ORIGINAL ARTICLE

The Role of Pirani Scoring System in the Treatment of Congenital Clubfoot by the Ponseti Method

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ABSTRACT

Objective: To assess the effectiveness of the Pirani score for the treatment of idiopathic congenital clubfoot deformity by the Ponseti Method.

Method: This observational cross-sectional study was conducted at Department of Orthopedic Surgery Peoples University of Medical & Health Science Nawabshah (SBA) from January 2015 to December 2016. Total number of 100 patients with 158 clubfeet of idiopathic congenital talipes equinovarus deformity upto the age of 2 years of either sex were included. Patients were evaluated and graded for severity by using the Pirani scoring system, which is based on physical examination and require no radiographic measurements or other special investigations. Results were analysed statistically.

Results: Male were 68% (68). There was correlation between the Pirani score and the number of casts to achieve correction and the need for tenotomy. Out of 100 patients 94 patients were obtained correction while 6 patients underwent posteromedial release (PMR) surgery. The total number of casts with average of 5.7 and the range of 4-8 casts, and percutaneous tenotomy was performed in 84 patients. At the final stage of Ponseti technique the mean comparison of Pirani scoring system was significantly decreased from the initial stage.

Conclusion: Pirani scoring system is a reliable, effective, and simple method to determine severity and monitor progress in the management of clubfoot deformity by the Ponseti method.

Key words: Pirani score, Clubfoot, Ponseti method,

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INTRODUCTION:

Idiopathic congenital clubfoot or talipes equinovarus (CTEV) is a complex deformity occurring in an otherwise normal child since birth[1]. Exact etiology is unknown, incidence is one per 1000 live births, boys are affected twice than girls, >50% of cases are bilateralal while right sided preponderance in unilateral cases[2-5]. Deformity consist of 4 components i-e, hind foot equinus, hind foot varus, forefoot adductus and cavus. The aim of treatment is the correction of all components of deformity with a good mobility, plantigrade, and pain-free foot. The long term results of manipulation, casting and PMR operations have been disappointing with lot of complications[6-9].

Since the late 1940s, Ignacio V. Ponseti. MD at University of Lowa, developed a method of clubfoot correction, which is easy to learn and has been recommended for use in developing world with a high success rate of 83-98%[10-13]. The Ponseti technique involves weekly manipulation of clubfoot deformity followed by cast application above knee level. Except the equinus deformity, all components of clubfoot usually corrects within 5-6 weeks. Finally a simple percutaneous Tenotomy of Achilles' tendon is often required to achieve the complete correction. After correction foot-abduction brace is used to maintain the correction[14-16]. This technique results in strong, flexible and planti-grade feet with maintenance of function without pain has been demonstrated in

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a 35 years follow up study[17]. Clubfoot has been classified into mild, moderate and severe, but this is too subjective. There are different classification systems among which are Harrold and Walkers, Smoley, Bensahel and Dimeglio. Out of these systems, the commonly used one classification is the Pirani scoring system. The Pirani system, devised by Shafiq Pirani, MD, of Vancouver, has six categories; three in the mid foot and three in the hind foot. Each category can have their scores depending on the severity. This system is now routinely used in describing the outcomes of treatment[18].

There are six clinical signs of clubfoot contracture, each is scored accordingly to the Pirani's principle; zero means no abnormality, 0.5 means moderate abnormality, and 1 means severe abnormality. These six signs are divided into two parts. Out of six signs, three clinical signs related to the hind foot (rigidity of the equinus, severity of the posterior crease, and emptiness of the heel), and three clinical signs related to the mid foot (severity of medial crease, curvature of lateral border of foot, and position of lateral part of the head of the talus). Thus each foot can receive an hind foot score between 0 to 3, a mid-foot score between 0 and 3, and a total score between 0 and 6.[19]

This study aims to evaluate the reliability of the Pirani score in assessing severity of clubfoot and monitoring progress of management by Ponseti method.

METHODS:

A observational cross-sectional study was conducted form Jan 2015 to Dec 2016 at the department of orthopedic surgery Peoples University of Medical & Health Science (PUMHS) Nawabshah. 100 cases with 158 feet of either sex up to the age of 2 years was included in the study. Clubfoot deformity secondary to Polio, Cerebral Palsy, AMC and meningomy-elocele were excluded. Patients were evaluated and graded for severity by using the Pirani scoring system, which is based on physical examination and require no radiographic measurements or other special study.

Patient's demographic variable and Pirani score at presentation were recorded. Corrective serial casts were applied accordingly to Ponseti method. Percutaneous tendo Achilles tenotomy was done in patients to correct residual equinus. Dennis brown splints were applied on a full time basis for 3 months, and then at sleep time for 3 to 4 years. The Pirani score of the patients were calculated throughout the treatment period. The effectiveness of the Pirani score for the treatment of idiopathic congenital clubfoot deformity by Ponseti technique has been measured in terms of sex of the patients, initial severity score, total numbers of the casts applied, and need of percutaneous tenotomy and final severity score of the deformity.

