ORIGINAL ARTICLE

Idiopathic Talipes Equinovarus: An Outcome Based Prospective Study using Ponseti's Technique in Children <5 Years

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ABSTRACT

Background: Ponseti technique is reported to be associated with have excellent results in the management of clubfoot cases under 6 months age group. There was regional knowledge gap for cases of 2-5 years age group.
Aim: To observe and assessing the Ponseti's technique's role in the management of idiopathic talipes equinovarus among children of age range of 2-5 years.
Study Design: Prospective study
Place and Duration of Study: Department of Orthopedic, LUMHS from 1st January 2016 to 31st December 2017.
Methodology: Twenty five children with unilateral and bilateral TEV age between 2-5 years were included. Children <2 and> 5 years, congenital anomalies as well as syndromic feet were excluded. Patients' parents were explained the procedure and consent was taken and evaluation of TEV was made using Pirani Scoring at initial level and after weekly casting, manipulation and assessments.
Results: The mean was 3.2±.9 years, 17 (68%) were boys and 8 (32%) were girls. The bilateral involvement was seen in 12 (48%) cases while 13 (52%) cases were unilateral. Mean Pirani score before treatment were 5.67±0.81 and post-treatment Pirani score was 0.50 ± 0.33 with significant difference p-value 0.0001.Excellent results were achieved in 18 (48.64%) feet having a Pirani score of 0(zero), while good results were seen in 16 (43.24%) feet with Pirani score of 0.5- 1 whereas poor results were found in 3 (8.10%) feet with no correction and Pirani score was >1. Percutaneous Achilles tenotomy was required in 30 (81.08%) feet while7 (18.9%) feet were corrected with plaster cast alone whereas 3 (8%) feet were not corrected. Skin excoriation was observed in 01(2.7%) foot and 2 (5.4%) feet developed blister formation.
Conclusion: Congenital talipes equinovarus is well managed with Ponseti technique with above 90% success rate and less than 10 failure rates
Key words: Talipes Equinovarus, Pirani score.Ponseti Technique

INTRODUCTION

The idiopathic congenital talipes equinovarus also known as club foot is among the pediatric deformities seen in common practice with a prevalence of 1 in 1000 newborn with a multifactorial etiology including genetic as well as environmental components.[1] Boys are affected 2.5 times more as compared to girls, unilateral as well as bilateral involvement is reported to be 50% each.[2] A mutation in the FLNB gene that is co-segregated with ICETV was identified in 53 patients along with two other new missense mutations as an evidence of the involvement of the FLNB gene in ICTEV.[3] GWAS study conducted by Zhang et al[4] in 2014 and isolating the DNA from 396 clubfoot patients and from 1000 normal controls and genotyped them for more than 600,000 SNPs (single nucleotide polymorphisms) and found strong genetic association for ICTEV.

Idiopathic congenital talipes equinovarus needs to be corrected in early childhood otherwise it will result into persistent pain and chronic disability in children with worse impact on social life of the affected child[5]. Developing counties contribute for the major proportion of idiopathic congenital talipes equinovarus (80%) probably due to lack of awareness, low income and insufficient health care services.[5-7]TThe Ponseti technique is a standard and famous technique in the initial management of this condition with certain limitations and minor interventions may also be incorporated e.g. lengthening of the Achilles tendon and transfer of anterior tibial tendon for more success and effectiveness.[8] There are three main factors influencing the Ponseti technique and casting process, age at the time of first treatment, previous treatment history and severity level of deformity prior to management.[9] Further advanced invasive surgical options are available for severe, recurrent and complicated cases releasing soft tissues, osteotomies and external fixators.[10,11] There are two widely accepted scoring systems for grading the severity of club foot or CTEV, the Pirani score and the Dimeglio score.[12] Pirani score ranges from 0 which represent the normal foot to 6 which represents the deformity of most severe nature, it is so simple that even a non-specialist person related to health care system can use this easily.[13] The other system Dimeglio score consists of 20 points, grading the deformity into four categories (i) benign, (ii) moderate, (iii) severe and (iv) very severe. There are certain tools or criteria that are helpful in assessing the functions prior to intervention as well as the functional outcomes at post interventional level like patient's satisfaction, pain control, the patient's gait, the position of heel and the range of movement.[14] The current research was aimed at assessing the Ponseti technique's role in ICTEV correction.

MATERIALS AND METHODS

This current Prospective study was designed and conducted at Department of Orthopedic Surgery, Liaquat University of Medical & Health Sciences Jamshoro Sindh,

Pakistan over a time period of 1 year on 25 patients. The babies with age range between 2-5years with unilateral or bilateral TEV were included whereas the babies under 2 years of age and above 5 years, presence of any other congenital anomaly, syndromic foot etc were excluded. Gentle manipulation and casting above knee were done on weekly basis while the first correction of forefoot cavus and adduction was done followed by correction of heel varus and then the correction of hind foot equines was done in the last. This Correction order was maintained to prevent rocker-bottom deformity through dorsiflexion of foot through ankle joint. Repeated casts helped in holding the foot in correct position which allowed the foot to reshape gradually. After series of manipulation and casting, when satisfactory position was achieved a percutaneous Achilles tenotomy was performed, the final cast was applied in order to maintain the foot position at15 degree dorsiflexion while 70 degrees abduction for a time period of 3 weeks. It was advised to use D.B shoes for 23hours/day for initial 3 months followed by only at the sleeping time alone for 2-3 years which is helpful in maintaining the correction and preventing the recurrence. The TEV were evaluated for selected before and after manipulation using Pirani Scoring using t-test with SPSS version 21.

