Original Article

Assessment of impact of patient's age at presentation and Pirani score on treatment duration in clubfoot

Singh V B, Chaurasia A K, Lakhtakia P K

Investigation performed at department of orthopedics, S. S. Medical College, Rewa, Madhya Pradesh, India

Abstract

Background: Delayed presentation of clubfoot is the primary problem in developing nations like India. The purpose of this study was to find out whether the delay in presentation of club feet and its initial Pirani score in infants adversely affect treatment course in terms of number of plaster casts required to achieve complete correction.

Methods: We retrospectively studied 2 years record of infants with idiopathic clubfoot treated with the Ponseti method. Karl Pearson correlation coefficient (r) was used to find out correlation of patient`s age in months with number of casts required to achieve full correction. We also used this correlation coefficient to find out correlation between severity score of foot and number of casts needed. Correlation was considered statistically significant if $P < 0.05$.

Results: There was a positive and strong correlation between severity score of foot and number of plaster casts required to achieve full correction and it was statistically significant. We also found a positive but weak correlation between patient`s age in months and number of casts required and the correlation was not found statistically significant.

Conclusion: The number of casts required for correction in idiopathic clubfoot in infant was significantly influenced by its initial Pirani score. However, Age at presentation does not have statistically significant impact on number of Ponseti cast required for correction.

Keywords: CTEV, Ponseti Cast, clubfoot.

Address for Correspondence: Dr. Amit Kumar Chaurasia, Department of Orthopaedics, S. S. Medical College, Rewa, Madhya Pradesh, India

Email: amit140975@yahoo.com

How to site this article: Singh V B, Chaurasia A K, Lakhtakia P K. Assessment of impact of patient's age at presentation and Pirani score on treatment duration in clubfoot. OrthopJMPC 2017;23(2):33-37.

Introduction

Talipes equinovarus or clubfoot is one of the most common congenital deformities of the lower limb with an incidence of about 1 in 1000 live births [1]. There are four major clinical components of the deformity, that is, equinus, varus, adductus and cavus. When untreated, children with clubfoot walk on the sides and/or tops of their feet, resulting in callus formation, potential skin and bone infections, inability to wear standard shoes, and substantial limitations in mobility and employment opportunities. Although clubfoot is recognizable at birth, the severity of the deformity can vary from mild to an extremely rigid foot that is resistant to manipulation. Pirani classification system is widely used in the initial evaluation of clubfoot deformities [2]. In recent years, the non-invasive treatment of clubfoot, developed by Dr. Ignacio Ponseti, has been shown to have a success rate above 95% and the best longterm outcomes [3-10]. Therefore, the

Ponseti method is fast becoming the gold standard for clubfoot treatment and is currently being implemented all over the world. The "golden period" for commencement of treatment is three weeks after birth, since up to the age of less than three weeks ligaments in the feet are still pliable so that they can be manipulated. As the patient`s age advances foot is supposed to become more rigid for manipulative correction and thus expected to require greater number of casts and duration to achieve full correction. India is the second most-populous country in the world with 25% of its people (about 375 million) living below the poverty line. Approximately 25,000 children are estimated to be born with idiopathic clubfoot every year in India. Delayed treatment of clubfoot is the primary problem in developing nations, where social stigma, lack of education, poverty and lack of proper health services hinder the early presentation and treatment of a child with clubfoot. The deformity becomes worse by walking as the weight bearing takes place on the side or dorsum of the foot, causing further contracture of the medial soft tissues and plastic deformation of bones [11]. The purpose of the study is to find out whether the delay in presentation of club feet and its initial Pirani score in infants adversely affect treatment course in terms of number of plaster casts required to achieve complete correction.

Materials and Methods

We retrospectively studied records of infants with clubfoot treated with the Ponseti method from July 2015 to June 2017 at club foot clinic in association with CURE India, of department of Orthopaedics, Shyam Shah Medical College, Rewa, Madhya Pradesh, India. We included patients with idiopathic club foot deformity who were presented after birth and up to 1 year of age. Non-idiopathic cases, cases who had previously received treatment in the form of plaster somewhere else and patients with residual deformity after surgery were excluded from the study. From the patient`s records information of patients collected including age, sex, number and side of feet affected, family history of clubfoot in first-degree relatives, maternal history of tobacco and alcohol consumption during pregnancy, any complication during pregnancy and birth, history of previous treatment, severity of deformity by Pirani score, number and duration of plaster cast treatment and any surgical treatment needed to achieve complete correction. Karl Pearson correlation coefficient (r) was used to find out correlation of patient`s age in months with number of casts required to achieve full correction. We also used this correlation coefficient to find out correlation between severity score of foot and number of casts needed to achieve full correction. Correlation was considered statistically significant if $P < 0.05$.

