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RESEARCH ARTICLE

MANAGEMENT OF IDIOPATHICCONGENITAL CLUBFOOT BY USING PONSETI METHOD

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ABSTRACT

Introduction: Ponseti method in the treatment of congenital clubfoot has led to a renewed interest in this method among orthopaedicians.
Aims and Objectives: The Aim and objectives of the study were to assess the results in terms of the number of foot corrected, the need for tenotomy and recurrence of the deformity. This study primarily focuses on our experience in applying the ponseti method in the management of congenital clubfoot.
Methodology: This study was conducted between October 2014 to September 2016. A total of 25 cases & 42 feet were treated by this method with the mean follow-up time of 18 months (6 to 36). The standard method as described by Ponseti using Plater of paris were applied from 3rd week after birth and changed at weekly interval until correction was attained. Percutaneous tenotomy of tendo-achillis were performed only to persistent equineus deformities. Pirani score was used for assessment of the deformity.
Results: Mean Pirani score improved from the first cast to the time before tenotomy. Tenotomy was required in 32 of the total 42 feet. 6 out of 42 feet were successfully treated by casting only. Of the total 38 feet corrected by serial casting and tenotomy there was no recurrence. The remaining 4 required extensive soft-tissue release.
Conclusion: Ponseti method for congenital idiopathic clubfoot is a safe and satisfactory method

INTRODUCTION

Idiopathic congenital talipes equino-varus is a complex deformity that is difficult to correct. It is one of the most common congenital deformities. The ratio of male to female is 3:1, and 40% of cases are bilateral. [1]The prevalence of both immediate and long-term complications in surgically treated clubfoot has generated a renewed interest in nonsurgical treatment.[2] The Ponseti method involves serial manipulation, a specific technique of cast application, and a possible percutaneous tendoachilles tenotomy. It is reported to provide a lower complication rate, less pain and better function as the patient ages as compared to operative treatment.[3]

The method has been reported to have short-term success rates approaching 90% and the long-term results have been equally impressive.[4] Complications occurring as a result of Ponseti technique have not been reported.[5]

MATERIALS AND METHODOLOGY

We treated 25 children with 42 congenital talipes equinovarus feet using Ponseti technique. The study was cleared by institutional research cell and the ethical committee. The study period was from October 2014 to September 2016. All children who were brought to our outpatient department of orthopaedics with complaints of deformity of foot were screened. Those having congenital talipes equino-varus deformity and age less than two years were included in the study. All secondary, relapsed, recurrent, syndromic congenital talipes equino-varus and those above two years were excluded from our study. The deformity grading for both pre and post correction was done using Pirani scoring and deformities was graded upto maximum point of six. Clinically the foot was evaluated for medio-lateral border ratio, degree of hind foot equinus, fore foot adduction, heel varus and foot cavus. All the case were done manual cast application using plaster of paris by a single person using the Ponseti method as an outpatient procedure. When the mid-foot score was less <1 and hind-foot score was >1 after manipulation and casting, percutaneous tendoachilles tenotomy was done under local anaesthesia either as on out patient procedure or in operation theatre. Once forefoot and hind foot is aligned, then abduction is started progressively and percutaneous tenotomy of Achilles tendon was done if needed and final corrective cast was applied for three weeks with foot held in maximum abduction and equinus after tenotomy. Those cases that showed little or no correction even after ten cast applications were treated as failiure and were done surgical correction. A foot orthosis(Dennis brown splint) was given after removal of the final cast. The orthosis was removed for not more than one hour every day and continued till the child starts walking. Once the child had

started walking CTEV shoes were used during daytime and foot orthosis was used during night. The manipulation and casting was done by one consultant in all cases. The number of casts required to obtain correction was also recorded. Demographic data including age, sex and laterality of the deformity along with mode of child birth was noted. Children were followed up every week during the manipulation and casting stage and every month for 3 months once the orthosis was applied. Parents were advised to strictly adhere to the bracing protocol. Those who did not show correction were treated surgically.

All children were also assessed according to Catterall-Pirani scoring system (CP Score) and comparison between initial CP score (cpi) and final CP score after casting and tenotomy (if required) at 3 months (cpf1), 6 months follow up was recorded. All the pre-treatment and post-treatment data of clinical, were statistically analysed.

RESULTS

In our study total correction of the deformity was obtained in 38 feet (8 unilateral and 15 bilateral CTEV). In our study, the end point for castings was taken as ten casts. Percutaneous tenotomy was done when equinus was present after after required casting and was done as opd procedure or in operation theatre.

