Original Research Article

Clinical and Radiological Evaluation of Congenital Clubfoot (CTEV) Treated with Ponseti Technique and Its Outcomes

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Abstract:

Background -

Congenital Clubfoot (CTEV) occurs in approximately one in 1000 live births and is one of the most congenital birth defects. It is usually defined as a fixation of the foot in adduction, equinus, cavus and varus. The Ponseti method is at present a well-established method of treatment of idiopathic clubfoot deformities. The purpose of this study was to evaluate the results of serial casting with Ponseti method in orthopaedic clinics of Government Medical College and Rajindra Hospital Patiala on the basis of Pirani's Scoring and Radiological findings before and at the end of treatment.

Materials & Methods –

A total of 30 patients were enrolled in the study and were treated with Ponseti's casting after grading the severity of deformity clinically by Pirani's scoring and Radiologically by calculating the Talo-first metatarsal angle in AP view and Talo-Calcaneal angle in AP and stress dorsiflexion lateral views. Same clinical and radiological parameters were again assessed at the end of treatment before commencement of Foot abduction orthosis.

Results –

The average number of casts applied before full correction was was 5.56 ranging between 5 to 8. Average duration of treatment was about 6.65 weeks before the patient was put on FAO (foot abduction orthosis). Pirani score significantly improved from an average of 5.50 (range 4-6) on presentation to 0.24 (range 0-2) after correction.

Conclusion–

Ponseti's method of manipulation and plaster Casting corrects all 4 deformities associated with patients of congenital idiopathic clubfoot which is evident by statistically significant improvements clinically as measured by Pirani severity score and radiologically by Talo-calcaneal and Talo-first metatarsal angle and is associated with lower rates of complications.

Key Words:

Congenital TalipesEquino Varus, Pirani Scoring, Foot Abduction Orthosis, Talocalcaneal Angle AP, Talo-First Metatarsal Angle

Introduction:

Idiopathic clubfoot or CTEV is the most common orthopaedic congenital condition which has been managed since the time of Hippocrates with unsatisfactory results. The results have however improved over the decades owing to the better knowledge about the etiology and pathoanatomy of clubfoot. The treatment methods have also changed over the decades. After the introduction of conservative casting by J.H.Kite in 1937 the method was adopted for many years and reserving surgery only for resistant cases [1]. I.V. Ponseti, a proponent of conservative management pointed out the errors in Kite's method of correction. Presently, his method of manipulation and casting and other conservative methods are followed all over the world as the early and most effective treatment of clubfoot. However surgery is reserved only for resistant, recurrent and cases which presented late.[2,3]

Inclusion Criteria	Exclusion criteria
1. Age group >1 day to 2 years 2. Both sexes 3. Patients/ parents giving consent	1.Age >2 years 2.Poliomyelitis, Cerebral palsy, Myelomeningocele 3.Atypical clubfoot 4.Patients refusal

Material and Methods:

This study was conducted at Government Medical College and Rajindra Hospital, Patiala. 30 patients with congenital idiopathic unilateral or bilateral clubfeet after fulfilling the inclusion and exclusion criteria were treated conservatively with Ponseti method after taking written and informed consent.

Procedure:

For each patient, the following protocol was followed:

1. Complete work up of demographic details, as per proforma. All cases will be allocated to the study after informed consent.
2. Thorough clinical examination to assess the condition of skin, extent of deformity, muscle bulk, joint movement and neurovascular status of the foot will be done. Clinical gradingof main deformity of clubfoot will be done as per Pirani's [4] score.Each component is scored as 0 (normal), 0.5 (mildly abnormal) or 1 (severely abnormal). Record each score and the sum of the scores at each clinic visit. The least total score for all categories combined is 0, and the maximum (worst) score is 6.
3. Radiographs were taken to calculate the talo first metatarsal angle and talo calcaneal in AP and lateral view prior to onset of the treatment and before the onset of the bracing.
4. Results will be evaluated on the basis of the post treatment pirani score and post treatment radiological angles.

