections, vascular, environmental, genetic factors, following a compartment syndrome etc. History includes birth order, maternal age, history of amniocentesis, TORCH infection, maternal thyroid anomalies, normal and caesarian deliveries etc. Examination includes look for number of fingers status, of other limb anomalies (e.g. club hand, transverse or longitudinal limb defect, syndactyly etc.), stiffness of joint movements and exclude cerebral palsy.

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.[1,2] The aim of our study was to determine demographic characteristic of CTEV with respect to gender, laterality, presence of other congenital anomalies and maternal obstetric history in central rural India (Bundelkhand area of Madhyapradesh Distt Sagar). The second purpose of this study was to determine whether the Ponseti method can correct non-idiopathic CTEV with low recurrence risk, similar to idiopathic CTEV with Null hypothesis stating there was no difference between the two groups treated by Ponseti method.

Material and Methods

This study was prospective study done at tertiary centre, Department of Orthopaedics Bundelkhand Medical College & Associated Hospitals, Sagar from November 2012 to March 2016. All the patients of CTEV presenting at the Outpatient department

were registered. All parents were informed and counselled about the CTEV cast procedure. Each CTEV patients was seen by a single paediatrician to detect congenital anomaly or associated syndrome. Proper history and thoroughly examination for other anomalies were carried out. There name, age, sex, father and mother name, residential address and contact number, maternal antenatal history, birth weight, order, mode of delivery and significant birth events were also recorded. We looked for laterality, arthrogyriposis, neural tube defects, constriction bands of limbs, urogenital anomalies, cleft lip, cleft palate, developmental dysplasia of hip, knee subluxation and dislocation etc.

All the relevant data was collected that includes precast and post cast Pirani's score, post treatment complications like skin abrasions, pressure sore, recurrence, relapse or any other complication [3]. All patients were carefully examined, evaluated and serial casting by Ponseti Technique was started as soon as skin condition allowed. Meanwhile parents were taught the manipulation during breastfeeding at home.

Following correction of forefoot and midfoot correction of equines was done, percutaneous Achilles tendon tenotomy was done followed by above knee corrective cast applied for 3 weeks. Final cast was applied in 70° of abduction and 20° of dorsiflexion, care must be taken to apply pressure at mid foot and not on fore foot otherwise foot may develop rocker bottom foot. After cast removal Foot Abduction Orthosis was wore 23 hours per day until child do not starts walking than day time CTEV shoes was applied and night time Denis Browne splint. The splint maintains the external rotation in 70° and 40° in unaffected foot, splint not only maintains the correction but every time child kick his leg it produces further valgus. All children were advice for monthly follow up. Assessment of deformity in our study

done by Pirani scoring at the mean follow up of 11 months (5 month to 30 month)[3,4]. These results were evaluated for correction of deformity, the number of casts required, the need for a percutaneous tenotomy of Achilles tendon, relapse of the deformity and possible further surgery and available literature.

Results

The number of patients with CTEV registered

in this study were 120 , out of which twelve patients were lost to follow up, so sample size was 108.

Patterns of Clubfeet deformity: Out of total 108 patients, 64 (59.2%) patients were male and 44 (40.8%) were female (Male Female ratio= 1.4: 1). 51 (47.2 %) out of the total 108 patients, had bilateral clubfeet.

