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Research Article

CONGENITAL TALIPES EQUINOVARUS-PONSETI METHOD OF TREATMENT AND PREDICTORS OF RECURRENCE

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ABSTRACT

Introduction- Current demand of CTEV treatment is to have a plantigrade, supple foot in minimum possible time. Ponseti method, involving serial casting and tenotomy, nowadays appears to be subserving these aims with best possible outcomes. This present study aims at evaluating children treated with Ponseti technique of treatment and early predictors of recurrence in such cases.

Methodology- A combined prospective and retrospective study of 192 patients with 292 clubfeet was conducted. Children with established recurrence and atypical cases of clubfoot were excluded. Assessment was done for development of recurrence of deformity with the help of Pirani score, dorsiflexion and external rotation. Dynamic supination component was also studied in all patients.

Results- Out of the 192 patients included in this study, 100 were bilateral (52 percent) and 92 were unilateral (48 percent). The number of casts required for achieving correction varied from 4 to 20 casts however less than 3 year of age group without any previous surgical intervention were corrected in <6 casts.

14 out of 154 (9%) idiopathic non operated patients developed recurrence in terms of lateral border on an average duration of 2 year follow up. Eight out of 20 (40%) syndromic cases and 5 out of 14 (35 %) operated cases showed recurrence collectively. The foot abduction was found to be reduced in children who presented with recurrence. In many children external rotation restriction was seen before actual equinus happens.

Conclusion- Ponseti's treatment is considered the gold standard for management of idiopathic clubfoot, however recurrences are known to occur even in the best possible situations. Most of the early recurrences can be managed with repeat casting.

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INTRODUCTION

Congenital Talipes Equinovarus (CTEV) or Clubfoot is one of the most commonly encountered congenital deformity in Paediatric Orthopaedics. The reported incidence is one in every thousand live births. Worldwide approximately one lakh new cases of clubfoot are added each year (Ponseti, 2003; Herring, 2002).

The aim of CTEV treatment is to have a plantigrade, supple foot in minimum possible time. Ponseti method, involving serial casting and tenotomy, nowadays appears to be subserving these aims with best possible outcomes. In Ponseti method of treatment a plaster cast is applied after each manipulation to retain the degree of correction and soften the ligaments. The displaced bones are thus gradually brought into the correct alignment with their joint surfaces progressively remodeled yet maintaining congruency. After two months of

manipulation and casting the foot appears slightly over-corrected. After a few weeks in splints however, the foot looks normal (Ponseti, 2003).

Three weeks following tenotomy the cast is removed and then a foot abduction brace (Steinbeek's brace) is applied to prevent relapse. For unilateral cases, the brace is 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 to hold the feet in dorsiflexion. 2 The brace should be worn full time (23 hrs a day) for the first 3 months after the last cast is removed. After that, the child should wear the brace for 12 hours at night and 2 to 4 hours in the middle of the day (nap time), for a total of 14 to 16 hours during each 24-hour period. This protocol continues until the child is 3 to 4 years of age. 1 Partial recurrence of clubfoot deformity occurs in about one third of feet and is often due either to poor compliance with the

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abduction orthosis or to delayed onset of treatment (Bradford, 1889). Early recurrence of deformity (within the first year) may be successfully salvaged by repeat manipulation and application of casts to stretch and correct any residual deformity (Harrold et al., 1983; Dimeglio et al., 1995).

The aim of this study was:

1. To look for features of early recurrence.
2. To do Pirani scoring and look for other clinical features to assess predictors of recurrence.
3. To assess norms of foot movement dorsiflexion and external rotation in normal child with confirmed date of birth.
4. To evaluate children treated for clubfoot after completion of treatment in St Stephen’s hospital.
5. To evaluate all children coming for follow up after full correction of deformity treated here or outside.

MATERIAL AND METHOD

A combined prospective and retrospective study of 192 patients with 292 clubfeet was conducted between August 2013 and December 2015 in the Department of Orthopaedics St. Stephen’s Hospital. All children affected with Congenital Talipes Equinovarus disease undergoing Ponseti method of correction or those coming for follow up after getting full correction of deformity were included in our study. Children with established recurrence and atypical cases of clubfoot were excluded.

