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ORIGINAL ARTICLE

Effectiveness of Ponseti Technique in Treatment of Idiopathic Clubfoot in age of 2 to 5 Years

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ABSTRACT

Objective To evaluate effectiveness of Ponseti technique in treatment of clubfoot in children from 2 years to 5 years of age

Material and methods: Our study is Descriptive case series done at Department of Orthopedic Surgery, SMBBMU, Larkana, from April 15, 2019 to October 14, 2019. Patients fulfilling inclusion criteria attending Ponseti clinic of SMBBMU, Larkana were incorporated in our study. After getting consent, procedure was explained in detail with merits and demerits. Treatment was labeled effective if Pirani score after treatment ≤1/6. Bracing phase with Dennis Brown shoes was started for maintenance of the corrected foot after post tenotomy cast removal. Data was collected and entered into the performa attached.

Results: Mean and standard deviation for age was 4.08±2.17 years. Among 71 patients, 48 (67.6%) patients were male and 23 (32.4%) were female. Positive family history was found to be in 8 (11.26%) patients. Modes of delivery shows that 46 (64.8%) patients had gone through C-Section while 25 (35.2%) had normal vaginal delivery. Efficacy of Ponseti technique was noted in 52 (73.2%) patients.

Conclusion: From the studies it was shown that Ponseti technique for club foot in both presenting earlier or late is safe and effective.

Keywords: Clubfeet, Congenital Talipes Equinovarus, Ponseti Technique, Pirani Score.

INTRODUCTION

Congenital clubfoot is a "abnormality considered as group of poor alignment of foot bone and soft tissue region, with hindfoot equinus and varus deformity along with midfoot and forefoot cavus and adductus" [1]. It is most common congenital deformities [2]. Which affects 1 in 1000 newborn babies, it is twice common in boys and mostly bilateral deformity is seen in 50% of patients [3-4]. Incidence varies in different populations, 0.39 per 1000 in Chinese, 1 to 3 cases per 1000 in Caucasians and 7 in 1000 live births in Hawaiians [5]. This deformity may occur in isolation as in idiopathic clubfoot or along with other congenital anomalies in which case, it is called syndromic clubfoot [6]. Clubfoot treatment dates back to Hippocrates in 5th century BC and various treatment modalities have been proposed since then. Mostly noted soon after birth and different methods of treatment available are Kite technique, French method, Ponseti method, Ponseti modification etc [6]. Surgery is considered the main treatment modality for clubfoot management in children above 2 years of age. The basic goal of treatment is to achieve soft, supple and pliable feet. The rate of radical surgery in the treatment of clubfoot has largely decreased with the introduction of Ponseti technique [7]. Some people treat clubfoot in older children with Ponseti technique [8]. Ponseti management of clubfoot has evolved as the main treatment modality for clubfoot management in the last decade [9].

The upper age limit for the correction of clubfoot by Ponseti technique is very much debated and recent work in different countries has shown very promising results, supporting the validity of Ponseti technique even in children over 2 years of age. Study by Morcuende in 2007 showed its

success in older children, being effective in 94.11% [10]. Estimated proportion of effectiveness is 86.4%.

Rationale: Despite enough awareness, the improper management with relapse of abnormality is increasing day by day in our society mostly in remote areas. Due to early recognition most of times patients are treated conservatively. Results used to measure late-presenting cases not yet clear. Our recent and national literature is lacking in conservative management of club foot specially in neglected cases so this study is conducted to assess the efficacy of Ponseti method of treatment in idiopathic clubfoot in children between 2 to 5 years of age. Based on the result of this study we will be able to provide an efficient and pragmatic clinical tool for treatment decision of clubfoot. And this will help the orthopedics in decision making regarding the type of surgical procedure in such patients.

MATERIAL AND METHODS

Our study is Descriptive case series done at Department of Orthopedic Surgery, SMBBMU, Larkana, from April 15, 2019 to October 14, 2019. Patients fulfilling inclusion criteria attending Ponseti clinic of SMBBMU, Larkana were incorporated in our study. After getting consent, procedure was explained in detail with merits and demerits. While patient with syndromic and neurological club foot were excluded from this study. Informed consent was taken after explaining the procedure, risks and benefits of the study. On the first day, proforma was filled and Pirani score was calculated for the clubfoot. Pirani score was used to assess

the severity of deformity; deformity was severe with higher score. Score ranged from 0-6. There were total six scoring signs each scored 0 (normal), 0.5 (mild) and 1 (severe). Of these scoring signs three signs were of mid foot (curved lateral border, medial crease, talus head coverage) and three signs were of hind foot (posterior crease, rigid equinus, empty heal). After calculation of Pirani score ponseti treatment was started. After gentle manipulation of foot POP (plaster of Paris) cast was applied keeping the foot in supination. Patients were discharged home after being sure that their parents had understood the advice on plaster care. Cast was changed after one week and another cast was applied for a period of one week again keeping the foot in abduction and supination. Once there was the correction of cavus, adductus and varus deformity, tenotomy of tendoachilles was done for correction of residual equinus in selected cases. Cast was applied for a period of 3 weeks after tenotomy. After removal of post tenotomy cast Pirani score was calculated again. Treatment was labeled effective if Pirani score after treatment becomes 1/6 or less than 1/6 and it was labeled as not effective if Pirani score after treatment was above 1/6. Bracing phase with Dennis Brown shoes was started for maintenance of the corrected foot after post tenotomy cast removal. All the procedure was performed under the supervision of consultant > 5 years of experience. Data was collected in terms of age, gender, side affected, Pirani score at start of treatment and at the end of treatment, previous treatment, total number of casts till AMP correction, tenotomy (yes/no), family history (yes/no), mode of delivery (caesarian section or NVD), outcome variable (effective/not effective) and complications. Data was analyzed on SPSS version 22. Mean and SD were calculated for quantitative variables as age, Pirani score at start of treatment and at the end of treatment. Frequency and percentage were calculated for gender, previous treatment, family history (yes/no), mode of delivery and outcome variables (effective/not effective). Effect modifiers were controlled for age, gender, family history, mode of delivery, previous treatment and Pirani score at the start of treatment to see their effect on the outcome by using chi-square test, keeping $P < 0.05$ as significant.

