

Comparison of Ponseti Technique with Turco's Posteromedial Release in the Management of Congenital Talipes Equinovarus

Muhammad Inam, Mohammad Arif, Vaqar Hassan, Abdul Satar

ABSTRACT

- Objective** To compare the results of Ponseti technique with one stage Turco's posteromedial release for correction of clubfoot in children of less than 12 month of age.
- Study design** Comparative study.
- Place & Duration of study** Department of Orthopedics and Spine Surgery Postgraduate Medical Institute, Hayatabad Medical Complex Peshawar, from October 2008 to September 2010.
- Methodology** Patients were randomly selected by drawing lots, with even number included in group A (Ponseti Technique) and odd number in group B (Turco's posteromedial release). Patients of either sex with age less than one year having congenital talipes equinovarus were evaluated preoperatively by Pirani score, postoperatively by Mac Key score and were followed up for 2 years.
- Results** Out of sixty patients, 23(38.3%) were males and 37 (61.7%) females. Fourteen (23.3%) patients had bilateral while 46 (76.7%) had unilateral deformity. Minimum age was 2 week, maximum 52 week and average 5.58 week. Using Pirani score preoperatively, there were 36(60%) patients with severe abnormality and 24(40%) feet were moderately abnormal. Using Mac Key score the functional results at last follow up in Group A were excellent in 16(26.7%), good in 13(21.7%) and failure noted in 1(1.7%) patient. At last follow up, functional results in Group B were excellent in 14(23.3%), good in 10(16.7%), fair in 4(6.7%) poor in 1(1.7%) patient and failure in 1(1.7%) patient.
- Conclusions** Ponseti technique for an idiopathic clubfoot should be the choice for clubfeet. When there is recurrent deformity or resistant club foot then operative treatments may be considered.
- Key words** Clubfoot, Talipes equinovarus, Ponseti technique, Turco's technique, Mac Kay score, Pirani Score.

INTRODUCTION:

Clubfoot is one of the most common congenital orthopedic anomalies and was described by Hippocrates in the year 400 BC.¹ However it still continues to challenge the skills of the orthopedic surgeon as it has a tendency to relapse, irrespective of whether the foot is treated by conservative or

operative means.² One report on the long-term outcome of the Ponseti method particularly inspired orthopedic surgeons to adopt this treatment.³ The authors reported in detail on the simplicity of the method to achieve and maintain a flexible, plantigrade, and painless foot. However, because there are no data on the worldwide use of different methods for clubfoot management, one could assume numerous centers still treat congenital clubfoot by initial casting followed by surgical correction of residual deformities.⁴ Outcome of treatment is rated differently in the literature. Some authors have success rates of as high as 80% excellent or good outcomes for Ponseti management and

Correspondence:

Dr Muhammad Inam
Department of Orthopaedics and Spine Surgery
Postgraduate Medical Institute
Hayatabad Medical Complex Peshawar
E mail: dr_mohammadinam@yahoo.co.uk

for surgical treatment.⁵ In light of seemingly comparable outcomes, the much less invasive treatment pioneered by Ignacio V Ponseti is repeatedly cited as the preferred treatment.⁶ The evidence to support this estimation is based on retrospective trials and a few studies with historical control groups.⁷ Larger groups of patients with follow up have been reported only by few centers worldwide.⁸

For almost 3 decades, congenital clubfoot has been treated with manipulation and casting up to the age of six months followed by posteromedial release (PMR).⁹ With perception that the treatment of idiopathic clubfoot by extensive soft tissue release is often complicated by stiffness, recurrence, and the need for additional procedures, many treatment centers have adopted the minimally invasive Ponseti method, which has achieved excellent results in both economically developed and underdeveloped regions.⁹⁻¹³

This study was conducted to compare the results of Ponseti technique with Turco's posteromedial release for correction of clubfoot in children of less than 12 month of age.

METHODOLOGY:

This prospective, randomized, single centre, controlled study was conducted in the Department of Orthopedics and Spine Surgery Postgraduate Medical Institute Hayatabad Medical Complex Peshawar from October 2008 to September 2010 on 60 consecutive patients. Patients were randomly selected by drawing lots with even number included in group A (Ponseti technique) and odd number in group B (Turco's posteromedial release). Patients of either sex with age less than one year having congenital talipes equinovarus were evaluated by Pirani score preoperatively, postoperatively by Mac Kay rating score,¹⁴ and were followed up for 2 years.

On admission, a complete history was taken. All patients had a detailed examination of hips, spine and extremities and severity of the deformity (i.e. mild, moderate and severe) were recorded. The length and width of feet were measured and informed consent taken.

Preoperatively Pirani score¹⁵ was used to assess the severity of club foot, which means that if the score is zero then it is normal, score 0.5 is for the moderately abnormal and if the score is one then it is severely abnormal. Midfoot score (MS) and hindfoot score (HS) were used to assess the severity of deformity. Every clubfoot was scored

preoperatively for HS, MS, and total score. Midfoot score includes curved lateral border, medial crease and talar head coverage while hindfoot score includes, posterior crease, rigid equines and empty heel.

