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Comparison of Accelerated method of casting for correction of clubfoot with standard ponseti method.

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ABSTRACT… Objective: To see the results of accelerated method against standard Ponseti method for correction of clubfoot by using Pirani scoring system. **Study Design:** Randomized controlled trial. **Setting:** Children's hospital and the institute of child's health, Lahore. **Period:** June 2019 Dec 2019. **Material & Method:** 100 patients included in this study and divided into two groups. In group A (50 patients) correction was done by standard Ponseti method while accelerated method was applied in group B(50 patients). Weekly serial casting was done in group A while twice weekly in group B. Assessment was done by Pirani scoring system in both groups at beginning of correction, at each cast and at end of correction. **Results:** Average casting time for group A was 38 days while it was 20 days in group B. Correction rate was 94% in group A and 89% in group B. This difference was not found to be statistically significant (p=0.396). **Conclusion:** Accelerated method is applicable for correction of clubfoot because treatment time is shorter and results are similar to standard Ponseti method. Hence, this method should be adopted in Pakistan so that poor and rural parents can easily manage travel and financial issues because only 2 to 3 weeks are required for whole casting treatment.

Key words: Accelerated Method, Clubfoot, Standard Ponseti Method.

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INTRODUCTION

Congenital talipes equinovarus (CTEV) deformity is a common foot deformity also known as clubfoot .Its incidence is 1 to 2 in 1000 live birts.[1] This deformity is 2.5 times more common in boys as compared to girls.[2] This deformity has four components: cavus at midfoot, adductus at forefoot, varus at hindfoot and equinus at ankle (CAVE).[3] There are various classification systems used to describe this deformity but more informative and useful is that of Pirani.[4]

Treatment of clubfoot should be started as early as possible by serial manipulation and casting.[5] Correction of clubfoot by Ponseti method is now gold standard treatment.[6] In Ponseti method, every week above knee plaster is applied after manipulation of deformity. Sequence of correction is first correction of cavus by elevating the first ray and then adductus and varus simultaneously by abducting the foot and finally equinus by percutaneous tendo Achilles tenotomy. Each cast is removed after one week but last cast (if percutaneous tendo Achilles tenotomy is done) removed after three weeks. Percutaneous tendo Achilles tenotomy is not always required.[7] The surgery requirement is reduced up to 98% of cases after this non-surgical Ponseti method.[8]

There are many problems with weekly plaster change and total duration of treatment required in standard Ponseti method: 1. Parents have to travel long distance to reach foot clinic, 2.Total duration of treatment may take months and it causes disturbance in family life, 3.Poor parents cannot afford transport expenses and 4.It is very difficult for illiterate parents to keep a plaster dry and clean for a week and hence there are chances of loss of position.

The aim of our study is to change plaster twice weekly because: 1. It results greater compliance from parents, 2. It reduces total duration of treatment (only three weeks) and hence has no

disturbance to family life, 3. It reduces expenses of travelling and 4. It also eliminates plaster problems and hence loss of position of foot.

MATERIAL & METHODS

This study was conducted at dedicated foot clinic of the Children's hospital and the institute of child's health, Lahore during June 2019 Dec 2019. Approval was taken from institutional ethical committee. There were total 100 patients included in this study. Our inclusion criteria were children from birth to six months. All children with neuromuscular and syndromic problems were excluded from study. Group A patients feet (50 patients and 70 feet) were corrected by standard Ponseti method of applying cast weekly. Group B patients feet (50 patients and 74 feet) were manipulated by accelerated method of applying cast twice weekly. The last cast was kept for three weeks in both groups if percutaneous tendo-Achilles tenotomy done for equinus. Pirani score was measured at initiation of correction, at each cast and at end of correction in both groups. We manipulated feet for two minutes before applying each cast in each group. Percutaneous tendo-Achilles tenotomy was done under local anesthesia in a special room allocated in Operation Theater. Locally made shoes with bar were applied after correction of feet,70 degrees abduction on affected side and 40 degrees abduction on normal side. There was a strict advice to parents regarding wearing of shoes, 23 hours in a day for first three months and then during night and sleep time during day for four years. Both groups were treated by same team and also followed by same team. We recorded all data on a performa including biodata, Pirani score at beginning, at each cast and at end, number of casts required, total duration in days, percutaneous tendo-Achilles tenotomy required or not and any complications.