RESULTS:

Out of 100 patients 68 (68%) male and 32 (32%) were female with M:F = 2.1:1. of 100 cases, 58 (58%) of clubfoot were bilateral; while 26 (26%) cases were right sided and 16 (16%) of clubfoot were left sided.

Distribution of Pirani's initial severity score of right foot, score range was 3.5-6 and maximum numbers of patients had score 5 while mean and ± SD score was 4.9±0.6. Distribution of Pirani's initial severity score of left foot, score range was 3.5-5.5 and maximum numbers of patients has score 5 and 5.5 while mean and ± SD score was 4.8±0.65. Percutaneous Achilles tenotomy was done in 84 (84%) cases.

The number of casts applied range was 4-8 and means (±SD) of casts was 5.74 ±1.12, presented in table 1. Distribution of Pirani's final severity score of right foot, score range was 0-3 and maximum numbers of patients had score 1 while means with ±SD score was 0.833 ±0.982. Distribution of Pirani's final severity score of left foot, score range was 0-2.5, with mean and ±SD score was 0.58(±0.692). Mean comparison of Pirani's score at initial and final stage presented in table 2. Mean scores of both right and left foot was significantly decreased at final stage as compared with initial Pirani's score.

Table I. Demographic Data & Percutaneous Tenotomy in Club Foot Cases (n=100)

Variables	No. of Patients	Percentage
Sex		
Male	68	68%
Female	32	32%
Side of Club Foot		
Bilateral	58	58%
Right	26	26%
Left	16	16%
P/C Tenotomy		
Yes	84	84%
No	16	16%
Total number of casts appled: 5.74 (+1.12)		

In this study percutaneous tenotomy of Achilles' tendon was needed in 84% of patients. In a series by Pirani et al did tenotomy in 90%, Dobbs experienced tenotomy in 85% of cases. Study results are similar to findings of other studies, that clubfeet with Pirani score of >5 are highly likely to need an Achilles tenotomy [26, 27]. Our study also revealed that it is the hind foot contracture score rather than the mid foot components of the Pirani's score that predicts the need for tenotomy. These final results showed the mean score of clubfeet were significantly decreased at final stage as compared with initial Pirani's score (P-values <.0001). Six patients treated with Ponseti method required PMR operation and this were attributed to the late presentation on patients with severe Pirani's core of 6. In this series, study experience with Pirani's score system for the treatment of clubfoot by Ponseti method was as good as those from

Table II. Comparison of Pirani Score (n=100)

Sides	Pirani's severity score		P-values*
	Initial mean ± SD	Final Mean ± SD	
Right	4.95±0.62	0.83±0.92	<.0001**
Left	4.79±0.65	0.58± 0.69	<.0001

* By using students t* -test. ** Difference was significant. SD = Standard Deviation

DISCUSSION:

In published literature success is defined as to obtained a mobile, plantigrade, and pain-free foot and there in this study the success rate is 94%, a figure that compare with other series i-e, 83-98% [20-22].

In this study the males were affected more than females which is observed by many other studies as well [3,5,6]. The Pirani's initial severity score was 3.5-6 and maximum numbers of patients had score 5, this is comparable with other studies which revealed that most patients presented had severe deformity [4]. The number of casts per feet in our study was 4-8 (average : 5.7). In series by Ponseti et al [23], it was 5-10 (average: 7.6), by Leaveg et al [24] it was 7, by Mourcuende et al [25]. The number was 5. Clubfeet presenting with a Pirani's score of >5 require more cast changes. other published series. This study observed that the Pirani scoring system allows an estimate of the number of plasters required, and can be used to clarify the need for percutaneous Achilles tenotomy.

CONCLUSION:

The Pirani scoring system is a reliable, effective, and simple method to determine severity and monitor progress in the management of clubfoot deformity by the Ponseti method.

REFERENCES:

01. Porecha MM, parmar DS, Charda HR. Mid-term results of ponseti method for the treatment of congenital idiopathic clubfoot -

(A study of 67 clubfeet with mean five years follow-up). J Orthop Surg Res. 2011 Jan 12;6:3.

