Outcome of Patients Suffering From Congenital Idiopathic Club Foot: A Comparative Analysis of Using Classical Versus Accelerated Ponseti Techniques

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ABSTRACT

Objective: To compare the mean (days) required for correction of deformity by using classical versus accelerated Ponseti techniques in patients with congenital idiopathic clubfoot.

Methods: It was a Randomized controlled trial conducted in General Orthopaedic Ward Ghurki Trust Teaching Hospital affiliated with Lahore Medical & Dental College, Lahore. The Study was carried out over a period of six months from 25-07-2017 to 24-1-2019.The total number of patients were 80 (40 patients in each group) in this study. Group-A was treated with Standard Ponseti (SP) method and group-B was treated with accelerated Ponseti.

Results: Patients mean age was 1.6.±0.79 and 1.58±0.79 months in Group A and Group B, respectively. In Group A, 24 patients (60%) and in Group B 18 patients (45%) were males while 16 patients (40%) in Group A and 22 patients (55%) in Group B were females. Comparison of mean time (days) required for correction of deformity were 36.88±5.11 days and 20.73±3.40 in Group A and Group B respectively with p value <0.05.

Conclusion: The Accelerated form of Ponseti technique is a very effective way for managing patients with congenital club foot.It reduces the duration of total casting without any effect on outcome as compared to classical method of ponseti.

Key words: Congenital idiopathic clubfoot, Standard Ponseti, Accelerated Ponseti.

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INTRODUCTION

Congenital club foot is a vey common condition in children with a reported frequency of 1/700 – 1/1000 liveborns.[1] This condition is so called Congenital Talipes Equinovarus(CTEV) because the hindfoot is in equines, mid foot in cavus and fore foot in adduction as well as varus.[2] Majority (80%) of club feet are presented as isolated deformity and are idiopathic in nature.[3] A club foot is considered as resistant when the deformity persists inspite of 3 months conservative management.[4] Different hypothesis were made regarding occurrence of this condition like vascular abnormalities, abnormal muscular insertion, environmental factors such as in utero malpositioning as well as genetic factors.[5] The initial manipulation method and cast application was described by Kite's and later on modified by Ponseti.[6] Nowadays the ponseti method is gold standard which is based on weekly based plaster change.[7]

Regarding outcome after intervention for Club foot, it can be assessed through different ways. Chesney[8] was of opinion that the patient itself can assessed himself whether he has a well foot or not. Ponseti technique has been reported to produce excellent long term results in children with club feet.[9]

The main purpose of this study was to compare the mean (days) required for correction of deformity by using classical versus accelerated Ponseti techniques in patients with congenital idiopathic clubfoot.

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METHODS

This Randomized controlled trial was conducted at General Orthopedic Ward of Ghurki Trust Teaching Hospital affiliated with Lahore Medical & Dental College, Lahore from 25-07-2017 to 24-1-2019.The

sample of 80 (40 patients in each group) was calculated with a 95% confidence level, and a power of 80% and taking expected mean ±SD of days needed to correct the deformity in both groups i.e. 33.4±6.7 days in classical ponseti techniques vs 18.1±3.02 days in the accelerated ponseti techniques. Patients of either gender with congenital idiopathic clubfoot having Pirani score of 6(as per operational definitions) and age from birth to 3 months were our inclusion criteria. An informed written consent form the patients or guardian was obtained. Patients with clubfoot deformity secondary to neuropathic and syndromatic e.g polio, cerebral palsy, arthrogryposis multiplex congenital (AMC syndrome) and spina bifida were not included in our study.

All patients admitted through OPD fulfilling the inclusion criteria were enrolled in our study. After taking a written informed consent from all the parents or guardians and approval from ethical committee their demographic information including name, age, sex, address, date of admission was recorded. The included patients were allocated randomly into Group A or Standard Ponseti (SP) method group and Group B or Accelerated Ponseti (AP) method group. The children were selected randomly using lottery method.

Selected children in SP group were given casting by Ponseti technique for one week while in the AP group casting was applied for 5 days. In both the groups the technique of Ponesti was the same. In the initial cast cavus and pronation was corrected by dorsiflexing the first ray. In next casts forefoot adduction was correcting by abducting medial part of forefoot and counter over head of talus. Pre cast Pirani scoring and post cast Pirani scoring were recorded for both groups. Individual components of the Pirani score were rated as 0(normal) 0.5(moderate) and 1(severe) as given in proforma. On each visit, cast was removed, the foot was examined and Pirani score recorded. The castings were continued up to four weeks for accelerated group and six weeks for traditional group and outcome was assessed by Pirani score. A fall in the score of each component from 1 to 0 or sum of the scores from 6 to 0 was recorded. If any extra cast was needed it was reported in the proforma. Outcome was measured in terms of time required (days) to achieve correction in each patient.