All children included in this study were followed up, on weekly basis initially before achieving full correction of deformity, with the help of Catterall - Pirani scoring system and other clinical features like degree of external rotation, degree of dorsiflexion and dynamic supination. On every visit, the child underwent thorough assessment of foot followed by manipulation and casting by Ponseti’s manoeuvre. Later on after achieving full correction foot was kept in Steenbeek’s foot abduction brace initially full time for 3 months and later on at only nap time. On subsequent visits at 3 months, 6 months, 1 year and 2 year post correction, assessment was done for development of recurrence of deformity with the help of Pirani score, dorsiflexion and external rotation.

Dynamic supination component was also studied in all patients. Parents were enquired about total duration of brace wear, walking status of child, sleep pattern of child, the problems faced with brace wear.

RESULTS

In this study there were a total of 192 children, and among these there were 138 boys and 54 girls. Maximum number of children fell in the age group of 1-6 months with 61 children and smallest group was beyond 5 years of age. Which were 12 children in total. Hundred patients had bilateral clubfeet and 92 of which 51 had right side deformity and 41 had left deformity. Total number patients had unilateral clubfoot out of clubfeet was 192.

100 patients had bilateral clubfeet and 92 patients had unilateral clubfoot out of which 51 had right side deformity and 41 had left deformity. Hence total number of clubfeet studied was 292. Second order distribution. First order was 58 % and second order was 31 percent while 16 children were from third order group making it 8 percent, rest higher order contribution was 1 percent only.

Majority of children were of first and second order distribution. First order were 58 % and second order was 31% while 16 children were from third order group making it 8%, rest higher order contribution was 1% only.

Total of 192 patients, 20 patients syndromic group, 20 patients previously operated group and 4 patient were lost to follow up, a total of 154 patients of idiopathic nonoperated group average recurrence was 8 percent while for operated group it was 29 percent while 25 percent for syndromic group on mean 2 year follow up period. In idiopathic nonoperated group, the recurrence rate was significantly less as compared to operated group (8% vs 29%, p=0.007) and syndromic group (8% vs 25%, p=0.002) whereas operated group and syndromic group was comparable (29% vs 25%,p=0.697) (Table-1)

Medial crease was not altered in cases with recurrence of deformity as a medial crease is relatively fixed variable after primary correction of deformity. One forty six out of 154 idiopathic children gained zero score with Ponseti casting technique.

Table 1 Assessment of Lateral Border in patients.

Assessment Lateral Border (n=192)	Idiopathic Non-operated			Syndromic Group			Operated Group		
	Score 0	Score 0.5/1	Recurrence %	Score 0	Score 0.5/1	Recurrence %	Score 0	Score 0.5/1	Recurrence %
	At presentation	41	113	-	5	15	-	0	14
At brace prescription	148	6	-	20	0	-	12	2	-
3 month post correction	141	13	5	16	4	20	8	3	25
6 month post correction	124	30	16	14	7	28	6	4	33
1 year post correction	132	22	11	14	6	33	8	4	33
2 year post correction	142	12	4	15	4	20	9	3	25

Table 2 Assessment of Medial Crease in patients.

Assessment Medial Crease (n=192)	Idiopathic Non-operated			Syndromic Group			Operated Group		
	Score 0	Score 0.5/1	Recurrence %	Score 0	Score 0.5/1	Recurrence %	Score 0	Score 0.5/1	Recurrence %
	At presentation	7	147	-	2	18	-	5	9
At brace prescription	139	15	-	16	4	-	14	0	-
3 month post correction	141	13	-	15	5	-	13	1	-
6 month post correction	136	18	-	14	6	-	14	0	-
1 year post correction	138	16	-	15	5	-	14	0	-
2 year post correction	136	18	-	15	5	-	14	0	-

Recurrence among them was quite substantial initially. It was found to be higher in later follow up visits. syndromic and operated cases managed well after correction in terms of talar head coverage (Table-3).

assist families in this endeavor because lack of compliance with brace wear is the primary reason for recurrence of deformity and failure of this treatment method.

