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Treatment evaluation of clubfoot condition by Ponseti method prevalence and clinical outcomes of spinal tuberculosis with multi drug resistance

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Abstract

Introduction: Dr. Ponseti developed a method of clubfoot correction that is effective, inexpensive. Many long-term follow-up studies reveal that foot treated by Ponseti technique are strong, flexible, and pain-free. The correction achieved has been reported as being long lasting with some patients followed up to their fourth or fifth decade. Hence the present study was to assess the efficacy of Ponseti method in the management of Idiopathic Clubfoot.

Materials & Methods: As per the criteria, a total of 72 clubfoot diagnosed with the condition of idiopathic clubfoot were included in the study. In all the included babies the Pirani scoring was done to assess the severity of the condition. The deformity of the cavus was corrected first by supinating the forefoot to bring in the alignment with the hindfoot.

Results: When the treatment was completed the post treatment Pirani score was found to be decreased in all the age group patients. In the present study around 52 feet did required to undergo tenotomy. Results clearly states that more severity in deformity or late presentation of condition for treatment, more will be the visit required with increase number of casting.

Conclusion: The Ponseti method of clubfoot treatment is an excellent method as per our study. The follow-up of patients treated with this method has been over 40 years in some of the previous studies. Results of the clubfoot treatment by Ponseti technique in our study have been good and rewarding and now all the clubfeet are treated in our institution by this technique only.

Keywords: clubfoot, idiopathic, ponseti method, pirani score

1. Introduction

The birth defect where one or both the feet are rotated downward or inward is called as clubfoot. The affected foot is smaller in size as compared to other foot. In majority of the cases it is found that both the feet are equally affected [1]. If the treatment is not taken then the deformity persists for life long and people tend to walk on the side of normal feet. Permanent deformity includes pain and difficulty in walking. Other name of club foot is congenital talipes equinovarus that mean the deformity that affect the one foot or both and foot tends to turn inner side [2, 3].

Majority of the babies are born in the country where they are devoid of the treatment or left untreated leaving them to face the life of disability. When the clubfoot is neglected it causes social, psychological, physical and financial burdens on the patients and their families [4]. In treatment of clubfoot there has been a long history. In developed countries for many years the surgical management was in focus for many years. However such surgeries were associated with various complications and failures [5].

Many authors have stated that clubfoot is formed from the early development stages of humans; it is the result of malfunction during gestation. Early amniocentesis (11–13 wks) is believed to increase the rate of clubfoot because there is an increase in potential amniotic leakage from the procedure. Underdevelopment of the bones and muscles of the embryonic foot may be another underlying cause [6, 7].

During infancy there is no pain in the club foot however as the age increases, the affected individual cannot walk properly and there is associated pain. According to Pirani *et al* if clubfoot is left untreated then it can lead to loss of energy and various disabling problems [8].

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French, kites and Copenhagen techniques were followed by orthopaedists for a long period. Nonsurgical management generally led to inadequate correction whereas those children with idiopathic clubfoot who underwent surgery often developed extensive scarring of the soft tissues and residual pain.^[9]

In 1950, Dr. Ponseti developed a method of clubfoot correction that is effective, inexpensive. Many long-term follow-up studies reveal that foot treated by Ponseti technique are strong, flexible, and pain-free. This method is very effective and economical^[9]. The clinical correction achieved by this method has been reported to produce a functional, plantigrade foot without the need for posteromedial release in 85%–90% of cases. The correction achieved has been reported as being long lasting with some patients followed up to their fourth or fifth decade. Hence the present study was to assess the efficacy of Ponseti method in the management of Idiopathic Clubfoot.

2. Materials & Methods

The present study was done in the medical institute along with the associated hospital. The present is the prospective study in which the patients were selected from the out patients section of the department of the orthopaedics. The patients below the age of one year with complain of idiopathic clubfoot were included in the study. The study period was of one year.

Complete history that included the prenatal, intranatal, post natal and developmental milestones were recorded. The severity of deformity was recorded as per Pirani scores. The parents were educated about the condition, different methods of management and course of method of Ponseti. The cases were followed for one year for the improvement in the case condition.

All those parents who gave consent for the participation of the study, patients up to the age of 1 years and who were idiopathic in nature were included in the study. All those patients who were of more than 1 year, having neurological defects, who feet were previously treated and those parents who were not willing to participate in the study were excluded from the study. As per the criteria, a total of 72 clubfoot diagnosed with the condition of idiopathic clubfoot were included in the study.

The severity of the deformity for each of the foot was assessed as per the scoring system of Pirani. Dimeglio system and Pirani system have shown to be equally effective in the assessment of severity of the clubfoot condition. However Pirani has developed a reliable and valid method of clinically assessing the amount of deformity, to serially monitor the progress of correction and to guide the need and timing of percutaneous tenotomy of the tendo-achillis. The Pirani scheme scores six clinical signs either 0 (normal), 0.5 (moderately abnormal), and 1 (severely abnormal).

2.1 Midfoot score

Three signs like curved lateral border, medial crease and talar head coverage comprise the Midfoot Score (MS), grading the amount of midfoot deformity between 0 and 3.

2.2 Hindfoot score

Three signs like post anterior crease, rigid equines and empty heel comprise the Hindfoot Score (HS), grading the amount of hindfoot deformity between 0 and 3.

