



TREATMENT OF CONGENITAL CLUBFEET BY PONSSETI METHOD

**Dr. Mahendra
Kumar swami***

senior resident SMS medical college Jaipur *Corresponding Author

ABSTRACT Clubfoot or congenital talipes equinovarus, is a congenital deformity of the foot. It consists of cavus, adduction, varus and equinus. This is due to medial displacement of navicular and calcaneus around the talus. Talus is in equinus. Medial deviation of the head and neck of talus is due to force of calcaneus on talus.

METHODS: This descriptive case series study was conducted from 1 September 2014 to 31 December 2016 to determine the frequency of idiopathic clubfoot correction, by using the Ponseti method. A total of 89, unilateral and bilateral clubfeet, from both genders were studied. Patients between age of 2 weeks to 1 year were included in the study. Basic pirani score six (06) who were previously untreated were included in the study. Patients who were corrected with serial castings, were put in foot abduction Steinbeck brace. All the data was collected in the proforma and analyzed by SPSS version 16.00. Results: A total of 89 clubfeet were included in the study. Mean age of the patients was 10.28±7.45 ranging from 2 weeks to 1 year. There were 47 (52.5%) male and 42 (43.5%) female out of total 89 patients. Of these 10 patients were corrected with serial casting only while 76 patients underwent percutaneous tenotomy, which is a minor procedure and done on out-patient department basis. After correction, the feet were put in 70 degree of abduction in abduction brace. Only 3 patients required some sort of surgery, more than tenotomy.

CONCLUSION: Ponseti is very effective, economical and non-invasive way of treating congenital idiopathic clubfoot. only resistant cases may need some sort of extensive surgery.

KEYWORDS : Clubfoot; Ponseti method; Pirani score

INTRODUCTION

Clubfoot or congenital talipes equinovarus, is a congenital deformity of the foot. It consists of cavus, adduction, varus and equinus. This is due to medial displacement of navicular and calcaneus around the talus. While talus is in equinus. Further, medial deviation of the head and neck of talus is due to force of calcaneus on talus. The severity of the deformity varies from patient to patient. The exact cause of this deformity is not yet known.

Clubfoot is a worldwide issue. More than 2.2 million children are born in a year with this deformity. Various studies show various frequencies. If left as such, it can lead to permanent contractures and bony deformities. So, this needs correction by surgery or serial casting. Surgery is associated with recurrence, overcorrection, joint stiffness and pain. So, manipulation and serial casting is preferred by many orthopedic surgeons, worldwide. Manipulation and serial casting was treatment of choice for idiopathic club foot correction, in Iowa University, since 1950's. In 1996, Dr. Ignacio Vincent Ponseti, work was published, who wrote about this low cost, effective method. Since then, this method got acceptance all over the world.²

The goal of treatment is to have a painless, functional, plantigrade foot with good motion and with no need for shoes modification. It is achieved with serial manipulation and casting on weekly basis. Foot abduction orthosis for 3 months, continuously, and then at night and at naptime for a further 4 years Our study aim is to evaluate the efficacy of Ponseti technique for the correction of congenital idiopathic clubfoot without proceeding to any extensive surgery.

MATERIAL AND METHODS

A total of 89 clubfeet were included in the study. Unilateral and bilateral, idiopathic clubfeet of both genders were included in the study. Patients with baseline pirani score of 06 were included in the study. Patients of 02 weeks to 01 years were included in the study. Syndromic, previously treated and those with associated neuro muscular disorders were excluded from the study group. Data collection was started after approval of synopsis from ethical committee of the institution. Fully informed consent was taken after explaining benefits and hazards of the procedure. Confidentiality of the data was ensured.

Data was collected from parents in out-patient department and details history of the patient, including history of pregnancy, birth history, developmental history, family history and history of previous treatment with casting or surgery, were taken. Physical examination was done and baseline Pirani score was calculated and recorded for each patient. Cast was applied and parents were counselled. Parents

were asked for weekly follow up. Patients were followed up to a maximum of 10 Ponseti casts. Patients were put in foot-abduction-orthosis when deformity was corrected. Equinus was the last deformity corrected. Percutaneous tenotomy was included as a part of Ponseti method. All this data was entered in *Pro forma*.