Table 3 Assessment of Talar head coverage in patients

Assessment Talar head coverage (n=192)	Idiopathic Non-operated			Syndromic Group			Operated Group		
	Score	Score	Recurrence	Score	Score	Recurrence	Score	Score	Recurrence
	0	0.5/1	%	0	0.5/1	%	0	0.5/1	%
At presentation	0	154	-	2	18	-	6	8	-
At brace prescription	146	8	-	14	6	-	12	2	-
3 month post correction	152	2	-	15	5	-	13	1	-
6 month post correction	150	4	-	12	8	-	12	2	-
1 year post correction	141	13	-	13	7	-	11	3	-
2 year post correction	143	11	-	12	8	-	11	3	-

Table 4 Assessment of Rigid equines in patients.

Assessment Rigid equines (n=192)	Idiopathic Non-operated			Syndromic Group			Operated Group		
	Score	Score	Recurrence	Score	Score	Recurrence	Score	Score	Recurrence
	0	0.5/1	%	0	0.5/1	%	0	0.5/1	%
At presentation	0	154	-	2	18	-	0	14	-
At brace prescription	141	13	-	18	2	-	11	3	-
3 month post correction	129	25	9	6	14	33	9	5	19
6 month post correction	134	20	5	5	15	28	8	6	31
1 year post correction	132	22	13	3	17	17	7	7	43
2 year post correction	126	28	11	4	16	22	8	6	31

None of the idiopathic nonoperated child presented with score zero.141 out of 154 idiopathic child attained score zero on completion of treatment .average recurrence observed was 9.5 %which was higher in syndromic group 25 percent and 31 percent in operated group. In idiopathic nonoperated group, the recurrence rate was significantly less as compared to operated group (10% vs 25%, p=0.034) and syndromic group (10% vs 31%, p=0.006) whereas operated group and syndromic group was comparable (25% vs 31%, p=0.496) (Table-4).

Infants are often irritated when transitioned from casts to the shoes because their feet are not used to being touched. Because poorly fitting shoes can cause blisters, we recommend that the shoes be removed and the feet examined several times a day for the first week (Dobbs *et al.*, 2004).

On observation we found that Relatively irreversible deformity which do not correlate with recurrence of deformity On observation we found that Relatively irreversible deformity which do not correlate with recurrence of deformity (Table-5).

Geoffrey *et al.*, Crawford, in a research article clearly mentioned that Compliance with the post correction abduction bracing protocol is crucial to avoid recurrence of a clubfoot deformity treated with the Ponseti method. When the parents comply with the bracing protocol, the Ponseti method is very effective at maintaining a correction, although minor recurrences are still common (Geoffrey *et al.*, 2007)

Table 5 Assessment of External rotation in patients

Assessment External rotation (n=192)	Left		Right	
	Mean ± SD	Min - Max	Mean ± SD	Min - Max
3 months	29.53 ± 6.93	15 – 45	27.20 ± 7.77	10 – 45
6 months	22.27 ± 6.74	10 – 40	22.60 ± 6.64	10 – 40
1 year	23.27 ± 5.60	10 – 40	20.60 ± 6.19	10 – 35
2 year	20.73 ± 6.19	10 – 35	17.60 ± 5.54	10 – 30

DISCUSSION

Patients on clubfoot treatment need to be on long term follow up and maintenance of brace to prevent recurrence of deformity. In Ponseti’s own series before the 1980’s the recurrence rate was upto 48 percent in the first year after correction of deformity30. These figures improved only after brace protocols were changed to continue brace for 3-5 years.

Relapse and recurrence of an already corrected clubfeet is quite understudied part of this disease which aids significant morbidity in community. The speed of growth of the foot decreases after the first year of life, diminishing greatly after five years. Relapses occur swiftly in premature infants and more slowly in older infants. Relapses are less common and less severe in mild club feet with little fibrosis and in children with loose ligaments. They occur because the factors inducing the deformity are still active. Relapses are rare after four years of age (Westhoff *et al.*, 2013).