The treatment protocol was in 2 stages. The first stage included the correction of the deformity by week casting and the second stage included maintenance of the correction by

bracing. As soon as after birth the casting was begun, some of the babies were called after a week due to presence of fragile skin. In all the included babies the Pirani scoring was done to assess the severity of the condition. The deformity of the cavus was corrected first by supinating the forefoot to bring in the alignment with the hindfoot. The cast was applied for one week maintaining the correction. Next week the cast was removed and the scoring of improvement was done. Over the next 2 or 3 weeks the foot was serially abducted to bring about over correction. When the calcaneum was sufficiently abducted beneath the talus, scoring was assessed. When midfoot score had fallen below 1 but hindfoot score remained over 1, it was indicative of residual equinus deformity requiring release of the contracture. This was when the decision to perform Percutaneous Tendo-Achillis Tenotomy would be taken. Tenotomy was done under sedation achieved by syrup pedicloryl and local anaesthesia. Long leg cast was applied for the next 3 weeks. All tenotomy wounds were inspected by 1 week.

Babies were then shifted to Maintenance phase by bracing them in dennis brown

splint; 23 hours a day for the first 3 months and then 14 hours a day for 3 years. Weekly follow up was done during initial periods of bracing to ensure compliance and to periodically assure and educate the parents. Later monthly follow up was advised.

3. Results

Total of 30 babies' patients belonged to the age group of 4 months. Of the total babies in the age group of up to 4 months; 12 of the babies had bilateral clubfeet, right sided clubfeet were present in 10 babies and left sided clubfeet were present in 10. So the total of 44 clubfeet was in the under 4 month age group. In the age group of 4 to 8 months there were 14 babies. Of those bilateral clubfeet was present in 6, right sided clubfeet was present in another 6 babies, so the total of 18 clubfeet belong to this age group. In the age group of more than 8 months there were 6 babies. Of these 4 babies had bilateral clubfeet and left sided clubfeet was observed in 2 babies. A total of 10 clubfeet were in this group.

For the group of babies less than 4 month of age the average pre operative Pirani score was 5.12 while that for those in age group of 4 to 8 months it was 5.32 and for the babies who were more than 8 months of age the average score was 5.73. When the treatment was completed the post treatment Pirani score was found to be decreased in all the age group patients. The average post operative score in age group of below 4 months was found to be 0.15, for that in age group of 4 to 8 months it was 0.29 and for those who were more than 8 months it was 0.54. The pre and post operative Pirani scores difference was found to be statistically significant. (table 2)

During serial manipulation and casting the equinus deformity is corrected by percutaneous Tendo achillis tenotomy which is the integral part of Ponseti Method. Objectively the decision to perform tenotomy is taken when Midfoot score has fallen below 1 indicating complete correction of cavus and adduction, but hindfoot score is still more than 1 suggesting an equinus deformity requiring correction. In the present study around 52 feet did required to undergo tenotomy. Results clearly states that more severity in deformity or late presentation of condition for treatment, more will be the visit required with increase number of casting.

Table 1: Leg affected with the clubfoot condition

Side	Number
Bilateral	22
Right	16
Left	12

Table 2: Pre-treatment and post treatment Pirani score in different age groups

Side	Number
Bilateral	22
Right	16
Left	12

4. Discussion

Ponseti technique of serial manipulation and casting is being employed vastly in many of the CTEV treating centres. Ponseti and Smoley reported that by this method of manipulation surgery was avoided in 89% of cases^[10]. In Ponseti method of management the first element of correction is the cavus deformity by positioning the forefoot in proper alignment with the hindfoot. Clubfoot or congenital talipes equinovarus is a complex deformity of foot whose etiopathogenesis remains poorly understood. The effect of the deformity on the social and physical life of the patients and their parents cannot be overemphasized. The management of this deformity had been a puzzle for treating doctors for centuries^[11, 12].

The number of cast per feet in our study was eight to fourteen. In another study by Laaveg *et al.*^[13] the mean number of casts during their treatment was seven. Morcuende^[14] reported that 90% of the patients required five or fewer casts. Those feet which required a greater number of casts in our study had a high Pirani score at the onset of treatment. Also we found correlation between late presentation and the higher number of casts. The duration initially was high which decreased over time as we mastered the technique and started getting faster correction.

Tenotomy was required in 72% of the cases (52 out of 72 feet). Pirani carried out tenotomy in over 90% of his clubfoot patients. Laaveg *et al.* did tenotomy in 78% cases. Gupta *et al.*^[15] did it in 95% of cases. In the study by Dobbs *et al.*^[16] tenotomy was required in 91% cases; also, four patients had severe bleeding after tenotomy.

We have only included those patients with follow-up of more than 6 months. The results for the current series have been very encouraging with good to excellent result in 92% cases. The results of our series are comparable with any other published major study. The most common relapse seen was forefoot adduction; this was due to non-compliance of the brace and also partly due to application of the brace incorrectly at home when parents removed them for bathing. Since most of the parents in the current study are from the lower class, educational level is low and thus they fail to understand the importance of the proper way to apply the brace to maintain correction.

All the babies are being followed up. Some of them are beyond 1 year of age and have started to walk, to wear normal shoes and to participate in house hold plays. Importantly parents are pleased with the results.

5. Conclusion

The Ponseti method of clubfoot treatment is an excellent method as per our study. The follow-up of patients treated with this method has been over 40 years in some of the previous studies. Results of the clubfoot treatment by Ponseti

technique in our study have been good and rewarding and now all the clubfeet are treated in our institution by this technique only. We feel that by proper education and motivation along with integration into a government program like Pulse polio, may improve the outcome not only in terms of degree of deformity correction but also duration of the treatment.

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