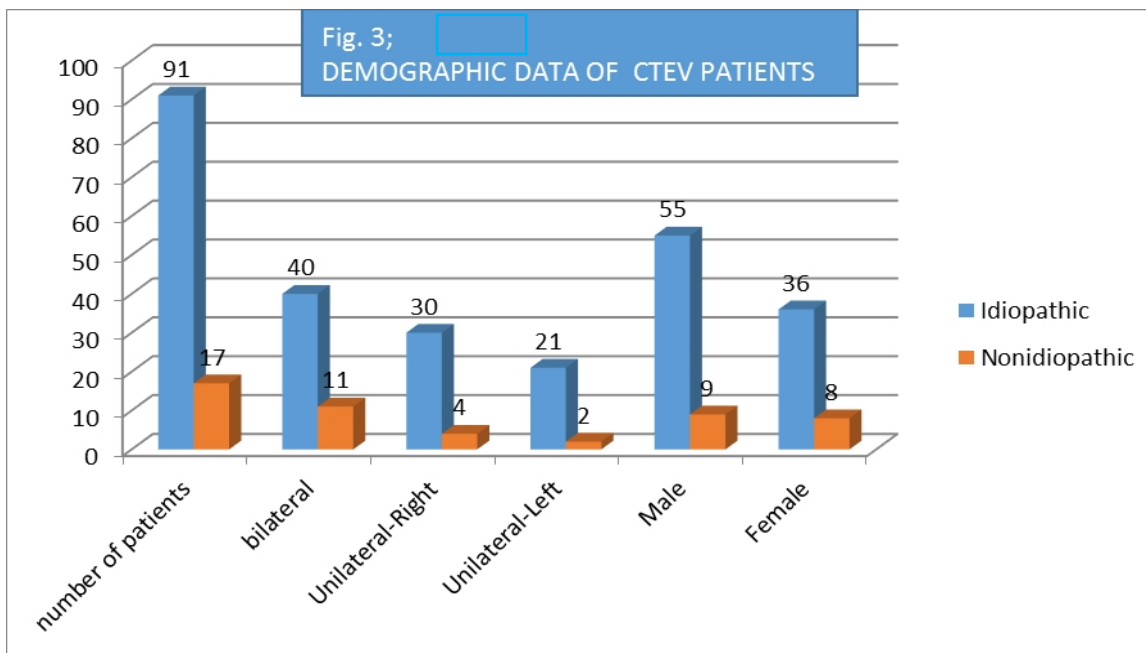


Figure 1: Bar diagram showing demographic data of CTEV patients

Associated Congenital anomaly :91 (84%) patients had primary idiopathic clubfoot (131 feet), whereas remaining 17 (16%) patients had clubfoot deformity associated with other congenital anomalies (28 feet). Neural tube

defects and Arthrogryposis Multiplex Congenita were the commonest anomalies associated with clubfeet as shown in pie diagram.

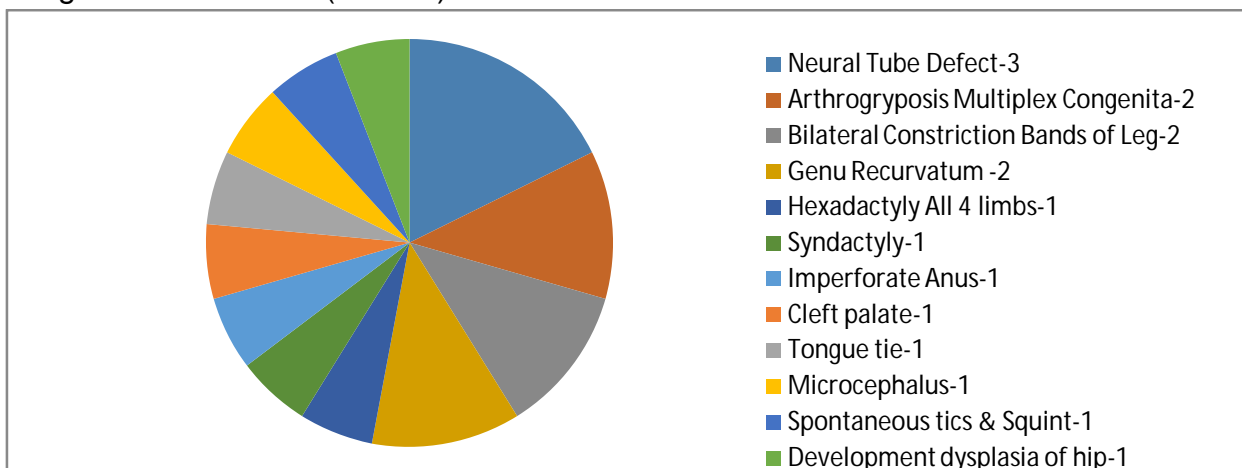


Figure 2: Pie diagram showing associated congenital anomalies in CTEV patients

Gestation Period: 5 out of 108 patients with clubfeet were preterm, out of which 4 had idiopathic clubfeet and one had clubfeet associated with imperforate anus. 101 children with clubfeet were born at term, whereas two patient was post-term and associated with genu recurvatum and microcephalus.

