Original Article

Management of Congenital Club Foot

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Abstract

Aims and Objectives: To determine the effectiveness of Ponseti technique with the kite method in the management of congenital club foot. **Study Design:** It was a prospective interventional study. **Place and Duration of Study**: The study was conducted in the department of Orthopedic Surgery Foundation University Medical College and Fauji Foundation Hospital Rawalpindi from 1st October 2009 to 31st June 2010. **Results**: Total of 46 patients with grade 2 deformity was included in the study who meets the inclusion criteria. Patients were randomly divided into two groups of 23 each. Majority of the patients (65 %) were between 05-09 weeks of age. The mean age was recorded as 7.7 weeks with S.D of 5.21. TEV is a predominantly male's disease as 65 % patients in this study were males, while 35 % were females in group-A. Similarly in group-B, males were 78% and 22% were female. Outcome of both the procedures was recorded at three months follow up. In group-A success rate was recorded 74% as compared to group-B in which 87 % patients were found in satisfactory range with more than 25 passive range of dorsiflexion at ankle joint. **Conclusion**: Conservative Ponseti method is the best option for the management of Congenital Talipes Equino Varus (clubfoot) for grade 2 deformity, when starts early. This not only corrects the deformity, preventing surgical intervention but also lessens the financial burden over the parents as well as on the health system. **Key Words**: Clubfoot, Kite and Lovell's method, Ponseti's method, TEV.

INTRODUCTION

Club foot is one of the most commonly encountered congenital anomalies in orthopedics and was described by Hippocrates in the year 400 BC[1]. However, it still continues to challenge the skills of the pediatric orthopedic surgeon as it has a notorious tendency to relapse, irrespective of whether the foot is treated by conservative or operative means. Part of the reason that the foot relapses is the surgeon's failure to recognize the underlying patho anatomy. Most of the cases of club foot are idiopathic[2]. The incidence is approximately 2 per 1000 live births and it is more common in males[3]. The risk of club foot increased 20 times if first degree relative has this condition[2]. Club foot is frequently associated with severe congenital abnormalities like tracheobronchial fistula and agenesis of anal canal[4]. Mild cases may respond to conservative treatment, whereas severe, fixed cases are likely to need surgery. In all cases it is worth starting gentle stretching as soon as possible. Stretches need to be supplemented by strapping or serial plaster of Paris cast. Conservative treatment progressively become less effective as the child gets bigger. Recurrence of deformity in severe cases may occur and a second procedure as revision of surgery is required. There is another technique introduced in France in the 1970 [5] by Masse and Benashel. It involved daily manipulation of the child's clubfoot by the physical therapist for 30 min. In recent years, interest has been renewed in the Ponseti casting technique and many centers *et al* now believe that most clubfeet can be treated by Ponseti casting rather than surgery for grade 2 deformity. Successful correction of clubfoot deformity generally is reported in 90% to 98% of children treated with Ponseti casting. Bor *et.al*[6], Goksan and Morcuende *et al*[7]. It has been reported that Ponseti casting can be used in children less than 2 years old, even after previous unsuccessful non operative treatment [6,7,12]. Ponseti's technique is getting popular among orthopedic doctors and a number of studies concluded that Ponseti's method revolutionizes clubfoot treatment. This study is conducted with the view to compare these two methods.

CLASSIFICATION

Clubfoot has been classified in the past as mild, moderate and severe, but this is considered to be too subjective. Three classification systems that are accepted world while are the Dimeglio. Classification system, Pirani and international clubfoot study group (ICFSG) classification system. Flynn et al and Celebi et al[7] have shown that after an initial learning curve, all three systems had very good interobserver and intraobserver reliability. We will not be discussing the classification here and the reader is referred to the relevant texts for further study.

MATERIALS AND METHODS

A total of 46 patients with Grade-2 clubfoot deformity were studied to compare Kite & Lovell's method vs. Ponseti's technique for the treatment of clubfoot. Passive range of dorsiflexion at ankle joint after treatment for six months was measured. This study was done from Oct 2009 to June 2010 at the Department of Orthopedics, Fauji Foundation Hospital Rawalpindi. Age range from new born to 20 week. Either gender with grade 2 club foot deformity was included in the study. Teratologic clubfoot, Syndromic clubfoot (cerebral palsy, meningocele, arthrogryposis), relapsed clubfoot, and grade 1 & 3 were excluded from the study. Eligible patients were taken from out-patient department. Parents were explained regarding study procedure and its purpose in brief and written consent was taken. Two groups were made of either gender with comparative age distribution. Group-A treated by Kite Method and group B managed by Ponseti method. The collected data was entered and analyzed in computer software SPSS version 17. Mean and standard deviation was calculated for age. At the end of study, the success rate was calculated on the basis of passive range of dorsiflexion at ankle after treatment in both groups (normal value is >25◦). The difference between two groups of success was subjected to statistical significance. As the study variable was categorical therefore chi-square test was used as test of significance. The level of significance used was 0.05.