RESULTS

A total of 89 clubfeet were included in the study group. Mean age of the patients was 10.28±7.45 ranging from 2 weeks to 12 months. In frequency of deformity corrected there were 85 (96.0%) out of total 89 patients, including those who underwent percutaneous tenotomy. Of these, 10 feet (11.29%) were corrected in cast only. Percutaneous tenotomy of 76 feet (84.74%) was done in addition to Ponseti casting, at an average of sixth follow-up visit [range: 5–8 visits]. Thus, a total of 85(96.04%) idiopathic clubfeet were corrected without going for a major invasive procedure. Tendo Achilles lengthening and posterior capsulotomy was sufficient for correction of the deformity in 3 cases (2.82%) after 10 casts. Only 1 (1.12%) cases were resistant feet and underwent Postero-medial release after 10 casts. as shown in table 1. In frequency distribution of deformity corrected by gender, there were 47 (49.2%) male and 42 (46.9%) female patients out of total 89 patients, as shown in table-1. In frequency distribution of type of corrective surgery with gender, patients found with Ponseti casting were 10 (5.6%) male and female, with percutaneous tenotomy 47 (43.5%) male and 42 (41.2%) female, with postero- medial – release 1(1.1%) male and 0 (0.0%) female, with tendo Achilles lengthening & posterior capsulotomy 2 (2.3%) male and 1 (0.6%) female as shown in table-1.

Table-1: Frequency distribution of type of corrective surgery needed by gender

Type of correction	Male	Female	Total
Ponseti casting	5	5	10
Ponseti casting with tenotomy	39	36	75
Ponseti casting with ta lengthening	2	1	3
PMSTR	1	0	1
TOTAL	47	42	89

DISCUSSION

Congenital talipes equinovarus is bony and soft tissue deformity of unknown cause, affecting both developed and underdeveloped nations equally. Frequency of idiopathic clubfoot is 1–2 per 1000 live births. Since 1996, Ponseti is favoured line of treatment, all over the world. It is effective and economical way of treating idiopathic clubfoot. It does not need any operation theatre setup. On the other hand, corrective surgery for clubfoot, causes foot stiffness, pain and decrease dorsiflexion of the foot.¹⁻³

Keeping in view, the universal trend towards the correction of clubfoot

by Ponseti method, we used this method in our institution and got very comparable results for it. More than 96% of correction means drastic decrease in surgeries for clubfoot. Of these, only two cases needed postero-medial release. These 2 were resistant cases. The remaining 5 cases were corrected with posterior capsulotomy and tendo-achilles lengthening. Percutaneous tenotomy was done on out-patient department basis under plain xylocain (2%), when pirani score was 1. The remaining 20 cases were easily corrected in cast.

Our study is very much comparable to the one reported by Morcuende *et al.* who is among the pioneers of developing this technique. He reported a success rate of 98% with serial casting followed by a minor procedure of percutaneous tenotomy⁷. As mentioned by Morcuende *et al.*, this is because of good understanding of the anatomy of clubfoot.

In another study, conducted by Lourenco *et al.* correction rate was only 37.5% (9-feet). He attributed this to increased age of the patient. In his study, he included patients with walking age. Out of 24 clubfeet, 7 (29.16%) feet had to undergo a second percutaneous tenotomy for equinus while 8 (33>34%) underwent postero medial release.⁹ Another distinction of his study was that all the corrected underwent percutaneous tenotomy after serial casting. But in contrast to this, 11.3% did not need any percutaneous tenotomy. This is probably due to young age group in our study.

