ORIGINAL ARTICLE

Efficacy of Ponseti Manipualtion and Casting in Management of Idiopathic Clubfoot: Early Results

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ABSTRACT

Objective: To evaluate the efficacy of Ponseti method for treatment of idiopathic clubfoot by correction of all deformities in terms of Pirani score ≤ 1 after completion of treatment.

Study Design: Prospective descriptive case series study.

Material and Methods: 55 patients of either gender from birth till two years of age were included. Children older than 2 years, those with secondary clubfeet and those who were operated upon before were excluded from study. Clubfeet were graded according to the Pirani scoring system and serial manipulations followed by weekly above-knee casting was done in the sequential order as described by Ponseti.

Results: The study was conducted for 15 months. Mean number of casts required was 5.25. Achilles tenotomy was required in 78.18% patients. Correction of deformities was achieved in 96.4% patients. Final Pirani score was documented to assess the success of treatment in terms of Pirani score ≤ 1. Patients were followed every week for casting and then every 6 weeks after completion of treatment for observation of maintenance of correction.

Conclusion: The Ponseti method is safe and effective treatment for congenital idiopathic clubfoot, and radically decreases the need for extensive corrective surgery.

Key words: Clubfoot, Pirani scoring system, Ponseti method.

INTRODUCTION

The long-term aims of treatment of clubfoot are a pain-free, flexible, functional foot, with good mobility and tolerating normal footwear[1]. Children with neglected clubfeet are destined to grow up with deformed feet leading to physical disability. Untreated, this disability affects an individual's mobility and threatens their potential productivity. The neglected clubfoot deformity results in disability for the individual, a reduced standard of living for the entire family, and a burden to the community[2].

The traditional treatment for clubfoot may involve a combination of initial casting, extensive posterior medial soft tissue releases and bony procedures, followed by further casting. This treatment is associated with significant risks, complications, and potential for poorer prognosis with patients developing weak, stiff and scarred feet. Follow-up studies have also shown that these feet have a higher incidence of pain and their gait is affected[1]. After adolescence, pain increases and often becomes crippling[3].

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Given the potential devastating complications and discouraging long-term results, treatment preferences have since changed to primarily a non-operative approach through the Ponseti method. The method has become the standard of care and completely eliminates the need for extensive operative correction in over 98% of patients if applied correctly. The treatment involves manipulation, a series of castings, percutaneous Achilles tenotomy and foot bracing[4]. The Ponseti treatment for clubfoot deformity was introduced in North America in the late 1940s and has become a primary treatment option in many countries more recently[5].

The Ponseti method is safe and effective treatment for congenital idiopathic clubfoot, and radically decreases the need for extensive corrective surgery[6]. This method is particularly suited for developing countries, where there are few Orthopaedic surgeons in rural and remote areas. The technique is easy to learn by allied health professionals, such as physiotherapists and Orthopaedic assistants. The treatment is economical and easy on the babies[3].

The purpose of this study was to evaluate the application of Ponseti method for treatment of clubfoot in our setup.

MATERIAL AND METHODS

The study was conducted at Benazir Bhutto Hospital Rawalpindi in the Out-patient department from June 2010 to August 2011. It was a descriptive case series study. We treated babies of either gender from birth till two years of age with Idiopathic clubfeet including those treated conservatively before with Pirani score >1, whose parents consented us for this method of treatment.

Children older than 2 years of age, secondary club foot and previous operative treatment were excluded from study. Every clubfoot under study was graded according to the Pirani scoring system[7] and then serial manipulations followed by weekly above-knee castings were done. The deformities were corrected in the sequential order as described by Ponseti[8]. Cavus was corrected in first cast. In subsequent casts adduction was gradually corrected. The equinus deformity was treated in the end by either Achilles tenotomy followed by casting for three weeks, or by weekly casting alone. The final cast was applied with the foot in 15 degrees dorsiflexion and 70 degrees external rotation. Pirani scoring was regularly revised on removal of each cast to monitor the status of correction of deformities. The final outcome was recorded at the time of removal of final cast, usually at fourth or sixth week when Achilles tenotomy was not required and at eight week when tenotomy was done. Final Pirani score was documented to assess the success of treatment. The corrected clubfeet were then placed in the foot abduction brace with 15 degrees dorsiflexion and 70 degrees external rotation. In case of unilateral deformity, the normal foot was placed in 45 degrees external rotation. The brace was to be worn for 23 hours a day for 3 months, and then only at night and nap time for 4 years. Thereafter patients were called first at two weeks after start of bracing and then every six weeks till three months and then after every three months.

RESULTS

A total of 55 patients (81 clubfeet) are presented. 36 babies were male (65.5%). Mean age of babies was 2.78 months (range 4 days to 12 months) (Mean ± SD = 2.62). Bilateral involvement was seen in 26 patients (47.3%).