Results

Patients ranged from 2-120 days of age with an average age of 24.03 days and Male : Female Ratio was 2:1. Out of 30 cases (41 feet), 26 were Flexible 4 cases was of Rigid type of clubfoot and 11 cases are bilateral and 19 cases are unilateral. Of the 19 cases with unilateral involvement 10 had right sided involvement and 9 had left sided involvement. Mean number of casts applied for unilateral cases was 5.31 and for bilateral cases was 6.04. Overall the mean number of casts applied was 5.56 ranging between 5 to 8. Average duration of treatment was about 6.65 weeks before the patient was put on FAO (foot abduction orthosis) after correction of all the deformities which was slightly more as compared to number of weekly castings as a few patients developed plaster sores because of which the treatment was withheld and parents were taught manipulation. Percutaneous tenotomy was required in 87.80% of the cases. In the present study of 41 feet (30 cases; 11 bilateral and 19 unilateral) good or excellent results were achieved in 31 feet (75.60%). Fair result obtained in 6 (14.63%) feet and another 4 feet (9.75%) had a poor result. The final results were graded as Good, if the Pirani score remained zero; fair, if the total score was one or less (midfoot and hindfoot score) and poor if the total score exceeded one.

Table 1. Evaluation with Pirani score

	Right foot		Left foot	
	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
Mean Pirani score	5.57	0.16	5.5	0.3

Table 2. Radiological Evaluation - Talo 1st Metatarsal angle

	Right foot		Left foot	
	Pre Treatment	Post Treatment	Pre Treatment	Post Treatment
Mean	-55.33	6.61	-53.5	7.5
S D	12.66	2.64	11.20	2.57
n	21	21	20	20
p value	< 0.0001		< 0.0001	

Table 3. Radiological Evaluation Talo-Calcaneal Angle AP and Lateral

	AP				LAT			
	Right foot		Left foot		Right foot		Left foot	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Mean	0.45	22.66	0.78	22.25	2.68	30.71	4.89	30.55
SD	2.22	5.36	3.87	5.71	2.86	4.78	4.609	6.11
n	21	21	20	20	21	21	20	20
p value	< 0.0001		< 0.0001		< 0.0001		< 0.0001	

Discussion:

Since Hippocrates' initial description of the treatment of clubfoot more than 2,000 years ago, idiopathic clubfoot has been recognized as a difficult and frustrating deformity to treat. The method of serial manipulation and casting developed by Ponseti for congenital club foot was instituted in an effort to achieve a plantigrade, functional foot without the need to resort to major surgical intervention. Ponseti and Smoley reported that open surgery was avoided in 89% of cases by this technique of manipulation, casting and limited surgery.

In present study 66.66% patients (20 out of 30) were males and 33.33% (10 out of 30) were females. Male children were more affected than females. Similar results were found in the study done by Changulani M et al 2006[5], Bhaskar A. et al 2006 [6], Brewster M.B.S et al 2008[7], Pulak et al 2012[8]. In the present study, the total number of patients were 30, with 11 cases being bilateral (36.66%) and 19 cases unilateral (63.33%). Of the 19 cases with unilateral involvement 10 had right sided involvement (33.33%) and 9 were having left sided involvement (30%). Similar observations were made by Ponseti IV et al in his study in 2009[9] in which out of total 67 patients 40 patients had only one foot deformed (60 per cent) and 27 patients had both feet deformed (40 per cent).

The Mean Pirani score at presentation was 5.50, which ranged from 4 to 6. The Mean Pirani score at presentation for unilateral cases was 5.44 and for bilateral cases was 5.61. Similarly, in the study done by Changulani M et al 2006[5] andBhaskar A. et al 2006[6] mean pirani score at presentation was 5.0 and 5.74. 5 out of 41 feet had relapse. That is 12.19% of the total treated feet had a relapse with treatment by Ponseti method. Similarly, in a studies conducted by Bhaskar A et al in 2006 [6] and Brewster MB in 2008[7] relapse rates were 15% and 6.25 % respectively .

In Supination

In Abduction

Maximum Abduction both feet

Post treatment talocalcaneal angle and Talo –1st metatarsal angle (AP view)

Post treatment talocalcaneal angle (lateral view)

Conclusion:

Our experience with the use of the Ponseti method suggests that it is a simple and effective method of treating congenital idiopathic clubfoot. The Ponseti technique is reliable, and has good long-term Results. It can be stated that, while Congenitaltalipesequinovarus is relatively easy to treat, mistreated or untreated clubfoot disease can cause severe disability, ranking it among the worst musculoskeletal diseases.

No conservative method to treat orthopedic diseases is as effective as the Ponseti method. At the present time, the Ponseti method should be the first choice in the treatment of primary cases of clubfoot whether the physician prefers surgical or nonsurgical treatments.

Conflict of Interest : None

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