In our study, no mother had history of alcohol consumption or cigarette smoking. Age of presentation was 01 day to 210days with mean age 62.06 days.

Treatment was started at a mean age of 87.5days with range from 14days to 168days.

Out of the 159 feet in 108 patients, 141 (88.6%) feet were corrected whereas eighteen feet have recurrence of CTEV. Idiopathic variety had 7.6% recurrence (10 out of 131) while non-idiopathic variety had 28.5% recurrence (8 out of 28). 8 feet (in 5 patients) required soft tissue procedure. Those who required, soft tissue procedure 6 were non-idiopathic and 2 were idiopathic.

	Idiopathic	Nonidiopathic	Overall (Idiopathic+Nonidiopathic)	Chi-Square Test(χ^2)
Corrected feet	121/131 (92.3%)	20/28 (71.4%)	141/157 (89.8%)	9.99
Recurrence	10/131 (7.7%)	8/28 (28.6%)	18/157 (10.2%)	

Table 1: Showing results of Ponseti Casting

On applying Chi-Square Test X^2 value came out to be 9.99 and degree of freedom was 1.[5] On referring to X^2 table, with 1 degree of freedom the value of probability (P-value) of 0.05 is 3.84. since the observed value (9.99) is much higher we conclude that null hypothesis is wrong and nonidiopathic CTEV has more recurrence rates as compared to idiopathic variety. In 141 corrected feet, total 988 cast were applied mean 7.83. Tenotomy was performed on 35 feet (23.6%). Mean Pirani score at presentation was 4.8 SD \pm 0.4 mean mid foot score was 2.2 SD \pm 0.2 and mean hind foot score was 2.6 SD \pm 0.4. After treatment the mean Pirani score was 0.5. There was only a few complications 03 patients develop plaster sore and 01 has develop post tenotomy transient discolouration which resolved and 02 patient develop tight cast treated with removal of cast.

Discussion

The current study is based on patients treated in an orthopaedic tertiary referral centre and found 16% to have known etiologies of their CTEV. While other studies had reported up to 24% of associated abnormalities.[1,2,4,7] A difference in the prevalence of associated abnormalities is probably because of the higher rates of poor pregnancy outcomes, neonatal death, stillbirth, termination of pregnancy. The most common congenital anomaly associated with CTEV deformity includes neural tube defects and arthrogryposis, Probably because disorders specifically involving the neuromuscular system represent a final common pathway for disruption anywhere along the unit (brain, spinal cord, nerve, or muscle)[6]. In our study male: female ratio is 1.4:1 whereas Charles reported 3.17:1 , Bhaskar 3:1 and SJ Laaveg and Ponseti reported 2.18:1[8,9,10]. The difference may

be because of poor educational background of parents so more affection towards male child that brings male child earlier to clinics for seeking treatment. We had 47.2% bilateral cases and 52.8 % unilateral cases similar to SJ Laaveg and Ponseti 49 % bilateral and 51 % unilateral cases[10].

Ponseti's technique of serial manipulation and casting came into being as an effort to achieve a plantigrade and functional foot without the need of a major surgical intervention. Though the treatment by cast is an old method, Ponseti's technique is a standardized method supported very well by anatomic principles. Ponseti said that open surgery could be avoided in 89% of cases by his technique of manipulation, casting and tenotomy [11]. Complications of open surgery included wound infection, overcorrection and relapse to neurovascular compromise resulting in amputation and long term complication like weakness, stiffness leading to early arthritis. Ponseti and Smoley advocated that sectioning the heel cord after correction of other components allows the shorten heel cord to lengthen. [11]

In our study 988 cast were applied on 141 corrected feet with mean cast was 7.83, whereas P. J. Dyer et al reported mean cast 5.31, and Changulani et al reported mean cast 06, in our study most of the patient had late presentation attributing to increased number of casts [4,14].

