

ORIGINAL RESEARCH

OUTCOME OF PONSETI TECHNIQUE FOR THE MANAGEMENT OF CONGENITAL TALIPES EQUINOVARUS AT A DISTRICT HOSPITAL

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Abstract

Background: Congenital talipes equinovarus (CTEV), also known as clubfoot, is a complex congenital deformity of the foot that, left untreated, can limit a person's mobility by making it difficult and painful to walk. Present study was aimed outcome of Ponseti technique for the management of congenital talipes equinovarus at a district hospital.

Material and Methods: This prospective, observational study, conducted in children age <1-year, idiopathic clubfoot (unilateral or bilateral), underwent treatment by Ponseti method.

Results: In present study, 48 infants with 80 clubfeet were studied. Majority were brought at less than 3 months of age (62.5 %), followed by at 6-9 months of age (16.67 %), 3-6 months of age (12.5 %) & at 9-12 months of age (8.33 %). Male infants (60.42 %) were more as compared to female (39.58 %). Mean age of presentation 3.6 ± 1.9 months. Only 5 feet (6.33 %) required percutaneous tendoachilles tenotomy. Mean number of casts applied for achievement of correction was 6.9 ± 2.1 . Modified Pirani score before treatment was 5.1 ± 2.3 as compared to 0.56 ± 0.21 score at follow up of 1 year.

Conclusion: Ponseti method of manipulation and casting is an excellent method for the correction of all four deformities associated with congenital talipes equinovarus & can achieve painless, plantigrade, normal looking foot, after proper follow-up & good compliance.

Keywords: Ponseti method, congenital talipes equinovarus, club foot, manipulation and casting.

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INTRODUCTION

Congenital talipes equinovarus (CTEV), also known as clubfoot, is a complex congenital deformity of the foot that, left untreated, can limit a person's mobility by making it difficult and painful to walk. The etiopathogenesis of CTEV has been linked to several genetic and environmental factors and some are associated with arthrogryposis, myelomeningocele and amniotic bands but in 80% of cases the etiology is unknown and are termed as idiopathic clubfoot.^{1,2}

The three basic components of clubfoot are equinus, varus, and adduction deformities. Clubfoot is accompanied by internal tibial torsion. The ankle, midtarsal, and subtalar joints all are involved in the pathological process.³ The goal of treatment is to attain a functional, pain-free, plantigrade foot, with good mobility without calluses, and without the need to wear special or modified shoes.

Due to the potential devastating complications of surgery in idiopathic CTEV, treatment preferences have changed primarily to non-operative approaches like splinting, taping and casting and Ponseti method of serial casting has become the standard of care.⁴ The late Dr. Ignacio Ponseti developed a method of clubfoot correction that successfully realigns clubfoot in infants without extensive and major surgery. Present study was aimed outcome of Ponseti technique for the management of congenital talipes equinovarus at a district hospital.

MATERIAL AND METHODS

This prospective, observational study, conducted in department of orthopaedics, at District hospital, Udhampur, India. Study duration was of 1 year (July 2020 to June 2021). Study was approved by institutional ethical committee.

Inclusion criteria

- Children age <1-year, idiopathic clubfoot (unilateral or bilateral), underwent treatment by Ponseti method, parents willing to participate.

Exclusion criteria

- Age more than 1 year,
- Earlier treated with different plaster cast application procedures,
- Previously operated for clubfoot,
- Atypical or secondary clubfoot, associated neurological or other neurological problems.

The patients were treated conservatively with Ponseti method after taking written and informed consent. All children were evaluated through detailed history and general physical and local examination. Thorough clinical examination to assess the condition of skin, extent of deformity, muscle bulk, joint movement, and neurovascular status of the foot was done. Clinical grading of each clubfoot was done according to the Pirani severity score.⁵ Each component was scored as 0 (normal), 0.5 (mildly abnormal), or 1 (severely abnormal).

Pirani scoring and the total scores were maintained at each visit on a weekly interval. The least total score for all categories combined was 0 and the maximum score was 6. Manipulation, casting & percutaneous tendoachilles tenotomy were done with the Ponseti technique by the same team of orthopedic surgeons, led by the primary author. Results were evaluated on the basis of the posttreatment Pirani score, final result was graded as good, if the total Pirani score remained zero; fair, if the total score was 0.5–1; and poor if the total score was more than one.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

RESULTS

In present study, 48 infants with 80 clubfeet were studied. Majority were brought at less than 3 months of age (62.5 %), followed by at 6-9 months of age (16.67 %), 3-6 months of age (12.5 %) & at 9-12 months of age (8.33 %). Male infants (60.42 %) were more as compared to female (39.58 %).

Table 1: General characteristics

Characteristics	No. of patients	Percentage (%)
Age in months		
0-3	30	62.50%
3-6	6	12.50%
6-9	8	16.67%
9-12	4	8.33%
Gender		

Male	29	60.42%
Female	19	39.58%

In present study, mean age of presentation 3.6 ± 1.9 months. Only 5 feet (6.33 %) required percutaneous tendoachilles tenotomy. Mean number of casts applied for achievement of correction was 6.9 ± 2.1 . Modified Pirani score before treatment was 5.1 ± 2.3 as compared to 0.56 ± 0.21 score at follow up of 1 year.