Results

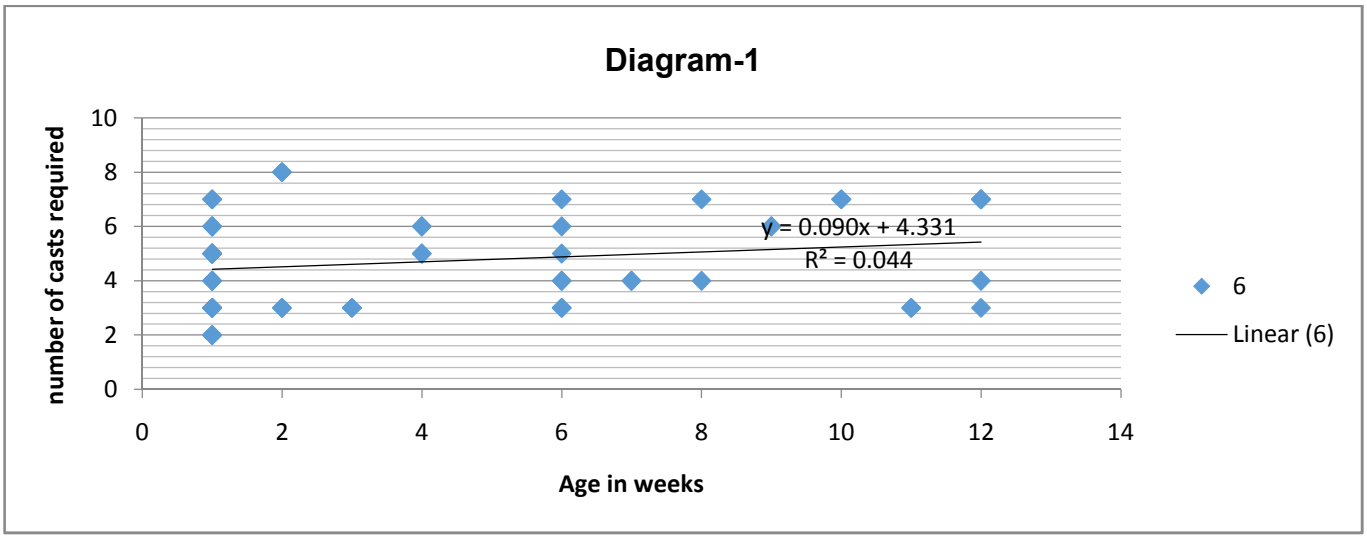
55 feet of 37 patients were selected in this retrospective study. Patient`s age ranged from 1 to 12 months and 29% of all presented in their 1st month of age (Table - 1). There were 30 male and 7 female patients.

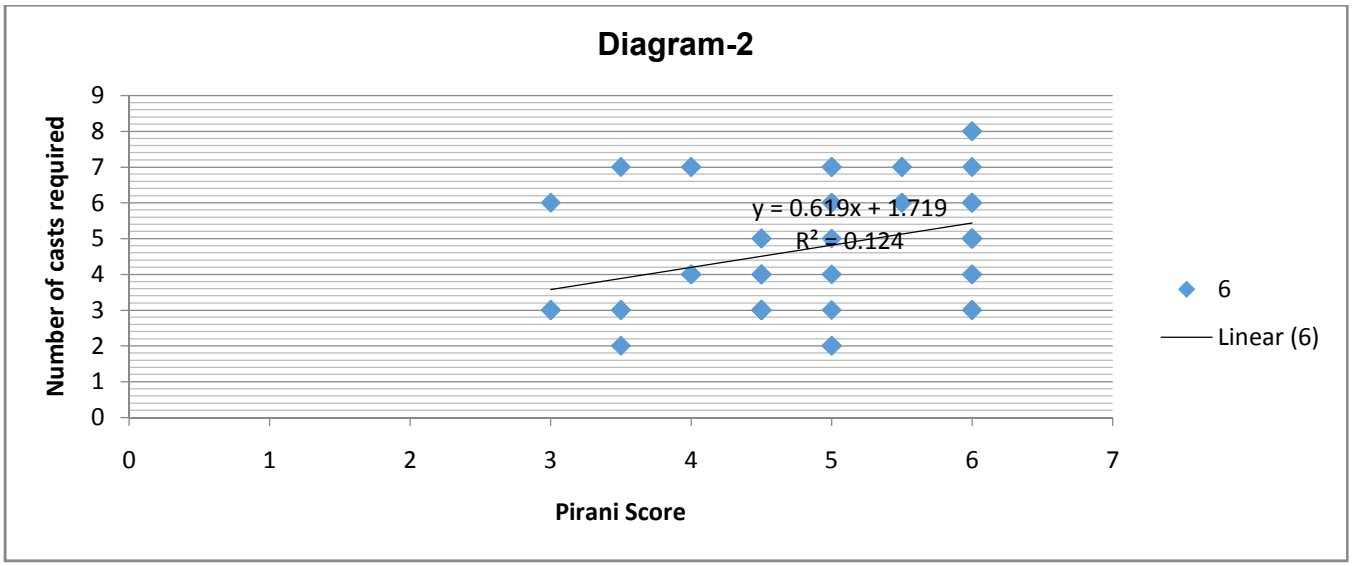
Table-1:Distribution of Clubfoot by age at first presentation to hospital

Age group (in month)	Number of patients
1	16
2	2
3	2
4	3
5	0

6	4
7	1
8	2
9	1
10	1
11	1
12	4

Nineteen patients had unilateral deformity, whereas 18 had bilateral deformity. We found a positive correlation (r= +0.19) between patient`s age in months and number of casts required to achieve full correction (diagram-1) though the correlation was not found statistically significant (P=0.15).