All the data was recorded in the proforma and statistical analysis was done with SPSS(Version 17).All the qualitative variables such as gender, was represented as percentage while all the quantitative variables like duration in days in both groups and Pirani score was presented as mean and standard deviation. The mean number of days required for foot corrections in both groups were compared using Independent sample t test. A P value was considered significant when< 0.05.

RESULTS

In our study the total number of patients were of 80 (40 patients in each group) and study extended from 25-07-2017 to 24-1-2019.The included patients were allocated randomly in to Group A which was the Standard Ponseti (SP) method group and Group B which was the Accelerated Ponseti (AP) method group.

Patients mean age was 1.6.±0.79 and 1.58±0.79 months in Group A and Group B, respectively (Table I). In Group A a total of 24 patients (60%) and in Group B 18 patients (45%) were males while 16 patients (40%) in Group A and 22 patients (55%) in Group B were female children (Table II). A comparative analysis of the mean time (days) required for correction of deformity shows 36.88±5.11 days and 20.73±3.40 days mean time in Group A and Group B, respectively) with p value p<0.001 (Table III).

Table I: Age distribution of patients

Pt. Age (Month)	Group A (Standard Ponseti)		Group B (Accelerated Ponseti)	
	NO.	%	NO.	%
< 1	21	52.5	22	55.0
2-3	19	47.5	18	45.0
Grand Total	40	100	40	100
Mean ±SD	1.6.±0.79		1.58±0.79	

Table II: Gender distribution of patients

Gender	Group A (Standard Ponseti)		Group B (Accelerated Ponseti)	
	NO.	%	NO.	%
Male	24	60	18	45
Female	16	40	22	55
Total	40	100	40	100

Table-III: Comparison of mean time (days) required for correction of deformity

Group	Mean	SD	P value
Group-A (Standard Ponseti)	36.88	5.11	P<0.001
Group-B (Accelerated Ponseti)	20.73	3.40	

DISCUSSION

The natural history of treatment of Congenital club foot has been modified a lot during past last 10 years. Initially, extensive surgery was main modality of treatment. Nowadays, the Ponseti Technique has been the gold standard, which include only serial casting without any major surgical intervention.[10] Although outcome studies of accelerated Ponseti technique in idiopathic congenital clubfoot are available but studies on syndromic clubfoot and complex club foot are not yet done.[11,12]

Traditional Ponseti technique, which included weekly base change of cast, was modified and Now Accelerated Ponseti technique is gaining popularity because of decrease in interval between casts without any adverse effect on final results. In our study ,we similarly found that Accelerated ponsetti technique is favourable than traditional ponseti technique for management of CTEV. Literature is full of different techniques for managing these patients and currently most of literature is on the interval between casting and more literature now in favor of decreasing interval between casts in managing clubfoot correction.[13-16]

Solanki[7] did a compare study between the traditional Ponseti casting technique and Accelerated Technique and reported same number of casts in both technique. However, tendoachilles tenotomy was required in 55% in traditional group patients while it was 65% in accelerated group. Morcuende[16] a retrospective analysis of such patients managed with Ponseti technique and accelerated technique and found that there is no change in outcome of management in both groups.They found that acceleration of more than 5 days can cause problems like swelling of fingers. On other hand Harnett[13] did a study on further acceleration of casting like 3 times a week and got equal results but they didn't mentioned problems with these accelerated technique which was mentioned by Morcunde. Our final results were also comparable to the results published by Harnett.[13]

The main disadvantages of traditional ponseti technique is long duration of treatment ,which is not suitable for families who came from from remote areas causing increasing economic burden on families and increasing absency from working hours.[17] Accelerated technique on other hand can overcome these problems and increase the compliance of the patients. The patients in accelerated technique can be admitted until last cast and tenotomy of the patients if required. More advantages of this technique are decrease skin issue, more hygienic ,less chances of osteopenia and increase in motor development. [18]

There are several limitations of our study. We did not compare the complications and total number of casts both the groups. Moreover, the number of patients in both groups were less in number.We recommend further studies for better results in our setup .

CONCLUSION

The Accelerated form of Ponseti technique is a very effective way for managing patients with congenital club foot. It reduces the duration of total casting without any effect on outcome as compared to classical method of ponseti.

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Authorship and contribution Declaration

Jamil Ahmed, Conception and design of the study
Subhan Shahid, Data collection
Waqar Alam, Drafted the manuscript
Ashfaq Ahmed, data collection
Haseeb Hussain, Drafted manuscript
Rizwan Akram, Revised the manuscript critically for important intellectual content
Amer Aziz, Final approval of the version for publication