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age (months)	55	.13	12.00	2.7887	2.62327
Pirani Score Lt Foot	36	.5	6.0	4.111	1.1409
Pirani Score Rt Foot	43	1.5	5.5	4.198	.8461
No. of casts applied	55	3	10	5.25	1.818
Valid N (listwise)	24				

Table 2: Correction Achieved (Pirani Score ≤ 1)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	53	96.4	96.4	96.4
	No	2	3.6	3.6	100.0
	Total	55	100.0	100.0	

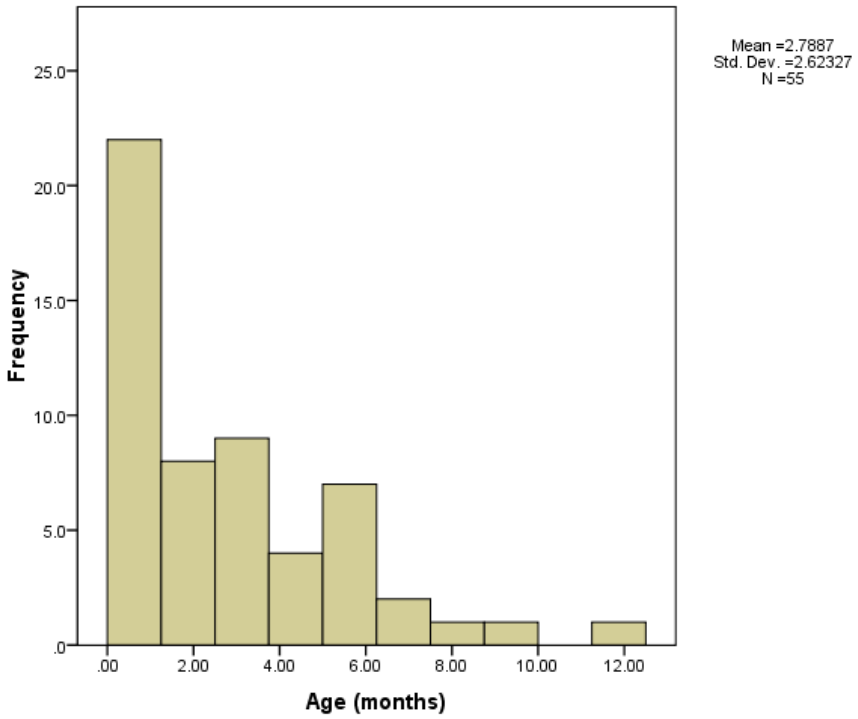

Figure 1: Age distribution in months

Mean Pirani score was found to be 4.11 (Mean ± SD = 1.14) for left foot and 4.20 (Mean ± SD = .85) for right foot. The number of casts required for correction ranged from 3 to 10 with mean of 5.25 (Mean ± SD = 1.82).

s Out of 55 patients, 43 required Achilles tenotomy (78.18%) on application of final cast. On completion of treatment phase of Ponseti method, we were able to correct the deformity (Pirani score ≤ 1) in 53 out of 55 patients (96.36%).

DISCUSSION

Ignacio Ponseti at University of Iowa was the pioneer of a non-operative treatment of clubfoot, who practiced a method different from Kite and others five decades back. The results of his early studies [9,10] were quite encouraging, which were also reproduced by Cooper and Dietz[11] in 1995. In later 1990s that surgeons began to acknowledge this method and gained popularity throughout the world. [12] Currently this method is the gold standard of clubfoot treatment.

There are two phases of Ponseti method, the treatment phase and maintenance phase. Our aim was to evaluate the efficacy of the treatment phase of this technique in achieving correction of clubfoot deformity. Maintenance of corrected clubfoot in a foot abduction brace is a different phase of management that requires a long term follow-up, which was not part of this study.

In our study 65.5% babies were male. In a study by Morcuende et al. there were 68% males[13]. The age of babies ranged from about a week to 1 year, this range was consistent with a study by Willis et al.[14] in which the range was from 1 to 52 weeks. Although the maximum age limit in our study was 2 years, most of the babies treated were younger than 6 months.

47.3% babies had bilateral deformity. In a study by Gupta et al. 60% had bilateral clubfeet[3]. Right foot was found to be more frequently involved (32.7%) than left foot (20%) in unilateral cases. The mean Pirani score in our study was 4.2 (1.5-6). This was quite similar to the study by Kampa et al.[3] Mean number of casts required in our study was 5.25, which was similar to other studies[1, 14]. We have found out that the removal of cast just before the application of new cast could really decrease the number of casts required for correction. This was also demonstrated in a study by Terrazas-Lafargue and Morcuende[15].

78.18% babies needed Achilles tenotomy in this study, which is less than the figure mentioned

in various other studies[3,6,7,14]. Our early experience with this technique was very encouraging, as we were able to correct the deformity in 51 babies out of 53 (96.4%). Smilar results have been shown by Kampa et al.[3] and Morcuende et al. [13]

The limitation of this study is its short duration of 6 months. Although the correction of deformity in the initial treatment phase can be well assessed, but the long term maintenance of corrected deformity requires a regular long term follow-up. The maintenance phase in which foot abduction brace is worn is as important as the treatment phase, perhaps, there is every chance of recurrence of deformity. Therefore a long term study is needed to assess the maintenance of corrected deformities.

An important factor that may help in improving parents' compliance is that all the patients should be called on the same day. During the initial phase of our study, we used to call one or two patients every day for casting. Later on we started to call them on the same day and found it very helpful as it gave them opportunity to see other babies with similar problems, and to share their concerns with others. Another important thing that has already been mentioned is that one should try to remove the previous cast just before applying the next one. Removing the cast for more than one hour results in some loss of correction and requires more number of casts than actually would have been required.

CONCLUSION

Ponseti method is an excellent option for management of Idiopathic clubfoot and should be regarded as the standard mode of treatment. Surgery should only be reserved for older children, or those feet which cannot be corrected by Ponseti method. It has been globally accepted as the preferred mode of treatment. Not only that it is cost effective, but one can also avoid the hazards of surgery.

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