The brace was applied immediately after the last cast removed, 3 weeks after Achilles tenotomy in group A and after removal of the Kirschner wire in Group B. For Unilateral clubfoot the brace was set at 60 to 70 degrees of external rotation on the clubfoot side and 30 to 40 degrees of external rotation on the normal side. For bilateral involvement the brace was set at 70 degrees of external rotation on each side. After applying the brace for the first time when the last cast was removed, the child followed up after 2 weeks to troubleshoot compliance issues, then after 3 months to night time only protocol and then every 4 months until age 2 year to monitor compliance and check for relapses.

RESULTS:

Out of sixty patients, 23(38.3%) were males and 37 (61.7%) females. Fourteen (23.3%) patients had bilateral while 46 (76.7%) had unilateral deformity. Minimum age was 2 week, maximum 52 weeks and average 5.58 weeks. Using Pirani score preoperatively, there were 36(60%) patients with severely abnormal and 24(40%) moderately abnormal feet. Using Mac Key score at first follow up, functional results in group A were excellent in 16(26.7%), good in 11(18.3%) and fair in 3(5.0%) patients. At second follow up functional results in group A were excellent in 14(23.3%), good in 14(23.3%) and fair in 2(3.3%) patients. At last follow up functional results in group A were excellent in 16(26.7%), good in 13(21.7%) and failure noted in 1(1.7%) patient (table I).

Functional results in group B at first follow up were excellent in 15(25%), good in 10(16.7%) and fair in 5(8.3%) patients. At second follow up functional results in group B were excellent in 15(25%), good in 10(16.7%), fair in 4(6.7%) and poor in 1(1.7%) patients. At last follow up functional results in group B were excellent in 14(23.3%), good in 10(16.7%), fair in 4(6.7%) poor in 1(1.7%) patient and failure in 1(1.7%) patient.

DISCUSSION

One stage Turco's posteromedial release is still the treatment of choice in most of the third world countries but now the Ponseti method of treatment for congenital clubfeet is gaining widespread clinical acceptance.⁷⁻⁹ In our study 65 % patients had received conservative treatment (i.e. serial casting)

	Age of the patients in weeks	Turco's Functional Results at First follow up	Turco's Functional Results at second follow up	Turco's Functional Results at last follow up	Ponseti Functional Results at First follow up	Ponseti Functional Results at second follow up	Ponseti Functional Results at last follow up
N	60	30	30	30	30	30	30
Mean	5.58	1.67	1.70	1.83	1.57	1.60	1.57
Median	04	1.50	1.50	2.00	1.00	2.00	1.00
Mode	03	01	01	01	01	01	01
Std. Deviation	3.35	.76	.84	1.02	.68	.62	.82
Range	10	02	03	04	02	02	04
Minimum	02	01	01	01	01	01	01
Maximum	52	03	04	05	03	03	05

	Turco's Functional Results at last follow up	Ponseti Functional Results at last follow up
Chi-Square	22.333	12.600
df	04	02
Asymp. Sig.	.000	.002

right from initial weeks of life, while 35% of the patients had no conservative treatment till the time of presentation. This may be mainly due to low socio-economic and educational status of the parents.

Halanski et al treated eighty six clubfeet; forty feet were included in the group that was treated with the Ponseti method, and forty-six feet were included in the group that was treated with manipulation and casting followed by surgery.¹⁶ In his study there was no difference between the groups in terms of gender, ethnicity, age at the time of first casting, pretreatment Pirani score or family history. In the Ponseti group, fourteen feet required fifteen operative interventions for recurrences, with only one foot requiring revision surgery. Four of these fifteen were posteromedial release while eleven were minor. Thirteen feet in the surgical group required fourteen surgical revisions. Two postoperative complications were seen in each group. While in our study there was one major operation like PMR in group A and one revision surgery in group B. There were no major postoperative complications in our study in either group.

Vaishnavi et al had followed their 33 patients treated with Turco's procedure, with clinical and radiological examinations.¹⁷ Three (9%) cases each had recurrence of heel varus and forefoot adduction. Three cases (9%) had cavus deformity, while four cases had flat foot. All patients were noted to have calf muscle wasting. Two feet out of 33 had recurrence of all the deformities. There were 27 (81.9%) good to excellent results while in our study 24(80%) had good to excellent results. The most common problem in their study was terminal restriction of dorsiflexion, but most of the patients were happy with the results.