02. Shah RA. Clubfoot in children surgical / operative treatment. Am Abbasi Shaheed Hosp Karachi & K.M.D.C. Coll. 2004; 9 (2):605-7.
03. Matuszewsik L, Gil L, Karaski J. Early results of treatment for congenital clubfoot using the ponseti method. Eur J Orthp Surg Traumatol. 2012; 22:403-6.
04. Janicki JA, Narayanan UG, Harvey BJ, Roy A, WeirS, Wright JG. Comparison of Surgery and physiotherapist-direction ponseti treatment of idiopathic clubfoot. J Bone Joint Surg Am. 2009 May; 91 (5): 1101-8.
05. Ullah H, Siraj M, Ullah Z, Khan MS. Early experience with ponseti technique in the management of congenital idiopathic Talipes Equino varus (CTEV) in children less than 2 years of age. J Pak Orthop Assoc. 2015 July; 27 (2): 63-4.
06. Guptakumar TS, Rahul M. Ponseti technique in the management of idiopathic clubfoot. Kerala J Orthop. 2014; 27(1):15-7.
07. Desai L, Oprescu F, DiMeo A, Morcuende JA. Bracing in the treatment of children with clubfoot: past, present and future. Lowa Orthop J. 2010;30:15-23.
08. Pavone V, Testa G, Costarella L, Pavone P, Sessa G. Congenital Idiopathic talipes equinovarus: An evaluation in infants treated by the ponseti method. Eur Rev Med Pharmacol Sci. 2013 Oct; 17 (19):2675-9.
09. Noh H, Park SS. Predictive factors for residual equinovarus deformity following ponseti treatment and percutaneous achilles tenotomy for idiopathic clubfoot: a retrospective review of 50 cases followed for median 2 years. Acta Orthop. 2013 Apr; 84 (2):213-17.
10. Din SH, Shah SA, Hayat S. Conservative treatment of congenital talipes equinovarus. J Postgrade Inst 2004; 18 (3):368-72.
11. Sanghvi AV, Mittal VK. Conservative management of idiopathic clubfoot: Kite versus ponseti method. J Orthp Surg (Hong Kong). 2009 Apr; 17 (1): 67-17.
12. Inam M, Arif M, Hassan V, Satar A. Comparison of ponseti method with Turco's poster omedial release in the management of congenital talipes equinovarus. J Surg Pak. 2012 Jan-Mar; 17 (1):2-6.
13. Chotel F, Parot R, seringe R, Berard J, Wicart P. Comparative study: ponseti method versus French physiotherapy for initial treatment of idiopathic clubfoot deformity. J Pediatr Orthop. 2011 Apr-May; 31 (3):320-25.
14. Saifullah M, Md Noorul Fk, Shahjahan M, Abu SS. Management of cogenitial talipes equinovarus (CTEV) by ponseti casting technique in neonates: our experience. J Neonatal Surg. 2013 Apr; 2 (2):17.
15. Gupta A, Singh S, Patel P, Patel J, varshney MK. Evaluation of the utility of the ponseti method of correction of clubfoot deformity in a developing nation. Int Orthop. 2008; 22:75-9.
16. Haqazy M, Nasef NM, Abdul-Ghani H. Results of treatment of idiopathic clubfoot in older infants using the ponseti method: a preliminary report. J Pediatr Orthop. 2009; 18 (2): 76-8.
17. Ponseti IV, Morcuende JA, Mosca V, Pirani S, Dietz F, Herzenberg JE, et al. In: Staheli L, ed. Clubfoot: ponseti management. 3rd ed. Global - HELP; 2009. Available from; https://global-help-publications.storage.googleapis.com/books/help_cfponseti.pdf
18. Piani S, Naddamba E, Mathias R, Konde_Lule J, penny JN Beyeza T, et al. Towards effective ponseti clubfoot case. Clin Orthop Related Res. 2009; 467: 1154-63.
19. Hussain FN. The role of the pirani scoring system in the management of clubfoot by the ponseti method. J Bones Joint Surg 2007; 89 (4):561-2.
20. Arif M, Inam M, Sattar A, Shabir M. Usefulness of ponseti technique in management of congenital talipes equino_varus. J Pak Orthop Asso. 2011 June; 23 (2):60-64.
21. Zia M, Javaid MZ, Rehman OU. Efficiency of ponseti manipulation and casting in management of idiopathic clubfoot: early results. J Pak Orthop Assoc. 2013 July; 25(2):1-4.
22. Ziontz LE, Zhao G, Hitch cock K, Meawal J, Ebramzadeh E. Has the rate of extensive surgery to treat idiopathic clubfoot declined in the united states? J Bone Joint Surg 2010; 92(4):882-9.
23. Halanski MA, Davison JE, Huang JC, Walker Ch, Walsh SJ, Crawfored HA. Ponseti method compared with surgical treatment of clubfoot: a prospective comparison. J Bone Joint Surg Am. 2010 Feb; 92(2):270-8.

24. Changulani M, Grag NK, Rajgopal TS, Bass A, Nayagam SN, Sampath J, et al. Treatment of idiopathic clubfoot clubfoot using the ponseti method. Initial experience. J Bone Joint Surg. 2006;88:1385-87.
25. Morcuende JA, Terrazas G. Effect of cast removal timing in the correction of idiopathic clubfoot by the ponseti method. Lowa Orthop J. 2007;27:24-7.
26. Maranho DA, Noqeira MH, Simao MH, Volpon JB. Ultrasonographic evaluation of Achilles tendon repair after percutaneous sectioning for the correction of congenital clubfoot residual equinus. J Pediatr Orthop. 2009;29(7):804-10.
27. Scher DM, Feldman DS, Bosse HJP, Sale DA, Lehman WB. Predicting the need for tenotomy in the ponseti method for correction of clubfoot. J Pediatr Orthop. 2004;24(4):349-52.