In our study we found 88.6% correction rate R.A. Agrawal reported 96%, and Bhaskar 80% correction rate. While percutaneous tenotomy of tendo achillis done in 35 feet in 141 corrected feet Changulani et al performed tenotomy in 85 feet in 100 feet and R. A Agrawal performed in 58 of 60 feet. [9,12,13]

Maintenance of deformity is challenging and important because ill-fitting splint and noncompliance to splint is the major cause for recurrence. In our study eighteen feet had recurrence of CTEV because of non compliance to splint. Those who requires, soft tissue procedure six out of twenty-eight feet (17.8%) were nonidiopathic type (one unilateral and two bilateral) because the feet were stiff and contracted. In idiopathic CTEV two out of hundred and thirty one feet (1.5%) requires soft tissue release. Chi-Square test value comes out to be 9.99 which is quiet significant. Suggesting nonidiopathic CTEV frequently requires soft tissue surgeries for correction as compared to idiopathic variety.

Conclusion

In our study majority of patients with CTEV (84%) are idiopathic, 16% were non-idiopathic. We found that Ponseti method is an excellent method of correction for idiopathic clubfeet in infants. We demonstrated here that non-idiopathic CTEV can be treated with the Ponseti method with higher recurrence rates as compared to non-idiopathic variety.

References

1. Wynne-Davies R. Family studies and the cause of congenital clubfoot. Talipes equinovarus, talipes calcaneo-valgus and metatarsus varus. J Bone Joint Surg Br 1964; 46: 445–63.
2. Byron-Scott R, Sharpe P, Hasler C, et al. A South Australian population-based study of congenital talipes equinovarus. Paediatr Perinat Epidemiol 2005; 19: 227–37.
3. Pirani S, Outerbridge H, Moran M, Suwatsky B. A method of assessing the virginclubfoot. POSNA 1995.
4. Dyer PJ, Davis N. The role of the Pirani scoring system in the management of club foot by the Ponseti method. J Bone Joint Surg Br. 2006;88-B:1082-4.

5. Park K; 2005: Parks textbook of preventive and social medicine. 18th edition. Banarsidas Bhanot Jabalpur India. Page no.650-51
6. Fisher, RA & Yales, Y. Statistical tables for biological, agricultural and medical research, 6th ed., Longman Groups Ltd., London, 1974
7. Mkandawire N, Kaunda E. An audit of congenital anomalies in the neonatal unit of Queen Elizabeth Central Hospital –1 year study period: 1st November 2002 to 31st October 2001. East Centr Afr J Surg 2002; 7: 29-33.
8. Charles Ej Docker, Simon Lewthwaite, Nigel T Kiely. Ponseti treatment in the management of clubfoot deformity – a continuing role for paediatric orthopaedic services in secondary care centres Ann R Coll Surg Engl 2007; 89: 510–512.
9. Bhaskar A, Rasal S. Results of treatment of clubfoot by Ponseti's technique in 40 cases : Pitfalls and problems in the Indian scenario. Indian J Orthop [serial online] 2006 [cited 2016 May 1];40:196-9.
10. Laaveg SJ, Ponseti IV. Long-term results of treatment of congenital club foot. J Bone Joint Surg Am. 1980 Jan;62(1):23-31.
11. Ponseti IV, Smoley EN. Congenital Club Foot: The Results of Treatment. J Bone Joint Surg Am. 1963;45:261–344.
12. Changulani M, Garg NK, Rajagopal TS, Bass A, Nayagam SN, Sampath J, Bruce CE Treatment of idiopathic club foot using the Ponseti method. Initial experience. J Bone Joint Surg Br. 2006 Oct;88(10):1385-7.
13. Agarwal RA, Suresh MJ, Treatment of congenital club foot with Ponseti Method. Indian J orthop 2005; 39:244-7.