Out of 42 feet, 6 feet achieved full correction at the end of initial casting without percutaneous tenotomy and 32 feet were fully corrected with percutaneous tenotomy. Four feet were not corrected with Ponseti method and were considered as failure cases. They were referred for posteromedial soft tissue release. No dropouts were faced in our study

The mean age at initiation of treatment for 25 patients (42 feet) was 34.72 days (range15 days to 90 days).

The mean initial Pirani severity score for 42 feet was 4.50 (out of maximum possible score of six). After full correction by ponseti technique (with or without percutaneous tenotomy) the final mean score was found to be 0.56 and the mean change in score was found to be 3.94. This was analysed by the paired t test and the p value was <0.0005 which is significant. The mean value of Pirani score at 6 months follow up was 0.11 which shows a change of 4.39 from the initial score. This change also has a p value of <0.0005 which is significant.

Table 1 Distribution of Sex

Sex	No. of patients	Percentage
Female	11	44.0
Male	14	56.0
Total	25	100.0

There were 11 females (44%) and 14 males (56%). The male to female ratio was 1.9: 1

Table 2 Details of Percutaneous tenotomy done

Tenotomy	No. of patients	Percentage
Done	19	76.0
Not done	6	24.0
Total	25	100.0

76 % of patients needed percutaneous tenotomy of tendo achilles at the end of casting.

Table 3 Details of PMSTR done

PMSTR	No. of patients	Percentage
Not done	23	92.0
Done	2	8.0
Total	25	100.0

PMSTR: Postero Medial Soft Tissue Release.

Table 4 Pirani score

Pirani score	N	Mean	Std. Deviation	Std. Error Mean	t value	Sig.
Before	25	4.5000	0.76376	0.15275	21.766	0.000
After	25	0.5600	0.48563	0.09713		

DISCUSSION

Conservative management of congenital talipes equino varus is always the preferred mode of treatment for infants as the surgical correction is mostly associated with several complication like infection and long term stiffness. The emergence of [6,7]Ponseti's method and variaious cited literature of its superiority over the [12]Kite's method has made it the primary treatment modality for correctable deformity of CTEV for most orthopaedicians.

The study shows that earlier institution of the corrective cast gives a better result as here in our study most foot were obtained good correction when started in initial 2 months. At very early age the feet are pliable and response is much better because the remodelling of the small bones of foot occur as they are in cartilaginous phase and moreover visco-elastic properties of infant's soft tissues respond to properly directed mechanical stimuli with gradual remodeling of joint surfaces, resulting in gradual and simultaneous correction of the deformities.[8]

The sequence of deformity correction was most important to avoid complications like Rocker-Bottom foot, persistent cavus and locking of the calcaneus under the talus leading to persistent heel varus. [9]Frick has emphasized on the importance of maximal forefoot supination in the initial casting, failure of which results in persistent rigidity and incomplete correction of the deformity. During manipulations the foot is never pronated in order to prevent bean shaped deformity and incomplete correction of heel varus.

The fact that the navicular moves towards its normal position following manipulation was confirmed by Kuhns in his study using ultrasonography.[11]Pirani confirmed similar results in clubfoot treated by Ponseti method.[12]

25 children with congenital clubfoot participated in the study. Total number of clubfeet was 42. All the patients were of age 15 to 90 days (range: 15 days to 90 days) at initial casting. Mean age of the group was 34.72 days. Morcuende *et al*. had retrospectively analysed the records of 157 patients (256 clubfeet). In this study also all the patients were of the age group 0 to 24 months. There were 14 male children and 11 female children in the present study and the male: female ratio is 1.27:1. Morcuende *et al*. reported a male female ratio of 2.13: 1. The male preponderance found in this study is in agreement with other studies.

The feet were evaluated using Pirani severity scoring system which was easy to use and simple and fairly reproducible. In our study the scoring was done by a faculty who was not involved in the study and casting was done by the author throughout the period of study. The points in the Pirani scores are allotted on the basis of inspection findings of the sole of the foot, lateral border, posterior and medial creases, palpability of the talus and emptiness of the heel as well as correctability of equinus.

In about nineteen patients (76%), percutaneous tenotomy of tendoachiles was done in order to achieve complete correction. Ponseti himself has observed that percutaneous tenotomy was needed in most of the patients.

