ORIGINAL ARTICLE

Midterm Results with Ponseti Technique for Clubfoot at Khyber Teaching Hospital, Peshawar

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ABSTRACT

Objective: To evaluate clinical outcome of Ponseti technique for CTEV correction in our experience at Khyber Teaching Hospital.

Study Design: Descriptive cross sectional study.

Place and Duration of Study: This study was carried out at department of Orthopedics and Traumatology Khyber Teaching Hospital Peshawar, Pakistan from June 2014 to June 2016.

Patients and Methods: A total of 98 patients (130 clubfeet) were included in the study. Data including age, sex, duration of treatment, complications during follow up and final clinical outcome was recorded.

Results: There were 70 (71.4%) males and 28 (28.6%) females. Seventy (71.4%) patients showed excellent results, 12.25% (n=12) patients showed good results, 10.2% (n=10) patients had fair results and 6.12% (n=6) patients had poor results. Among the poor category all six patients showed relapse of deformity which were considered for PMR and tibialis anterior transfer. Five patients had complications that included skin excoriation (3 patients) and skin breakage (2 patients).

Conclusion: Ponseti technique is simple, technically easy, cost effective and giving better results. In the perspective of recurrence, relapse and resistant deformities in CTEV it can be adopted as first and index choice in the treatment of clubfoot.

Key words: Ponseti technique, Clubfoot

INTRODUCTION

Clubfoot or congenital talipes equino varus (CTEV) deformity of the foot is one of the ancient and is among the most common congenital abnormalities with unknown etiology.[1,2] It is a big issue of today's modern orthopedics with an incidence 1.2 per 1000 live births in Caucasian population, with a male to female ratio of 2.25:1 affecting both feet equally.[3]

Many treatments modalities prevails to treat CTEV. Very conservative methods such as just stretching and physiotherapy in early neonates, orthosis and braces are used to address minor deformities i.e. minor forefoot adduction, varus and equinus can be corrected to variable extent and success. These can be used alone or an adjunction to other methods.[4-7] Splints and orthosis in a diverse forms are used to cope with CTEV individual components like equinus or more components simultaneously.[4,5,8] Casting technique in CTEV management has well evolved over time from traditional casting towards organized Ponseti technique yielding better results than splints, braces and orthosis.[9,10] Surgical intervention is done as a primary treatment modality or an adjunct to conservative measures for residual and resistant deformities or following failure of conservative techniques. The diverse array of surgical interventions include posterior release, medial release, posteromedial release, posteromedial lateral release (Cincinnati) for heel varus and equinus correction and muscle balancing procedures in a younger child.[11-13] Older children need combination of the soft tissue procedures and sometime corrective osteotomies[14]. Children after puberty often need salvage procedure like triple arthrodesis alone or in combination with soft tissue releases and osteotomies.[15,16]

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Ponseti technique is a novel technique for correction of CTEV. It is an organized and principled modality of treatment with promising results.[17-9] It is simple, demanding no technicality with cost effectivesness.[20,21] Ponseti technique is simple, reproducible, less invasive and showing promising results if done properly, early initiated with good parent education and full attention to details. It is worldwide spread modality of treatment and well complied way of intervention in clubfoot.[22,23]

Our study is aimed to find out clinical outcome of Ponseti technique for the treatment of clubfoot in our experience at Khyber teaching hospital Peshawar Pakistan and to extrapolate our results to the public and private sector.

PATIENTS AND METHODS

This descriptive study was conducted at Department of Orthopaedics and Traumatology Khyber Teaching Hospital Peshawar from June 2014 to June 2016. Patients of idiopathic origin having forefoot adduction , midfoot cavus, hind footvarus and equines, fresh patients as well as patients with previously failed or improper conservative treatment in the form of casts or braces or splints and age limit was from birth to 6 years were included. All patients with syndromic clubfoot i.e. arthrogryphosis multiplex congenita or other congenital limbs anomalies, previous surgical treatments i.e. posteromedial release or any other soft tissue or bony procedures, neuromuscular disorders and systemic illnesses were excluded from our study.

