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A Study onManagement of Congenital Clubfoot Deformities Using Ponseti Method of Treatment in Rural India –

Dr.G.R.Reshi,
MS Orthopedics, Senior Consultant Department of Orthopedics M.M.A.B.M HOSPITAL

Dr. S. Rasool
Resident DoctorGMC Sgr .

Abstract-*Idiopathic clubfoot is a complex deformity and is difficult to treat. The goal of the treatment is to reduce or eliminate all components of the deformity so that the patient has a pain free, plantigrade, mobile foot with good function and without callosities. We have treated 31 patients with 45 clubfeet using ponseti technique. Grading system of Dimeglio et al was used to assess the severity of deformity. The average number of costs applied for obtaining correction was 6, ranging from 4 to 9. Tenotomy was done in 40 feet. 40 feet had good results; 3 patients (5 feet) developed recurrence because of non-compliance of use of orthosis.*

Key words-*Ponseti; Clubfoot; Talipes equinovarus*

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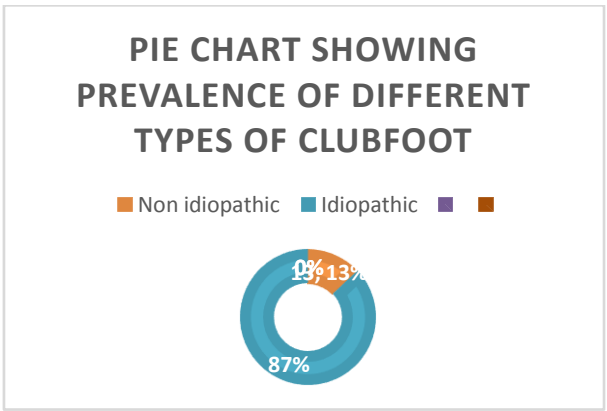
I. Introduction

Idiopathic clubfoot is a congenital complex deformity that is difficult to treat. Its incidence is 1 in every 1,000 new born babies. The ratio of male to female is 3:1 and 40% cases are bilateral. Being one of the most common congenital deformities they usually get neglected in far flung rural areas and result in permanent disability. The Ponseti method involves serial manipulations, special cast application, and sometimes percutaneous tenotomy of tendoachilis. It is less painful, and has lower complication rate and the overall function is better. The success rate is about 90% in the short term and equally impressive are long-term results. The aim of this method is to present our experience with ponseti method of correcting club foot deformity especially in rural India where specialized facilities are not available easily.



Graph 1: Showing Prevalence of different types of clubfoot.

II. Material And Methods

We have treated 31 patients with 45 clubfootdeformities using ponseti method of treatment at District Hospital, Anantnag, J&K State. All patients had primary congenital clubfoot deformity. Patients with secondary clubfoot deformity were excluded from this study. The foot deformity was assessed as per grading system of DiMeglio et al. With the help of Hand-held gonio meter, 4 parameters assessed on the basis of their reductiblity with gentle manipulation; (1) Equinous deviation in the sagittal plane; (2) Varus deviation in the frontal plane; (3) in the horizontal plane deviation around talocalcaneo-forefoot plane, and (4) in the horizontal plane adduction of forefoot in relation to hindfoot. In relation to each of one of the 4 parameters a score is assigned to each one of the parameters on a 4-point scale, with four point indicating reducibility from 90 degree to 45

degree; 3 points, reducibility from 45 degree to 20 degree; 2 points, reducibility from 20 degree to 0 degree; 1 point reducibility from 0 to 20 degree; and zero point reducibility of less than minus 20 degree. The sum of these parameters constitutes a 16-point scale. For poor muscle condition, cavus deformity, medial crease and marked posterior crease, 4 additional points are awarded. These add up to a total of 20 points.

Grading of the feet was done as per severity of the deformity; grade I, feet with mild deformity were more than 90% reducible having score of 0 to 5 points. Grade II, feet with moderate deformity which were partially reducible having a score of 5 to 10 points. Grade III, feet with severe deformity which were more resistant, less reducible had a score of 10 to 15 points. Grade IV, feet with very severe deformity and were irreducible had a score of 15 to 20 points. All congenital equinovarus deformities were graded before and after treatment as per DiMeglio et al scale. Any residual complication or deformity was recorded during treatment. The need for tenotomy and number of costs required for correction were recorded. Information about age, sex, and whether unilateral or bilateral deformity were recorded.

Treatment Protocol:

According to the following regime the ponseti method of management was used in all patients of less than two years of age. This was done by gentle manipulation of the foot and serial application of long leg Plaster of Paris (POP) cast without anesthesia.

Cavus was corrected first in all patients by supinating the forefoot and first metatarsal was dorsiflexed. For correction of varus and adduction, the foot was abducted in supination while counter pressure was applied with thumb against the head of the talus. Casts were changed bi-weekly after proper manipulation of the foot until good correction was obtained.