Table 2: Study parameters

Parameter	Mean \pm SD / No. of cases
Mean age of presentation (months)	3.6 ± 1.9
Feet requiring percutaneous tendoachilles tenotomy	5 (6.33 %)
Number of casts applied for achievement of correction	6.9 ± 2.1
Modified Pirani score before treatment	5.1 ± 2.3
Modified Pirani score at follow up of 1 year	0.56 ± 0.21

DISCUSSION

Ponseti method which includes serial corrective manipulation, a specific technique of the cast application, and a possible percutaneous Achilles tenotomy. The method has been reported to have short-term success rate approaching 90% and mid to long-term results are also equally impressive.^{6,7} Ponseti casting method is considered cost-effective and safe to perform, it takes approximately 4–5 weeks to correct all deformity components, making compliance a challenge for patients with limited economic resources and difficulty accessing care.^{8,9}

In study by Jan WF et al.,¹⁰ 75 patients of either sex with 100 feet, treated with Ponseti technique. Majority of the patients obtained full correction with this method. The mean value of the modified Pirani score improved from the pre-treatment value of 5.30 to 0.36 at the final follow up. The average number of casts required for full correction was 7.32.

Kushal P et al.,¹¹ studied total 65 feet, 42 feet (64.62%) required tendo achilles tenotomy and 23 feet (35.38%) were treated with casting alone and tenotomy was not required. There were 8 cases of relapses (12.31%). Out of these, 7 were idiopathic and 1 was syndromic. Out of these 8 relapses, 2 required repeat tenotomy and 6 were treated with casting as per ponseti technique. Complications due to plaster were minimal in our study. Incidence of rocker bottom feet in study was nil because of dedicated clubfoot manipulation in clubfoot clinic and patients were followed up regularly.

In study by Mayank Dutta et al.,¹² 26 patients (72.2%) were male, the anomaly was bilateral in 19(52.8%) cases, unilateral left side in 7(19.4%) and the right side in 10(27.8%). Mean age of presentation was 4.055 months. Clinical evaluation was performed using the Pirani's scoring system. Mean follow up was 9.16 months: range 6-18 months. An average of 6.69 casts were applied to achieve correction. Only 2 patients required tenotomy which was not corrected by casting. 9.09% cases with relapse at follow up were treated with recasting again by Ponseti method. In this study mean Pirani's score at the time of presentation was 5.072 and mean Pirani's score after 6 month's follow-up was 0.263. Excellent results were found in 44 feet (80%).

In study by Milind M P et al.,¹³ they followed the functional Ponseti Scoring System and got good to excellent results in 44 patients -89.79% (58 clubfeet - 86.56%) at mean five year of follow up. Parents of 32 patients (65.30%) accept the look of the clubfoot nearly normal and parents of 12 patients (24.49%) accept the look of clubfoot as normal. Of the 49 patients who responded to initial Ponseti casting, 14 patients - 28.57% (19 clubfeet - 28.35%) had relapse at varying age; out of which 9 patients - 64.29% (10 clubfeet - 52.63%) were corrected by

Ponseti casting method, while 5 patients - 35.71% (9 clubfeet - 47.37%) were resistant to Ponseti method. Poor compliance with the Denis Browne splint was thought to be the main cause of failure in these patients.

Ponseti method is a very effective method to correct the clubfoot deformities. However, we noticed that relapses occur in nine studies, which is due to the non-adherence of bracing regime and other factors such as low income and social economic status.¹⁴ Pavone et.al.¹⁵ reported in their study about 3% of relapses rate, one foot was relapsed by adductus and varus relapse pattern, another foot was affected by equinus, and one foot was totally relapsed with all four components of clubfoot. These relapses occur due to non-compliance with Denis Browne splint, and infrequently use of splint because of lack of education and socioeconomic status of parents of clubfoot children.

The standard regimen of the Ponseti casting technique involves weekly change of cast after an initial period of manipulation. However, more recently, this arbitrary interval between two consecutive casts has been called into question. Studies have shown that the accelerated Ponseti protocol has as similar safety and efficacy as the standard protocol. In the accelerated Ponseti technique, casting is done after five days, twice weekly or thrice weekly.¹⁶

Ponseti method has very less complications as compare to other surgical treatments.¹³ Treatment should be started immediately as early treatment is simple and bears excellent results.¹⁷ Treatment when started within 3 month of life, results are excellent, when started within six months of life, results are good and when started before walking age i.e., 12 to 15 months results are fair.¹⁸

CONCLUSION

Ponseti method of manipulation and casting is an excellent method for the correction of all four deformities associated with congenital talipes equinovarus & can achieve painless, plantigrade, normal looking foot, after proper follow-up & good compliance.

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