All patients were recruited via outpatient department (OPD) directly and through referral from lower orthopedic center and clinics across Khyber Pukhtoonkhwa mostly and also from adjacent districts of Punjab province and Afghanistan as well. Patients were dealt in Ponseti clinic in our department on Monday to Monday basis. Data including age, sex, photograph of the patient foot, no. of

visits and casts, Pirani scoring, clinical assessment, and any complications during treatment were documented and the data was uploaded on international Ponseti web. On each weekly visit after taking data and scoring, all patients undergone manipulation and passive stretching for 2 to 3 minutes then cast was applied first to the foot, then below knee and finally above knee. The order of correction of deformities was "CAVE" according to Ponseti principle that is first correcting midfoot cavus by simply supinating the foot in a manner that the deformity seems to be exaggerated by external look. After cavus, forefoot adduction was corrected and then finally equinus was addressed. When Pirani score was brought to 1.5 (posterior crease , emptiness of heel , rigid equinus) and not improving further, percutaneous tendoachilli tenotomy under local anaesthesia in minor operation theatre was performed and final cast was given in hyper corrected (15 to 20 degree dorsiflexion and 60 to 70 degree abduction). At removal of final cast, Dennis brown splint was given for maintenance of correction 23 hour for first 3 months and then 12 hours for 2 to 3 years.

(a) **(b)** **(C)** **(d)**

Pictures showing clinical assessment and ponseti scoring (a) and (b), final cast (c) and Dennis brown splint (d).

RESULTS

Our study enrolled a total no 98 patients (130 clubfeet) out of which 71.40% (n=70) were males and 28.6% (n=28) were females. Mean age was 15.46±15.3 months (2SD) with a range of 0.23 months to 60 months. Average follow up was 21.38±2.24 months (2SD) with a range of 17 to 24 months. Mean no of casts was 9.57±3.25 with a range of 5 to 20 casts. 38.8% (n=38) patients underwent percutaneous tendoachilli tenotomy. 71.42% (n=70) patients showed excellent results, 12.25% (n=12) patients had good results, 10.2 % (n=10) patients had fair outcome and 6.12 % (n=6) showed poor outcome with relapse of deformity i.e. 2 patient grade IIA, 3 patients grade IIB and one patient grade III. Fair outcome patients were considered for reponseti casting and poor outcome patients were offered PMR (4 patients) and 2 patients were treated via PMR and tibialis anterior transfer. 5.1% (n=5) patients showed minor complications i.e. 3 patients showing skin excoriation and 2 patients showed skin breakage. Average pre Ponseti Pirani score was 5.5 with a range 4 to 6. Average post Ponseti score at last follow up was 0.5 with a range 0 to 1.5.

Table 1: Pirani scoring system

Physical examination	Score		
	0	0.5	1
Curvature of lateral border	Straight	Mild distal curve	Curve at calcaneocuboid joint
Medial crease	Multiple fine creases	One or two deep creases	Deep creases changing contour of medial arch
Posterior crease	Multiple fine creases	One or two deep creases	Deep creases changing contour of longitudinal arch
Palpation of head of talus	Not palpable, navicular completely reduced	Partially palpable navicular incompletel y reducing	Complete palpable, navicular does no reduce
Emptiness of heel	Tuberosity of calcaneum easily palpable	Tuberosity more difficult to palpate	Tuberosity of clacaneum not palpable at all
Rigidity of equinus	Normal ankle dorsiflexion	Ankle dorsiflexes beyond neutral but not fully	Ankle can not be dorsiflexed to neutral

Table 2: Relapse grading

Physical examination	Decrease in ankle dorsiflextion from 15 degrees to neutral	Dynamic forefoot adduction or supination	Regid equin us	Regid forefo ot adduc tion	Combi nation of two or more defor mities
Grade	IA	IB	IIA	IIB	III

Table 3 showing no of patients, Pirani score and outcome

No of patients (n=98)	Pirani score at last follow up	Results
n=70 (71.4%)	0	Excellent
n=12 (12.25%)	0.5	Good
n=10 (10.20%)	1.0	Fair
n=6 (6.12%)	1.5	Poor

DISCUSSION

Clubfoot is the most common congenital orthopaedic anomaly faced by orthopedic surgeons all over the world. A multitude of treatments is in practice to cope with clubfoot each one with its own merits and demerits. Among all of these Ponseti techniques is getting more weightage due its simplicity, low technicality, cost effectiveness and with promising results.

