

Original Article

EFFICACY OF PONSETI METHOD IN MANAGEMENT OF CLUB FOOT

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Objective: To determine the efficacy of ponseti method in the treatment of club foot.

Material and Methods: This descriptive case series was conducted at Department of Orthopaedic Surgery, Services Institute of Medical Science (SIMS) / Services Hospital Lahore. Sample size of 100 was calculated with 95% confidence using non probability purposive sampling technique. children of age 6 month to 1 year with club foot of either sex were included. while those with any associated congenital anomaly were excluded and children with idiopathic club foot having skin disease and pressure sore due to POP cast were also excluded. All children had six casts at weekly interval by ponseti's technique. Prior to the fifth cast percutaneous Achilles tenotomy was done under local anesthesia if dorsiflexion was not possible beyond neutral. Following the removal of the last cast all the feet are placed in a Foot Abduction Orthosis (AFO). Sixth months after the completion of plaster treatment all feet were assessed by Pirani score.

Results: A total of 100 children were included in the study. The mean age was 5.78 ± 3.21 months. Majority of the patients were between 0-9 months of age i.e. 63% (n=63), and between 10-12 months 37% (n=37). Male to Female ratio in our study was 1.127:1. Percutaneous Achillies tonotomy was done in 82% of cases. Pirani score six months after cast treatment was calculated which shows 88% (n=88) Children had good results and 12% (n=12) didn't have effective results. Efficacy of Ponseti method in the treatment of club foot reveals Pirani score <1 in 88% (n=88) while >1 in 12% (n=12). Stratification for efficacy of Ponseti method with regards to age before treatment reveals that out of 88 cases 68.18% (n=60) were between 0-9 months of age and 31.82% (n=28) were between 10-12 months of age. Stratification for efficacy of Ponseti method with regards to initial Pirani score before treatment reveals that out of 88 cases 88.64% (n=78) had <4 and 11.36%(n=10) had >4 Pirani score.

Conclusion: We concluded that Ponseti method is highly effective for the management of club foot in children up to 12 months of age and need for extensive corrective surgery is greatly reduced. We recommend the Ponseti method as standard therapy in clubfoot management.

Key words: Clubfoot, Congenital talipes equinovarus, Pirani scoring, Ponseti method.

Introduction

Club Foot or Congenital Talipes Equinovarus (CTEV) is a multifaceted deformity of the foot, in which one or both feet are excessively plantar flexed, with the forefoot swung medially and the sole facing inward.¹ The prevalence of clubfoot in developing countries is estimated to be approximately one in 1000 births.¹ This condition occurs during development in the womb so it is a commonest congenital condition, requiring treatment.² The male-to-female ratio is 2:1. Bilateral involvement is found in 30-50% of cases. There is a 10% chance of a subsequent child being affected if the parents already have a child with a clubfoot.³

The incidence varies considerably between races. Clubfoot is particularly rare, for example, among Chinese and Japanese (approx. 0.5/1,000), but common in black people (3.5/1,000 in South Africa), Australian Aborigines (3.5/1,000) and Polynesians (6.8/1,000).⁴

Treatment for clubfoot should begin almost immediately after birth to have the best chance for a successful outcome without the need for surgery.⁵ Recently there has been an enthusiastic embracing of the Ponseti technique. Recent research has improved and refined the Ponseti technique that must now be appreciated and incorporated by clinicians. This technique is used across the world in both developed and developing countries and is universally regarded as the best management method for clubfoot Deformities.^{6,7} The purpose of this study was to access the early outcome of the management of club foot with Ponseti technique using Pirani scoring system.

Material & Methodology

This descriptive case series was conducted at Department of Orthopaedic Surgery, Services Institute of Medical Science (SIMS) / Services Hospital, Lahore. Sample size of 100 was calculated with 95%

confidence, 7% margin of error and taking assumed percentage of efficacy 85% (i.e., Pirani score 1 or <1) of Ponseti method in the management of club foot. The data was taken using non probability purposive sampling. In this study we included 100 children with age of 6 month to 1 year with club foot of either sex. Patient having any other congenital anomaly that lead to club foot like myelomeningocele and baby with Idiopathic club foot having skin disease and baby having pressure sores due to POP cast were excluded. All the infants were diagnosed club foot by Consultant Orthopaedic Surgeon in the Outpatient Department on clinical findings. Their parents were informed about the treatment and its possible outcome. Informed consent was obtained from the parent of the infants. All manipulations, casts and tenotomies were done by the surgeon himself. Pirani score was applied before manipulation and then first cast was applied in theater without anesthesia. Weekly cast was applied after the manipulation and stretching by Ponseti technique and Pirani score was applied before each cast. Prior to the Fifth cast percutaneous Achilles tenotomy was done if dorsiflexion is not possible beyond neutral. If tenotomy is required then this cast was applied for three weeks that allowed the tendon to regenerate. Following the removal of the last cast the foot was placed in Foot Abduction Orthosis (FAO). The Orthosis was used on full time basis for first three months and at night for last three months. Sixth

months after the removal of the last cast all feet were assessed by final Pirani Score. The score of 1 or < 1 was considered as good outcome and > 1 was considered as poor outcome. All collected data was entered into SPSS (statistical package for social science) 18 version and analyzed descriptively. In our descriptive analysis, frequency and percentages were calculated for qualitative variables like gender and efficacy (i.e., Pirani score 1 or <1), while mean and standard deviation was calculated for quantitative variables like patient age, Pirani score. Data was stratified for Pirani score uphill 4 at initial presentation.