RESULTS

There 25 patients selected for study and there were 37 CTEV feet, the mean age was calculated as 3.2±0.9 years, 18 (72%) children were <4 years while 7 (28%) were >4 years. Boys were 68% (17) while girls were 32% (8), bilateral involvement was seen in 48%(12) patients and unilateral involvement was observed in 52%(13) patients. The mean Pirani score was calculated as 5.67±0.81before manipulation and it was 0.50+0.33 after manipulation with a significant statistical difference (p=0.0001) [Table-1].Out of 37 feet 30 (81.08%) feet required a percutaneous Achilles tenotomy while the deformity of 7 (18.9%) feet was corrected with plaster cast alone.

Table 1: Comparison of Pirani score before and after intervention

Pirani Score	Mean±SD	P-Value
Before Intervention	5.67±0.81	0.0001
After Intervention	0.50±0.33	

Table 2: Frequency of outcomes

Outcome	Pirani Score	No.	%
Excellent	0	18	48.64
Good	0.5-1	16	43.24
Poor	>1	3	8.10

Table-3: Frequency of various complications

Complications	No.	%
Skin excoriation	1	2.70
Blister formation	2	5.41
Reoccurrence	3	8.11
NO complications	31	83.78

Final outcome of ponseti's method for treatment of idiopathic talipes equinovarus were assessed. Full correction was achieved in 34 (91.81%) feet with excellent results with Pirani score=0, Good results with Pirani score 0.5-1 were achieved in 16 (43.24%) feet and poor correction was seen in 3 (8.10%) feet with Pirani score = >1 [Table 2]. skin excoriation was seen in 1(2.70%) foot, blister formation was seen in 2(5.41%) feet and recurrence was seen in 3(8.11%) feet whereas 31(83.78%) feet did not show any complications [Table 3]

DISCUSSION

Smythe et al[15] reported that the initial Pirani score in their study subjects was 2.0 or above while after completion of study it was 1 or less in the 246 (85.0%) feet. They reported the Pirani score as 0 in 37 feet, while 0.5 in 99 feet and a Pirani score of 1 in 73feet, they further reported a Pirani score above 1 in 37(15%) feet that was inconsistent with our finding of less than 10% for a Pirani score above 1 while48.64% feet having Pirani sore of 0 and 43.24% feet with 1 Pirani sore, they also reported a success rate of 85% while it was >90% in our study. Anshupriya et al[16] studied 25patients of clubfoot with 39 feet (14 bilateral and 11 unilateral), the age range was from 3 weeks - 9.7 years which was inconsistent with our data that was from 2-5 years. They reported the final Pirani scores as 0.5 in 10(25.64%) feet whereas we found it in16 (43.24%) feet, a Pirani sore of 0 in 29 (74.36%) feet while we found it in 34 (91.81%) feet that was inconsistent between the two studies. Tenotomy for achilles tendon was reported by them 70% feet while our subjects required it in 30 (81.08%) feet again an inconsistency was observed possibly the age difference may be the cause. They reported 1 failure case while we observed 3 failure cases in our research that was inconsistent to our results. Chao Xu et al[17] in their study on 22 unilateral club feet observed a mean pretreatment Pirani score of 4.9±0.8 while the post treatment pirani score 1.0±0.5 with significant statistical improvement with a P-value of < 0.001 that was consistent with our findings with a p-value of 0.0001 but all their patients required percutaneous Achilles tenotomies that was inconsistent with our study findings. They reported full correction in 100% patients while we found it as 91.47% and 8.56% remained uncorrected. Sahito et al[18] studied 86 patients with club feet and there 111 club feet in total with an age ranging from 1wk-10 years which inconsistent with the age of our study patients (2-5years), further they reported percutaneous tenotomy of tendo achilles in 86(85%) feet that was consistent with our study results. They reported recurrence in 7(8%) of patients whereas we found it about 9% patients, the dropout rate in their study was 17(19.7%) while we had 0% dropout in our study. Dennis brown(DB) shoes were advised in both studies after correction for at least 2 years. Another study conducted by Jaqueto et al[19] in Brazil reported deformity improvement in 90.2% cases and an improvement in Pirani score from 5.5 - 3.6 was reported by them after management with Ponseti technique. An Indian study done by Malhotra et al[20] on 356 club feet cases comprised on 402 feet managed with Ponsetti technique showed 95.45% success rate that was consistent with our finding with a success rate of above 91% with excellent and good functional outcome. There were certain limitations in our study like a follow up of 1 year and study limited to 1 department of 1 institute, large scale multicenter studies are recommended along with promoting the awareness in the remote areas of the region.

CONCLUSION

Congenital talipes equinovarus is well managed with Ponseti technique with above 90% success rate and less than 10 failure rates

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