RESULTS

In this study majority of the patients i.e. 35% were between 0-04 weeks of age & 30% were found in 05-09 weeks age in group-A. Altogether 65 % of the patients present early i.e. less than 9 weeks of age which shows concern of the parents about their children. Another reason of early presentation is visible deformity of the foot which is easily notable by parents as well as relatives. If we compare club foot with other relatively hidden deformities like undescended testis, Patients usually present late due to obvious reasons. Again in group-B, majority of the patients i.e. 39% were recorded between 0-04 weeks of age while 26 % were found in 05-09 weeks of age so total of 65 % present at less than 9 weeks of age. The mean age was recorded as 7.7 weeks with S.D. of 5.21 as shown in Table 1.

Table-1
Distribution of Patients According to Their Age

Age (In Weeks)	No of Patients	
	Group-A	Group-B
0-04	08	09
05-09	07	06
10-14	05	05
15-19	03	03
Total	23	23
Mean & S,D.	7.7 with S.D of 5.21	

We also analyzed gender distribution in our study. Under discussion anomaly was found more in male babies i.e. 71.73 % as compare to females where the incidence was found to be 28.27 %.

Table-2
Distribution of Patients According to Their Gender

Gender	No. of patients	
	Group-A	Group-B
Male	15	18
Female	08	05
Total	23	23

In table No. 3, outcome of both the procedures at the end of six months was recorded. The criteria of successful outcome were decided according to the literature which was more than 25◦ passive range of dorsiflexion at ankle joint.

Table-3
Distribution of Patients According to Their Outcome

Outcome	Group A		Group B	
	Number of patients	%	No of patients	%
Successful	17	74 %	20	87%
Failure	06	26%	03	13%

Result was analyzed by applying Chi-Square test which shows no significant difference between the two modes of treatment. Rather Ponseti method of conservative treatment shows more number of successful managed cases as compare to operative treatment.

Table-4
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.243[a]	1	0.265		
Continuity Correction[b]	0.553	1	0.457		
Likelihood Ratio	1.263	1	0.261		
Fisher's Exact Test				0.459	0.230
N of Valid Cases	46				

DISCUSSION

Since 2002, several studies have demonstrated the successful use of the Ponseti method in clubfoot correction[8-14], so that the method is becoming an acceptable treatment for idiopathic clubfoot all over the world. Laaveg and Ponseti reported that 90% of their patients were satisfied with the function and appearance of their feet on long-term follow-up (average 19 years). Some of these patients who were followed up for 30 years showed no deterioration of the function or appearance of the feet. It has been written rather convincingly by Cummings that he found Ponseti's method to be more effective in treating congenital clubfoot non-operatively, even though he had used Kite's technique many times successfully to correct this deformity[15]. This method has reported not only clinical correction, but has also shown correction of the individual tarsal anlage as well as their relationships on magnetic resonance imaging[16]. Having used both techniques in our study, it became evident that the success rate with Ponseti's method was significantly higher. It also corrected severe feet deformities in a significantly shorter time period, thereby reducing the agony and distress to patients as well as parents. Superior results may be attributed to correcting all deformities simultaneously, correcting the cavus in the supinated position (called the magic move of Ponseti)[17]. In our study, we included 23 patients in each group with grade 2 foot deformity; we found 87% success results in patients treated with Ponseti's method while 74 % results were recorded in patients with Kite's method, which shows higher success rate in Ponseti's method. Our results are in agreement with a local study conducted by Shahabud Din, Shakeel Ahmed Shah, and Sikander Hayat et al[18] at Peshawar. They recorded 81.24% excellent results with Ponseti's method. We found Ponseti's method to be far superior in correcting all deformities in a shorter period of time, thereby reducing the requirement of surgical intervention. Encouraged with the results of this short-term study, we will not hesitate to offer Ponseti's method of management as the first line of conservative treatment to the patients attending our clubfoot clinic with grade 2 deformity.

CONCLUSION

Clubfoot is an enigmatic condition because it can make the best orthopedic surgeons at humble pie. Treatment over time has varied. Initially, it was Kite's technique which gave excellent results. However, since his results were not reproducible, this was replaced by conservative treatment and/or operative treatment. The dilemma faced by the surgeon was that even after surgery the club foot recurs and results in more surgeries and morbidity. Ever since the introduction of the Ponseti technique, the number of cases requiring soft tissue release has drastically decreased. However, one should remember that the Ponseti technique results are good only if it is followed in its totality including compliance with the FAO. Only time will tell if Ponseti's technique is the answer to this unsolved mystery but till today conservative treatment of Ponseti is the best option of treatment for Congenital Talipes Equino Varus (clubfoot) for grade 2 deformity. It corrects all the underlying deformities in children thereby averting the future surgeries, lessens the burden on the parents as well as the health care system.

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