RESULTS

Total number of patients and feet were 100 and 144 in group A and group B respectively. Male were 28 while female 22 in group A and in group B, male were 27 and female 23.20 Patients had bilateral clubfoot in group A and 23 in group B. Mean age at presentation was 2.4 months in group A and 2.7 months in group B. Pirani score in group A at beginning of treatment was 4.9 and 0.5 at beginning of treatment and at end of treatment respectively. Group B had 4.9 Pirani score at beginning of treatment and 0.525 at end of treatment. Average number of casts required were 6.55 in group A while 6.99 in groupB.70% percutaneous tendo-Achilles tenotomy was done in group A and 80% in group B (Table-I).

Correction of foot is graded into excellent, good and poor on basis of Pirani score at end of treatment (Table-II). Group A had 56 feet in excellent grade and 14 feet in good grade.54 feet in group B had excellent grade while 20 feet in good grade. No single foot was in poor grade in either group.

There was no difference in Pirani score at end of treatment in both groups.

	Group A	Group B
Total no.of patients(feet)	50(70)	50(74)
Male	28	27
Female	22	23
Bilateral	20	22
Mean age at start of treatment	2.4 months	2.7 months
Pirani score at beginning	4.9	5.35
Pirani score at end	0.5	0.525
Total no. of casts	6.55	6.95
Tenotomy required	70%	80%

Table-I. Findings.

Excellent	Pirani score<1
Good	Pirani score1-2
Poor	Pirani score>2

Table-II. Grading.

DISCUSSION

The clubfoot deformity is a congenital foot problem. The gold standard treatment of clubfoot is casting by Ponseti method. Weekly casting is done in Ponseti method but now different accelerated methods developed for casting due to long treatment duration. Some of these methods are: Every 5th day casting, twice a week casting, thrice a week casting and even four times a week

casting but most common and effective method is twice weekly casting.

There are many studies where twice weekly casting done. A study by Barik, Nazeer and Mani[9] showed that accelerated method of casting helps to increase compliance and to reduce travel and treatment costs. Functional outcome after 5-year follow-up is same in both standard Ponseti and accelerated Ponseti methods.

In a local study by Ullah, Inam and Arif[10] concluded that accelerated casting method has equal effectiveness in short period of time as compared to standard Ponseti method. Another local study results showed that accelerated casting method is a reliable alternative to standard Ponseti method for treating clubfoot in a short period of time with similar results.[11]

An important study reinforced our study results that change of weekly casting schedule to twice weekly may be near future trend in developing countries like Pakistan and India for correction of clubfoot.[12] A Nigerian study showed that accelerated method has no problems especially swelling of foot after correction.[13] Mageshwaran et al[14] paper depicted that accelerated casting method has following advantages: 1. Less number of days in plaster, 2. More rapid correction and 3.Results are same. Evans et al[15] 'fast cast' casting method was preferred by the parents because of faster treatment and to see child's foot skin. The physiotherapists also found it favourable because of less complications like joint stiffness, skin sores, and muscle wasting.

Our study also showed that accelerated casting method is as effective as standard Ponseti method.

Some studies done where correction of foot achieved by casting thrice a week. Solanki, Ajmera and Rawat[16] paper concluded that this accelerated method is good because patient remains under close contact of treating doctors and hence, complications are noticed easily and early. Moreover, this technique is more, beneficial, practical and time-saving for illiterate poor parents especially of rural areas.

Harnett et al[17] study results favoured that similar and good correction can be obtained by accelerated casting method where all components of clubfoot are manipulated thrice weekly. Sahu, Rajavelu and Tudu[18] results are also encouraging because accelerated casting helps in early correction of foot deformity and better compliance by the parents.

Every 5th day casting instead of 7th day casting is another way of accelerated method. Morcuende et al[19] conducted a study of 230 patients including 319 feet during a period of 11 years. The results found equally effective in accelerated group (5-day interval) and standard group (7-day interval). Harshwardhan and Kumar[20] concluded that accelerated casting method is an effective method that produces mobile, painless, plantigrade and flexible foot in a relatively short period of time as compared to standard Ponseti method. Moreover, this method is a safe, result-oriented and easy for remote areas of a developing country.

This study has limitations. It was a prospective randomized controlled study that compared accelerated casting method with standard Ponseti method and follow-up is very short so relapse cases cannot be estimated.

CONCLUSION

Accelerated method is applicable for correction of clubfoot because treatment time is shorter and results are similar to standard Ponseti method. Hence, this method should be adopted in Pakistan so that poor and rural parents can easily manage travel and financial issues because only 2 to 3 weeks are required for whole casting treatment.

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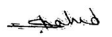
AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Farhad Alam	Collected & Interpreted data from pediatric orthopedic department and final revision of data.	
2	Abdul Latif Shahid	Contributor for concept and design analysis and interpretation of data.	
3	Islam Hussain	Review article.	
4	Abdul Latif Sami	Important intellectual contant.