Our study is aimed to find out outcome and efficacy of Ponseti technique in the treatment of clubfoot deformity. Its simplicity, low technicality, cost effectiveness and superior results make it procedure of choice for the treatment of clubfoot. Many studies in the medical literature support the same fact[17-.22]

Our study entailing a total of 98 patients (130 clubfeet) 70.4% (n=70) patients showed excellent results, 12.25% (n=12) patients showed good results, 12.20% (n=10) patients showed fair results and 6.12% (n=6) had

poor results with recurrence of deformity. Fair category were considered for reponseti and among poor category patients (n=6),4 patients underwent PMR and 2 patients were offered PMR plus tibialis anterior transfer for correction of adduction deformity. Five patients showed minor complications i.e. 3 showed skin excoriation and two patients showed skin breakage which were addressed via symptomatic treatment (skin ointments, analgesics and oral antibiotics for three days). No issue of femur fracture, knee stiffness or ischemic event happened during the study.

We encountered few problems during the study. Due to poverty, lack of education and awareness some of the children were paying infrequent visits i.e. presenting on second or third week rather than on weekly basis. Some of the patients lost cast integrity due to soakage or breakage during follow up. During maintenance phase some of the patients had their own way of putting Dennis brown splint i.e. not for 23/24 hour schedule but for a less time and inconsistently. All these confounding factors may have biasing effects on our outcome and results.

Vo and Huynh[18] a prospective study in Vietnam enrolling 101 patients (142 clubfeet) over a mean follow up of 2 years, 95.8% patients showing excellent and good results , 21.8% showing fair and 6.6% poor outcome. These results are comparable to our results with almost the same follow up but different scoring system.

Porecha et al[23] one of an Asian prospective study encompassing 49 patients (67 club feet) .They achieved excellent and good results in 89.79% (44 patients) and 20.1% (5 patients) were among fair and poor category at initial assessment. These results are almost equal to our results but their follow up (minimum 5 years) is quiet long and more reliable than us.

Although our study is yielding good results comparable to most of the studies in the literature, our sample may not be a representative one and our follow up was short as compared to other studies. Our patients/parents are from low socioeconomic stratum and low IQ, so not strictly following treatments guidelines. Poverty and finance is another issue which may have confounding and biasing effects on our outcome. Another fact regarding our study is our study population was including elder children (up to 5 years) with their deformity quite difficult to treat and to have good results this may have confounding effect on our outcome. Large scale multicenter randomized control trials can have proper answer for minute details of clubfoot.

CONCLUSION

Ponseti technique for treating clubfoot or CTEV is simple, demanding no expertise and technicality, cost effective and giving superior and durable results than all other modalities of treatments. In the perspective of recurrence, relapse, resistant deformities and consequent disability in CTEV, Ponseti technique should be the first and index procedure for its treatment.