There was also a positive correlation (r= +0.35) between severity score of foot and number of plaster casts required to achieve full correction (diagram-2) but the correlation was found to be statistically significant (P=0.008).

The mean Pirani score at the beginning of treatment for all subjects was 4 with a minimum of 1 and maximum of 6. The average number of casts applied to achieve complete correction of all clubfoot deformities was 4.5.

Discussion

The Ponseti method has become the gold standard for clubfoot treatment and the success of treatment depends on strict adherence of patients with the treatment protocol [3-10]. Early initiation of treatment has shown to have superior results. However, overall outcome and success depends greatly on compliance to bracing, which is more difficult in older children [12, 13]. In our study we investigated the influence of severity of clubfoot and age at initial manipulation and casting on the total number of castings required. Finding of study showed that the number of casts required has a stronger and significantly positive correlation with initial Pirani score of feet whereas it has a weekly positive correlation with age of the patients. Mazlina Awang and Abdul Razak Sulaiman [14] conducted a prospective study on 38 idiopathic clubfoot patients undergoing Ponseti casting with objectives to investigate whether the severity of clubfoot, age, and weight of the patients at initial manipulation and casting influence the total number of castings required. Results showed that the Pirani score was the only significant predictor for the total number of castings required. Similar results came in a study by Anil Agarwal & Neeraj Gupta in which they investigated the correlation of the number of casts before tenotomy with the age and initial Pirani score among 297 children (442 feet) with idiopathic club foot up to ten years of age [15]. The regression analysis showed both Pirani and age had positive correlation with number of casts, although weak (r2=0.05–0.20). The initial Pirani scoring correlated ten times more than age (in months) to the number of casts. Dyer and Davis in their study found that found that foot scoring 4 and above will likely require four or more times as many castings as feet scoring less than 4 [16]. This information can be useful while counselling the caregivers about treatment plan to ensure good compliance.

Conclusion

The number of casts required for correction in idiopathic clubfoot in infant was significantly influenced by its initial Pirani score. However, Age at presentation does not have statistically significant impact on number of Ponseti cast required for correction.

References

1. Carey M, Bower C, Mylvaganam A, Rouse I. Talipes equinovarus in Western Australia. Paediatr Perinat Epidemiol 2003; 17: 187-194
2. Pirani S. A reliable and valid method of assessing the amount of deformity in the congenital clubfoot. St Louis, MO: Pediatric Orthopaedic Society of North America; 2004.
3. Dobbs MB et al. Late recurrence of clubfoot deformity: a 45-year followup. Clin Orthop Relat Res. 2003 Jun;(411):188-92.
4. Herzenberg JE, Radler C, Bor N. Ponseti versus traditional methods of casting for idiopathic clubfoot. J Pediatr Orthop. 2002;22:517-21.
5. Ippolito E, Farsetti P, Caterini R, Tudisco C. Long-term comparative results in patients with congenital clubfoot treated with two different protocols. J Bone Joint Surg Am. 2003;85:1286-94.
6. Ippolito E, Fraracci L, Caterini R, Di Mario M, Farsetti P. A radiographic comparative study of two series of skeletally mature clubfeet treated by two different protocols. Skeletal Radiol. 2003;32:446-53.
7. Laaveg SJ, Ponseti IV. Long-term results of treatment of congenital club foot. J Bone Joint Surg Am. 1980;62:23-31.
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;113:376-80.
9. Lu, N., L. Zhao, et al. (2010). From cutting to casting: impact and initial challenges to the Ponseti method of clubfoot treatment in China. Iowa Orthop J 30: 1-6.

10. Abdelgawad, A. A., W. B. Lehman, et al. (2007). Treatment of idiopathic clubfoot using the Ponseti method: minimum
11. Penny JN. The neglected clubfoot. Tech Orthop 2005 20:153-66
12. Ponseti IV. The treatment of congenital clubfoot. J Orthop Sports Phys Ther. 1994;20(1):1.
13. Ponseti IV, Smoley EN. Congenital club foot: the results of treatment. J Bone Joint Surg Am. 1963;45- A:261–344.
14. Judd, J. Congenital talipes equinovarus-evidence for using the Ponseti method of treatment. Journal of Orthopaedic Nursing. 2004; 8 (3): 160-163.
15. Agarwal Anil, Gupta Neeraj. Does initial Pirani score and age influence number of Ponseti casts in children? Int Orthop; 38(3): 569-72, 2014 Mar
16. Dyer PJ, Davis N. The role of the Pirani scoring system in the management of clubfoot by the Ponseti method. J Bone Joint Surg Br. 2006;88(8):1082–1084.