Zwick et al has compared the results of Ponseti treatment with surgical treatment.¹⁸ When they evaluated foot function at the age of 3.5 years, patients in the Ponseti group scored higher in the functional rating score. None of the patients experienced foot pain, and all feet had a plantigrade position when standing. Herzenberg et al reported that 97% of the clubfeet could be managed with Ponseti method and tenotomy of the tendo-Achilles while in our study 98.3% of clubfeet were treated

successfully with Ponseti method.¹⁹

Richards et al had compared the Ponseti technique with physiotherapy method and found that the initial correction rates were 94.4% for the Ponseti technique as compared to physiotherapy method.²⁰ He concluded that Ponseti technique is the best. Eberhardt et al studied 29 patients with 41 clubfeet were treated with the Ponseti method.²¹ Classification followed Pirani's score. His study showed excellent result. In Hegazy et al study the overall results were satisfactory in 31 out of 32 feet.²² All these studies are comparable to the current study which showed that the Ponseti technique is best when started early in the management of congenital club foot.

CONCLUSIONS:

Less invasive treatment like Ponseti technique for an idiopathic clubfoot deformity is a favored technique in most patients nowadays and should be considered first when treating clubfeet. When there is recurrent or resistant club foot then operative treatments may be considered.

REFERENCES:

1. Anand A, Sala DA. Clubfoot: Etiology and treatment. *Indian J Orthop* 2008;42:22–8.
2. Spiegel DA, Shrestha OP, Sitoula P, Rajbhandary T, Bijukachhe B, Banskota AK. Ponseti Method for Untreated Idiopathic Clubfeet in Nepalese Patients From 1 to 6 Years of Age. *Clin Orthop Relat Res* 2009;467:1164–70.
3. 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;12;6:3.
4. Gerlach DJ, Gurnett CA, Limpaphayom N, Alaei F, Zhang Z, Porter K, et al. Early results of the Ponseti method for the treatment of clubfoot associated with myelomeningocele. *J Bone Joint Surg Am.* 2009; 91:1350-9.
5. Janicki JA, Narayanan UG, Harvey BJ, Roy A, Weir S, Wright JG. Comparison of surgeon and physiotherapist-directed Ponseti treatment of idiopathic clubfoot. *J Bone Joint Surg Am* 2009;91:1101-8.
6. Cooper DM, Dietz FR. Treatment of idiopathic clubfoot. A thirty-year follow-up note. *J Bone Joint Surg Am* 1995; 77:1477–89.
7. Dobbs MB, Nunley R, Schoenecker PL. Long-term follow-up of patients with clubfeet treated with extensive soft-tissue release. *J Bone Joint Surg Am.* 2006;88:986–96.
8. 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;86:22–27.
9. Dyer PJ, Davis N. The role of the Pirani scoring system in the management of club foot by the Ponseti method. *J Bone Joint Surg Br* 2006;88:1082–84.
10. Goksan SB, Bursali A, Bilgili F, Sivacioglu S, Ayanoglu S. Ponseti technique for the correction of idiopathic clubfeet presenting up to 1 year of age. A preliminary study in children with untreated or complex deformities. *Arch Orthop Trauma Surg* 2006;126:15–21.
11. 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;32:75–79.
12. Haasbeek JF, Wright JG. A comparison of the long-term results of posterior and comprehensive release in the treatment of clubfoot. *J Pediatr Orthop* 1997;17:29–35.
13. 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.
14. McKay DW. New concept and approach to clubfoot treatment: section I - Principles and morbid anatomy. *J Pediatr Orthop* 1982; 2:347-56.
15. Pirani S, Outerbridge HK, Sawatzky B, Stothers K. A reliable method of clinically evaluating a virgin clubfoot evaluation. 21st SICOT conference, 1999.
16. Halanski MA, Davison JE, Huang JC, Walker

-
- CG, Walsh SJ, Crawford HA. Ponseti method compared with surgical treatment of clubfoot a prospective comparison. *J Bone Joint Surg Am* 2010;92:270-8.
17. Vaishnavi AJ, Singh B. Congenital clubfoot – long-term results of modified Turco's procedure. *J Bone Joint Surg Br* 2004;87-B:313-8.
18. Zwick EB, Kraus T, Maizen C, Steinwender G, Linhart WE. Comparison of Ponseti versus surgical treatment for idiopathic clubfoot: A short-term preliminary report. *Clin Orthop Relat Res* 2009: 467:2668–76.
19. Herzenberg JE, Radler C, Bor N. Ponseti versus traditional methods of casting for idiopathic clubfoot. *J Pediatr Orthop* 2002;22:517–21.
20. Richards BS, Faulks S, Rathjen KE, Karol LA, Johnston CE, Jones SA. A comparison of two nonoperative methods of idiopathic clubfoot correction: the Ponseti method and the French functional (physiotherapy) method. *J Bone Joint Surg Am* 2009;1;91.
21. Eberhardt O, Schelling K, Parsch K, Wirth T. Treatment of congenital clubfoot with the Ponseti method. *Z Orthop Ihre Grenzgeb* 2006;144:497-501.
22. Hegazy M, Nasef NM, Abdel-Ghani H. Results of treatment of idiopathic clubfoot in older infants using the Ponseti method: a preliminary report. *J Pediatr Orthop B*.2009;18:76-8.