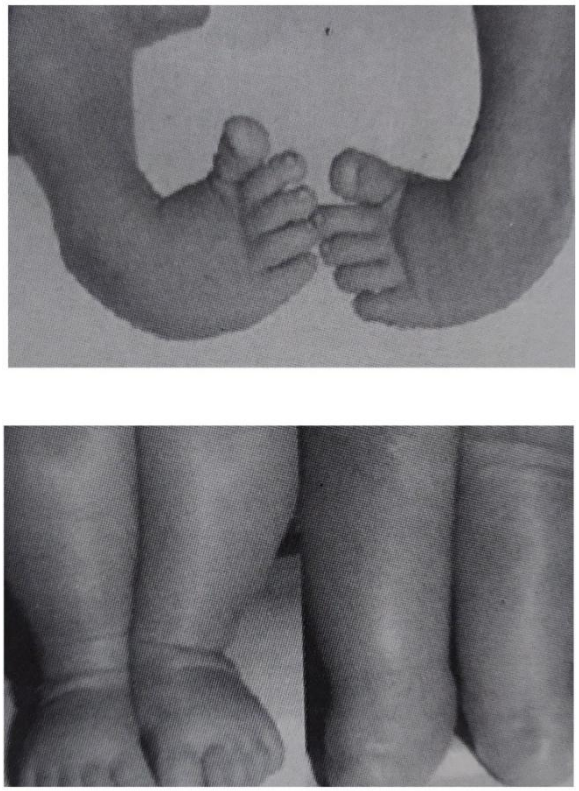


Fig 1: Top: Clubfoot deformity in 22 day /M. Below: Correction obtained with Ponseti method.

Without pronation, the foot should be markedly abducted (70 degree) in the last Pop cast. This position obtains full correction and prevents recurrence. If after correction of the varus deformity of the heel and adduction of the foot, residual equinous is observed a simple percutaneous Achilles tenotomy was performed under local anesthesia. Then a cast was applied and left in place for another three weeks till the tendon is healed. A brace was fitted on the day of last Pop cast removal to prevent recurrence of the deformity. The real length of the sole of the babies' foot was measured in centimeters. We used well-fitted open-toed, high-top, straight-leather shoes attached to a dennis brown bar equal to the distance between the child's shoulders. The corrected foot was maintained in 70 degree of external rotation with ankle in dorsiflexion. This prevented a recurrence of the deformities. The normal foot in a unilateral deformity was placed in 45 degree of external

rotation. This orthosis was worn for 23 hours a day for first 3 months and then at night for 12 hours for next three years.

The parents were taught to perform range of motion, exercises, for the ankle and foot when it was out of the brace. They were taught to make the infant squat on level ground while being supported by the parent. This prevented the equinous deformity by Dorsiflexing the ankle joint. In the second exercise the parents stabilize the leg with one hand while using the other hand to grasp the foot. The lateral border of the foot was then approximated towards the shin of the leg. In each sitting these exercises were repeated 20 times. These exercises were performed twicea day for the first three months and five times daily for the next three years. The patients were followed up on bi-weekly basis during the initial stages of treatment. After splint was applied, the patient was seen on a monthly basis for three months and then once every three months till the patient was three years of age.

III. Results:

The age of the patients ranged from 1 day to 22 months; average 3 months. Of the 31 infants 17 had unilateral and 14 had bilateral involvement. The deformity was classified as per DiMeglio et al system. As (moderate) grade II in 5 feet; (severe) grade III in 10 and (very severe) grade IV in 30 feet. The number of casts applied to obtain correction ranged from 4 to 9 casts (Average 6 casts). More number of casts was required in very severe deformity to obtain correction. 40 of the 45 feet required percutaneous tenotomy of the tendoachilis to correct residual equinous. Follow-up ranged from two to four years (average three years). 40 feet were treated by ponseti method successfully. These patients obtained complete correction with dorsiflexion of more than 20 degree and plantar-flexion of more than 40 degree. In 3 patients deformity relapsed because the parents did not cooperate in using orthosis. The reason given was poverty and inconvenience.

Fig 2: Xray showing deformity in 22-day M.

IV. Discussion:

Ponseti proposed use of serial casts in 1948 for treatment of clubfoot. It is based on strict rules established from anatomy of the foot. The goal is not to correct the apparent deformity but to impose a simultaneous supination and abduction of the foot. Percutaneous tenotomy of the Achilles tendon is performed once rotation of the calcaneum is corrected. On the other hand, extensive posterior medial soft tissue release is associated with scarring, long-term stiffness, and weakness of the leg which is avoided by using ponseti method. Correction of heel varus and decrease in the angle of neck of talus are better treated with ponseti technique than with traditional costing method. Ponseti technique has been reported with successful results in 92 to 98 percent cases of idiopathic clubfoot. We have successfully corrected 40 (89%) clubfoot foot deformities using ponseti method. The 3 patients (5 feet) who develop a recurrence were due to non-compliance with the use of orthosis: This is widely reported by other authors also, however, the ponseti method is a safe effective and economical method of treatment especially in rural areas where the patient's belonging to lower socioeconomic class and residing in far flung areas cannot afford to go for surgery in specialized hospitals in the city.

Fig 3:Ponseti Technique cast

V. Conclusion:

The ponseti technique is safe, easy, and affordable method of correction of congenital club foot deformity especially in rural areas where most of the people cannot afford expensive surgery in far off city hospitals.

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