Morin *et al.* quoted that A positive, rather than a negative communication style, emphasis on the brace as the most important aspect of treatment, and a more culturally sensitive family education paradigm, resulted in a lower rate of deformity recurrence when treating children with clubfeet using the Ponseti method (Morin *et al.*, 2013). Dobbs *et al.* illustrated that Difficulty can be encountered in maintaining compliance with orthosis wear. Every effort should be made to

Ponseti’s treatment is considered the gold standard for management of idiopathic clubfoot, however recurrences are known to occur even in the best possible situations. Several factors contribute to recurrence rates. This dissertation looked at a prospective series of patients that presented to our hospital in the period of august 2013 to December 2015. And evaluated the outcome specifically looking for factors responsible for early recurrences. 192 cases were seen in this study period. Among these 92 cases were idiopathic untreated cases while 80 cases were idiopathic but has treatment elsewhere in the form of cast correction or surgical intervention. 20 cases were identified to be of syndromic origin. Full correction was achieved in all cases of clubfoot except 4 lost to follow up cases. The shortest follow up period was 6 months while the

largest follow up was of 26 months. We encountered wide spectrum of age group in our study. 135 cases were of less than 1 year of age, while 1-2 year age group cases were 21. 24 cases were between 2-5 year of age along with 12 cases beyond 5 year of age.

All of the patient required 7.23 casts for initial correction of deformity, Idiopathic clubfoot could be corrected with 5-6 casts on an average. The Tenotomy rate was 93 percent In idiopathic group. Highest numbers of casts required were in previously treated cases upto 20 especially those already had surgical intervention (average 12 casts) The most common and earliest recurrence seen was that of equinus seen in 9.5 percent of idiopathic cases while that recurrence in syndromic and operated group was 25 percent and 31 percent of cases. The second earliest recurrence found was reappearance of curvature of lateral border which was 9 percent in idiopathic group on an average follow up of 2 year duration while in syndromic group that was 25 percent, operated children showed reappearance of lateral border in 29 percent. The most common reason for recurrence was poor compliance of brace, families giving varying reason for it. Pirani score was useful in older patients though as per literature it is not valid for older patients. Medial crease, Empty heel, Posterior crease were not reversed significantly in our case study.

Most of the early recurrences could be managed with repeat casting. Average 3 casts. 28 percentage required redo tenotomy. Dynamic supination was seen in 37 percent of cases of recurrences. Tibialis anterior tendon transfer was done in 2 patients External rotation was found significantly reduced in cases of recurrence which was evident by unilateral cases having different external rotation of normal and affected sides.

CONCLUSION

Current demand of CTEV treatment is to have a plantigrade, supple foot in minimum possible time. Ponseti method, involving serial casting and tenotomy, nowadays appears to be subserving these aims with best possible outcomes. Ponseti's treatment is considered the gold standard for management of idiopathic clubfoot, however recurrences are known to occur even in the best possible situations. Most of the early recurrences can be managed with repeat casting.

References

1. Bradford EG (1889). Treatment of club-foot. *J Bone Joint Surg Am* 1-1:89-115.
2. Dimeglio A, Bensahel H, Souchet P, Mazeau P, Bonnet F (1995). Classification of clubfoot. *Journal of Pediatric Orthopaedics B* 4(2):129-36.
3. Dobbs MB, Rudzki JR, Purcell DB, Walton T, Porter KR, Gurnett CA (2004). Factors predictive of outcome after use of the Ponseti method for the treatment of idiopathic clubfeet. *The Journal of bone and joint surgery (Am)* 86-A(1):22-7.
4. Haft GF, Walker CG, Crawford HA (2007). Early clubfoot recurrence after use of the Ponseti method in a New Zealand population. *The Journal of bone and joint surgery (Am)* 89(3):487-93.
5. Harrold AJ, Walker CJ (1983). Treatment and prognosis in congenital clubfoot. *J Bone Joint Surg* 65B:8-11
6. Herring JA (2002). Tachdjians Pediatric Orthopaedics: Congenital Talipes Equinovarus. *WB Saunders Co.*
7. Morin ML, Hoopes DM, Szalay EA (2014). Positive communication paradigm decreases early recurrence in clubfoot treatment. *Journal of Pediatric Orthopaedics* 1;34(2):219-22..
8. Ponseti IV (2003). Clubfoot: Ponseti Management. *Global Help Publications.*
9. Westhoff B, Weimann-Stahlschmidt K, Krauspe R (2013). Treatment of recurrent clubfoot and residual deformities after congenital clubfoot. *Der Orthopade*.42(6):418-26.

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