REFERENCES

1. Rosselli P, Nossa S, Huérfano E, Betancur G, Guzmán Y, Castellanos C, et al. Prenatal ultrasound Diagnosis of Congenital Talipes equinovarus in Bogota (Colombia) between 2003 and 2012. Iowa Orthop J 2015;35:156-9.
2. Kolecka E, Niedzielski KR, Cukras Z, Piotrowicz M. Congenital talipes equinovarus family occurrence. Chir Narzadow Ruchu Ortop Pol. 2011; 76(5):252-5.
3. Huntley JS. Optimizing the management of congenital talipes. Practitioner 2013; 257(1765): 15-8.
4. Chen W, Pu F, Yang Y, Yao J, Wang L, Liu H, et al. Correcting congenital talipes equinovarus in children using three different corrective methods: a consort study. Medicine (Balthimore) 2015; 94(28):e1004.
5. Agarwal A, Shaharyar A, Kumar A, Bhat MS, Mishra M. Steenbeek brace: patterns of wear. Foot Ankle Spec 2016;9 (1):13-16.
6. Ezeukwu AO, Maduagwu SM. Physiotherapy management of an infant with bilateral congenital talipes equino varus. Afri Health Sci 2011; 11(3): 444-8.
7. Solanki PV, Sheth BA, Poduval M, Sams SB. Effectiveness of modified ankle foot arthrosis of low thermoplastics in idiopathic congenital talipes equino varus. J Pediatr Orthop B 2010; 19(4): 353-60.
8. Adachi N, Fukuhara K, Nakasa T, Shibuya H, Okuhara A, Kato T, et al. Conservative treatment of severe clubfoot using a novel functional dynamic splint. J Pediatr Orthop B 2015;24(1):11-7.
9. Boden RA, Nuttal GH, Paton RW. A 14-year longitudinal comparison study of two treatment methods in clubfoot: Ponseti vesus traditional. Acta Orthop Belg 2011;77(4):522-8.
10. Owen RM, Kembhavi G. A critical review of interventions for clubfoot in low and middle income countries: effectiveness and contextual influences. J Pediatr Orthop B.2012; 21(1):59-67.
11. Bocahut N, Simon AL, Mazda K, Ilharreborde B, Souchet P. Medial to posterior release procedure after failure of functional treatment in clubfoot: A prospective study. J Child Orthop.2016; 10(2): 109-17.
12. Symeonidis P, Christodoulou A, Mareti E, Eleftherochorinou A, Gkourani S, Mbeslikas T, et al. Patient based long term results of the surgical treatment of congenital talipes equinovarus. Foot Ankle Spec 2016; 9(3):258-64.
13. Hosseinzadeh P, Peterson ED, Walker J, Muchow RD, Iwinski HJ, Talwalkar VR, et al. Residual forefoot deformity predicts the need for future surgery in clubfoot treated by Ponseti. J Pedaitr Orthop B.2016; 25(2):96-98.
14. Elgeidi A, Abulsaad M. Combined double tarsal wedge osteotomy and transcuneiform osteotomy for correction of resistant clubfoot deformity (the “bean shaped” foot). J Child Orthop 2014; 8(5): 399-404.
15. Chu A, Chaudhry S, Sala DA, Atar D, Lehman WB. Calcaneocboid arthrodesis for recurrent clubfeet: what is the outcome at 17-year follow up?. J Child Orthop 2014; 8(1):43-8.
16. Akinci O, Akalin Y. Medium term results of single-stage posteromedial release and triple arthrodesis in treatment of neglected clubfoot deformity in adults. Acta Orthop Traumatol Turc 2015; 49(2):175-83.
17. Chueire AJ, Carvalho Filho G, Kobayashi OY, Carrenho L. Treatment of congenital clubfoot using ponseti method. Rev Bras 0rthop 2016; 51(3):313-318.
18. Vo NQ, Huynh NM. Mid-term results of ponseti management for an idiopathic congenital clubfoot at a single center in Vietnam. J Pediatr Orthop B 2016; 25(3):253-7.
19. Mayne A, Bedawai AS, Beimi P, Garg NK, Bruce CE. The effect of dedicated Ponseti service on the outcome of idiopathic clubfoot treatment. Bone Joint J 2014; 96-B(10):1424-6.
20. Hallaj-Moghaddam M, Moradi A, Ebrahimzadeh MH, Habibzadeh Shojaie SR. Ponseti casting for severe clubfoot deformity: are clinical outcomes promising?. Adv Orthop 2015; 2015:821690.
21. Matuszewski L, Gil L, Karski J. Early results of treatment for congenital clubfoot using the Ponseti method. Eur J Orthop Surg Traumatol 2012; 22(5):403-6.
22. Niedzielski KR, Maleck K, Kosinska M, Lipczyk Z. Early results of congenital clubfoot using ponseti method. Chir Narzadow Ruchu Ortop Pol 2011; 76(5):247-51.
23. Porecha MM, Pamar DS, Chavda SR. Midterm results of Ponsti method for the treatment of congenital idiopathic clubfoot.(a study of 67 clubfeet with mean five year follow up-up). J Ortho Surg Res 2011; 12;6:3.