Porecha *et al.* in his study got 89.79% results at 5 years.⁸ Author attributed this to poor compliance of the patients to Denis Browne splint, which is mandatory to keep the foot in corrected position. Our study was short term; it did not include patients with relapses. Ostadal *et al.* reported 100% results¹². But a much recent study by Pavone *et al.* reported results very much comparable to our study. He reported success rate of 93.7%.¹⁰ Percutaneous tenotomy was needed in 74.9% after serial casting in his study. But this rate was 84.7% in our study. This is close comparison between these contemporary studies.

A success rate of 90% was reported by Morcuende *et al.* while studying correction by Ponseti method, in patients with Arthrogyposis. He included patients younger than 1 year of age. Although Arthrogyposis is very resistant to correction by Ponseti method. Yet younger patients can be corrected with this method, even with arthrogyposis¹¹. The remaining patients need some sort of surgery, which depends on the type and severity of the deformity.

Previous surgery, non-compliance, inadequate counselling of parents, associated neuro-muscular disorders, syndromic feet and age more

than 4 years are associated with failure of Ponseti method.^{4,6,7} We excluded these cases from our study.

This is the reason, why this much high correction is achieved. This study was limited of duration. Further multi centre studies are needed to confirm these results.

CONCLUSION

Ponseti is very effective non-invasive way to treat congenital idiopathic clubfoot, especially in patients below 1 year of age. Only resistant cases may need some sort of surgery in addition to Ponseti method.

REFERENCES

1. Kelly DM. Congenital anomalies of the lower extremity. In: Canale ST, Beaty JH, editors. Campbell's operative orthopaedics. 12th ed. Philadelphia, PA: Elsevier Mosby; 2013. p.994-1012.
2. Shabtai L, Specht SC, Herzenberg JE. Worldwide spread of the Ponseti method for clubfoot. *World J Orthop* 2014;5(5):585-90.
3. Hui C, Joughin E, Nettel-Aguirre A, Goldstein S, Harder J, Kiefer G, et al.
4. Comparison of cast materials for the treatment of congenital idiopathic clubfoot using the Ponseti method; a prospective randomized controlled trial. *Can J Surg* 2014;57(4):247-53.
5. Kim S, Goldstein RY, Park J, Shapiro P, Yoo AE, Sala DA, et al. Idiopathic clubfoot treated with Ponseti method: factors associated with patient follow-up. *Bull Hosp Joint Dis* 2014;72(3):204-9.
6. Zions LE, Packer DF, Cooper S, Ebramzadeh E, Sangiorgia S. Walking age of infants with idiopathic clubfoot treated using Ponseti method. *J Bone Joint Surg Am* 2014;96(19):e164.
7. Opel D, Abrams S, Halanski M, Noonan K. Lateral Intra-Articular Transposition of the Anterior Tibialis Tendon for the Treatment of Relapsed Clubfoot in Toddlers: A Previously Unreported Surgical Technique. *Open J Orthop* 2014;2014.
8. Morcuende JA, Dolan LA, Dietz FR, Ponseti IV. Radical reduction in the rate of extensive corrective surgery for clubfoot using the Ponseti method. *Pediatrics* 2004;113(2):376-80.
9. Porecha MM, Parmar DS, Chavda HR. Mid-term results of Ponseti method for the treatment of congenital idiopathic clubfoot--(a study of 67 clubfeet with mean five year follow-up). *J Orthop Surg Res* 2011;6:3.

10. Lourenco AF, Morcuende JA. Correction of neglected idiopathic club foot by the Ponseti method. *J Bone Joint Surg Br* 2007;89(3):378-81.
11. Gianluca Testa VP, Alberghina F. Effectiveness of Ponseti method for the treatment of congenital talipes equinovarus: personal experience. *Pediatr Ther* 2015;5(3):1000260.
12. Mercuende JA, Dobbs MB, Frick SL. Results of the Ponseti method in patients with clubfoot associated with arthrogyposis. *Iowa Orthop J* 2008;28:22-6.
13. Ostadal M, Chomiak J, Dungi P, Frydrychova M, Burian M. Comparison of the short term and long term results of the Ponseti method in the treatment of Idiopathic pes equinovarus. *Int Orthop* 2013;37