Results

A total of 100 cases fulfilling the inclusion / exclusion criteria were enrolled to determine the efficacy of Ponseti method in the treatment of club foot. Majority of the patients i.e. 63%(n=63) were between 0-9 months of age, 37% (n=37) were between 10-12 months. The mean age was 5.78 ± 3.21 months. Males were 53% (n = 53) while females were 47 % (n =47). Pirani score after treatment was calculated, which shows 88% (n =88) children had < 1 score and 12% (n=12) had >1 score, mean \pm SD was calculated as 0.64 ± 0.36 . Efficacy of Ponseti method in the treatment of club foot reveals in 88% (n =88) while 12%(n=12) did not show effective result. Stratification for efficacy of Ponseti method with regards to age reveals that out of 88 cause 68.18% (n =60) were between 6-9 months of age and 31.82% (n=28)

Table-1: Demographical and efficacy of treatment.

	Categories	Percentage
Age distribution (months) [n=100]	0-9	63 (63%)
	10-12	37 (37%)
Gender [n=100]	Male	53 (53%)
	Female	47 (47%)
Pirani score after treatment [n=100]	< 1	88 (88%)
	> 1	12 (12%)
Efficacy of procedure [n=100]	Yes	88 (88%)
	No	12 (12%)
Stratification for efficacy of procedure [n=188]	Age in months at start of treatment	
	6 - 9	60 (68.18%)
	10 - 12	28 (31.82%)
	Pirani score of stat of treatment	
	< 4	78 (88.63%)
	> 4	10 (11.36%)

were between 10-12 months of age. Stratification for efficacy of Ponseti method with regards to Pirani score before treatment reveals that out of 88 cases 88.64% (n=78) had < 4 and 11.36%(n =10) had > 4 Pirani score.

Discussion

Club Foot is a common congenital anomaly in the neonate.⁹This deformity is difficult to treat, having a marked tendency to recur, and causes a real disability.¹⁰ Neglected clubfoot is common, disabling, and contributes to poverty in developing nations. The management of Club Foot is conservative at early age by serial casts³. There are still reports of early recurrence of the deformity, and it is likely that a small number of clubfeet will require surgery even after expertly applied non-operative treatment.¹¹⁻¹⁶ The main objective of the treatment for club foot is to obtain pain free, platingrade foot with good mobility and without callosities.

The Ponseti clubfoot treatment has high efficacy in correcting the clubfoot deformity but is demanding on parents in developing nations and healthcare system. Its effectiveness as the best method of care remains unknown. The Ponseti method requires fewer casts and shorter duration of casting to achieve correction. Tenotomy of the Achilles tendon enabled better ankle dorsiflexion. The incidence of residual deformity and recurrence is also reported but it is lower using the Ponseti method.

Our results are in agreement with a local study conducted by Din et al at they recorded that 81.24% had excellent result with Ponsiti's method.¹⁷ Another study conducted by Mukhdoom et al. shows that efficacy (Pirani score 0-0.5) was achieved in 97.18% cases at one year follow up.⁸ Our result regarding efficacy according to age group are in contrast as we recorded significantly lower efficacy rate in 9-12 months of age. In Makhdoom et al study included the cases of all age's i-e. <1 month to 36 months but did not stratify the results to see the effects of age (early and late presentation). Moreover as efficacy, we assume it to be 85% in older children. It was

observed that if the initial pirani's score was > 4 it is likely that this foot will require percutaneous Achilles tenotomy and it was required in 82% of cases.²³

Ponseti technique has been reported having 92- 98% successful results for the treatment of the club foot¹³. Studies have shown that after adopting this technique the need for surgery has been dropped from 94% to 3%.²² Since 2002, several studies have demonstrated the successful use of Ponseti method in club foot correction, so much that this method is now becoming an ideal treatment of idiopathic clubfoot all over the world¹⁸. Laaveg and Ponseti reported that 90% of their patients were satisfied with the function and appearance of the feet¹⁹. It has been written rather convincingly by Cooper & Dietz that Ponseti method to be more effective treating congenital clubfoot non-operatively.²⁰

This method has reported effective not only in clinical correction, but has also shown to correct the individual tarsal anlagen and their relationship seen on magnetic resonance imaging²¹. However by using this technique in our study it became evident that the success rate with Ponseti's method was significantly higher. It corrected very severe feet in a significantly shorter time period, thereby reducing the agony and distress to children as well as their parents. Superior Result may be attributed to correcting all deformities simultaneously, the correction of cavus in the supinated position is called the magic move of Ponseti²². In future analysis of long term results (function and appearance) of the patient corrected by Ponseti method may be conducted for further evidence of higher success rate in Ponseti method.

Conclusion

We concluded that Ponseti method is highly effective for the management of club foot in children up to 12 months and need for extensive corrective surgery is greatly reduced. We recommend the Ponseti method as standard therapy in clubfoot management.

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