Although tenotomy as advised by Ponseti was done as an OP procedure under local anaesthesia we had opted for tenotomy done as OP procedure in few under local anaesthesia and as minor operation theatre procedure under IV sedation in some cases mainly due to anxiousness of the parents. In all these set up tenotomy was done as advocated in the procedure for tenotomy with foot held in maximal equinus correction and using a eleven size surgical blade. Tenotomy was done 1.5 cm above the calcaneal tuberosity in all the cases. There was no infection in any of our cases following tenotomy.

In our study, we observed that the earlier the child is started on casting by Ponseti technique, the results are better without any need for surgery. One of our patients was very obese and presented with frequent slipping of POP casts. Another patient developed repeated eczema and was referred for posteromedial soft tissue release. We also observed that as the child gets older, the prominence over the calcaneocuboid junction in the lateral column prevents complete correction.

At 6 months of follow up there was no recurrence of deformity in any of the cases mainly due to repeated insisting and educating the parents about the need to maintain correction using orthosis. This was practically achieved by frequent phone calls made to the patient by the author and reviewing cases as and when needed. Low socioeconomic and lack of awareness posed problems in some cases but was overcome with repeated counseling and educating the parents.
The rate of posteromedial soft tissue release can be drastically reduced by using Ponseti technique and hence the complications of surgery were avoided.[13]Colburn reported similar finding following treatment of CTEV by Ponseti method.

CONCLUSION

We found the following factors contributed to the success of CTEV correction by Ponseti technique:

- Earlier the child was started on treatment better were the results
- The milder the severity of deformity
- Strict adherence to the sequence of correction as advised by Ponseti.
- Removal of the cast just before applying the subsequent cast.
- Regular follow-up by the patients.
- The compliance of the parents in maintaining the cast as well as the Dennis Browne splint.
- Absence of complications.

Our results were successful in 92 % of the patients with no major adverse events and the results are certainly encouraging.

References

1. Dobbs MB, Rudzki JR, Purcell DB, Walton T, Porter KR, Gurnett CA. Factors predictive of outcome after use of the Ponseti method for the treatment of idiopathic clubfeet. *J Bone Joint Surg (*Am). 2004; 86:22-7.
2. Ponseti IV. Idiopathic congenital talipes equino-varus. In: Ponseti IV, eds. Congenital Clubfoot Fundamentals of Treatment. 1st ed. New York: Oxford University Press Inc.; 1996: 448-454.
3. Colburn M, Williams M. Evaluation of the treatment of idiopathic clubfoot by using the Ponseti method. *J Foot Ankle Surg*. 2003; 42(5):259-67.
4. Lehman WB, Mohaideen A, Madan S, Scher DM, Van Bosse HJ, Iannacone M, *et al*. A method for the early evaluation of the Ponseti (Iowa) technique for the treatment of idiopathic clubfoot. *J Pediatr Orthop*. 2003;12(2):133-40.
5. Dobbs MB, Gordon JE, Walton T, Schoenecker PL. Bleeding complications following percutaneous tendoachilles tenotomy in the treatment of clubfoot deformity. *J Pediatr Orthop*. 2004; 24(4):353-7.
6. 6.Ponseti IV, Smoley EN. Congenital Clubfoot: The results of treatment. *The Journal of bone and joint surgery Amercian* volume 1963; 45A: 2261-70.
7. Ponseti IV . Treatment of congenital club foot. *J Bone Joint Surg Am* 1992;**74:** 448-53.
8. Ponseti I V: Congential Clubfoot. Fundamentals of Treatment, OxfordUniversity Press, London, 1996.
9. Frick SL: The Ponseti method of treatment for congenital Clubfoot; Importance of maximal forefoot supination in initial casting. Orthopedics, Jan. 28 (1), 63-65, 2005.
10. Lawrence R. Kuhns, Khaldoun Koujok, Janette M, Clifford Craig: Ultrasound of the navicular during the simulated Ponseti maneuver-*Journal of Pediatric Orthopedics,* 23,, 243-245, 2003.
11. Pirani Shafique, Laura Zeznik, David Hodges: Magnetic ResonanceImaging study of the Congenital Clubfoot treated by Ponseti method-*Journal of Pediatric Orthopedics,* 21:719-726, 2001.
12. Kite JH. Non operative treatment of congenital clubfoot. Clinical orthopaedics1972; 84:29-38.
13. Colburn Michael. *The Journal of Foot and Ankle Surgery* September-October 2003 Vol 42(5).