RESULTS

In our study 71 patients were added of club foot in children from age 2 to 5 years and the results were analyzed as: Mean ± SD of age was 4.08±2.17 with C.I (3.56……4.59) years as shown in TABLE 1. Mean ± SD of pirani score at start of treatment was 3.75±1.14 with C.I (3.48…….4.01) as shown in TABLE 2. Mean ± SD of pirani score at end of treatment was 0.79±0.58 with C.I (0.64…….0.91) as shown in TABLE 3. Efficacy of ponseti technique in the treatment of club foot was noted in 52 (73.2%) in patients as shown in FIGURE 7

DISCUSSION

Club foot is congenital anomaly affecting either gander of both developed and developing nations equally, yet etiology is not well known. Its prevalence is 2% and since late ninety's ponseti technique is gaining popularity worldwide due to its effectiveness and economical. Ponseti is generally considered excellent for club foot.[1] Our study results shown that even neglected club foot can be managed safely on conservative management with ponseti but recurrence can occurs after keeping patient on prolong follow up. In our study group it was also that as age increases it was very much demanding to calculate Pirani score both prior and after treatment. It was also noted that as age advances, bone region of hind foot especially calcaneus become more prominent because of change in posterior crease and fart pad, leading to normalization even in severe abnormality of equinus. Because of such changes feelings of empty heal and the posterior crease become decrease reliability with advance age. Actual treatment of untreated club foot is surgery but it is very much costly, demanding, need expertize and not free of complications.[92,11] Many surgeons used Ilizarow technique as salvage method for untreated club foot patients with delayed presentation.[93,12] But it is also costly, demanding require expertly and never the less with associated complications. Treating such types of complicated club foot require regular follow up to monitor degree of correction. In such patients instead of short we used longer intervals of follow up between the casts than used in standard method. This leads to stretching of the soft tissues, as these tissues have lost their elasticity with advancing age. In our study group we manipulated and casting was performed every 2 times in month to allow proper remodeling and reducing tissue edema. In study of Spiegel he has used casting every week and he got good results. While on other hand our results with Ponseti method shows excellent results more upto mid foot but as we go posteriorly effectiveness decreases and even less results with advancing age. We also used same technique of recasting even in recurrent cases with or without retenotomy of the Achilles tendon. In our study, the mean age was found to be 4.08±2.17 years. Our study can be compared with results of Shah MQ, et al.[90,13] which reported the mean age of the patients was 10.28±7.45. In a study done by Jamil M, et al.[91,14], the mean age was reported as 5.24±2 years. In present study, the mean pirani score at start of treatment was 3.75±1.14 whereas at end of treatment, it was noted as 0.79±0.58. Jamil M, et al.[91,14] also reported the mean pirani score of 5 in his study. In this study, 71 patients were included, out of which 48 (67.6%) patients were male and 23 (32.4%) were female. In a study conducted by Shah MQ, et al. [90,13,] there were 87 (49.2%) male and 83 (46.9%) female patients out of total 177 patients. In a study reported by Jamil M, et al.[91,14], of 28 patients, 17 (60.7%)were male and 11 (29.3%) were females. In our study, previous treatment of 58 (81.69%) patients was found. In current study, family history was found to be in 8 (11.26%) patients.

Our study reported that the modes of delivery shows that 46 (64.8%) patients had gone through C-Section while 25 (35.2%) had normal vaginal delivery. In our study, efficacy was reported in 52 (73.2%) patients. Overall limitations of our study were that it was hospital based and we were not completely known regarding severity of disease.

CONCLUSION

From the studies it was shown that Ponseti technique for club foot in both presenting earlier or late is safe, economical and effective.

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TABLE # 1
DESCRIPTIVE STATISTICS OF AGE
n=71

MEAN	4.08 (Years)
±STANDARD DEVIATION	2.17
95% CONFIDENCE INTERVAL	3.56.....4.59
MINIMUM	2
MAXIMUM	5
RANGE	3

TABLE # 2
DESCRIPTIVE STATISTICS OF PIRANI SCORE AT START OF TREATMENT
n=71

MEAN	3.75
±STANDARD DEVIATION	1.14
95% CONFIDENCE INTERVAL	3.48.....4.01
MINIMUM	0
MAXIMUM	6
RANGE	6

TABLE # 3
DESCRIPTIVE STATISTICS OF PIRANI SCORE AT END OF TREATMEN
n=71

MEAN	0.79
±STANDARD DEVIATION	0.58
95% CONFIDENCE INTERVAL	0.64.....0.91
MINIMUM	0
MAXIMUM	6
RANGE	6

FREQUENCY OF EFFICACY
n=71

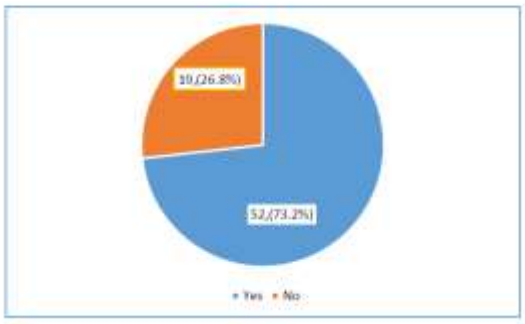

Figure 1