

Causes of Failure of Conservative Treatment of Club Foot

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Background: Club foot is a global problem with an estimated incidence of 1 in 1000 live births.¹ It causes deformity and disability of the foot. This deformity is treated conservatively by serial plaster castings initially but in case of failure of this method surgical correction of the deformity is done. This study was designed to find out the factors that caused failure of the conservative treatment.

Study Design: Cross sectional.

Sample size: There were 50 patients with 78 club feet.

Targeted Population: All the patients with club foot deformity those presented in the outpatient Department of Orthopedics Surgery and Traumatology Unit-I, King Edward Medical University / Mayo Hospital Lahore, were included in this study.

Results: The average age of patients at the time of presentation for treatment was 9.3 weeks. Male to female ratio was 1.54:1. There were 32 unilateral 18 bilateral deformities. 54 Calves were thin.

Conclusion: In this study all the patients presented for delayed treatment. During this time even soft and supple club foot deformities became rigid and required surgery for their correction Males were affected more than the females which is comparable with other similar studies. More patients had bilateral club foot deformity. Among the unilateral cases right foot was more involved than the left. All the patients had severe deformity. There were more patients with thin calves. It was due to retracting fibrosis of soft tissues which resulted in rigidity of the deformity and caused failure of the conservative treatment.

Key Words: Club foot Surgery.

Introduction

Club foot is the most common congenital musculoskeletal deformity. Its incidence is approximately 1 in 1000 live births which rises to 1 in 20 if there is genetic predisposition.²⁻⁶ Initially, this deformity is treated conservatively by serial plaster castings. In case of failure, surgical correction of the deformity is done. About 50-60% of patients do not respond to conservative treatment⁷⁻⁹ therefore, surgery is required for correction of the deformity. In the orthopedic literature the first reported corrective club foot surgery was done by Phelep in 1891. Later on Codrilla 1900, Boochmann 1937, Bost 1990, Turco and so many others modified this surgical procedure to gain the best results.^{10,11} Operative correction of club foot deformity is recommended between the ages of 3-6 months to utilize the remodeling potential of the foot.¹² The indications of surgical treatment are based on severity and rigidity of club foot deformity.¹¹ The purpose of this study was to report the factors those caused failure of the conservative treatment and surgery was required to correct the club foot deformity. In this study 50 patients with 78 club feet were studied.

Objective

The objective of this study was to record the factors those caused failure of the conservative treatment of club foot deformity.

Materials and Methods

Study Design: It was a cross sectional Study.

Settings: The study was carried out in the Department of Orthopaedic Surgery and Traumatology Unit –I, King Edward medical University, Mayo Hospital, Lahore.

Duration: This study was completed in 18 months.

Sample Size: 50 patients with 78 club feet.

Targeted Population: All the patients with club foot deformity presented in out patients Department of Orthopedics Surgery and Traumatology Unit-I, King Edward Medical University/ Mayo Hospital Lahore were included in this study.

Statistical Techniques: All the data were analyzed using SPSS. The metric data was presented in form of mean \pm S.D along its range (Max-Min). The qualitative data was presented in form of frequency and percentages. Non parametric chi-square test was applied to see the significance of different categories.

Results

During this study, 50 patients with 78 club feet were studied to identify the factors causing failure of the conservative treatment. There were 31 (62%) males and 19 (38%) females in this study. Twenty eight patients (56%) had bilateral club foot deformity and 22 (44%) patients had unilateral club foot deformity in which 13 (26%) had right and 9 (18%) had left club foot deformity. All the feet were of severe variety. In 78 club feet 33 (42.30%) calves were normal and 45 (57.7%) calves were thin.

First significant cause of failure of treatment was late presentation of the patient (p-value 0.029) i.e. 20 (40%) patients presented for treatment after 6th week 15 (30%) patients in 8th week, 8 (16%) patients in the 10th week and 7 (14%) patients in the fourteenth week after their birth. Second significant reason of failure was the removal of plaster by the parents and discontinuation of conservative treatment that was against medical advice (p-value < 0.001). Third reason was the severity of the clubfoot deformity that was associated with thin calves (p-value < 0.001).

Discussion

Age of presentation for treatment of club foot deformity is an important factor. It is recommended that serial plaster casting should be started as early as possible. As time passes club foot deformity becomes rigid and it becomes impossible to correct the deformity without corrective surgery. Nand S 1964¹³ reported a series of 70 patients with age of presentation ranging between 4 weeks to 5 years. Hussain SA et al 2008 reported a series of 220 patients with age of presentation ranging from 6 weeks to 3 years.¹⁴ All of these patients required surgery for correction of the deformity. In our study, the age of presentation for treatment ranged from 6 weeks to 14 weeks, twenty patients presented for treatment in 6th week, 15 patients in 8th week, 8 patients in 10th week and 7 patients in fourteenth week after their birth. All the patients were partially treated by serial plaster casting which was discontinued by the parents due to one or another reason. Age of presentation for treatment in this study is less than the previously reported series which is due to awareness of the advantages of early treatment of club foot deformity.

Both males and females can be affected by club foot deformity. Wynne-Davis reported a series of club foot deformity with male to female ratio of 2.17:1⁶, Yamamoto H and Morokawa reported male to female ratio 2:1.18 and 2.2:1 respectively in their series.¹⁵ Same authors also reported male to female ratio 1.6:1 from Sweden.¹⁵ From United States of America male to female ratio of 2:1 was reported for club foot.¹⁶⁻¹⁹ Chesney DJ et al 2004 in a nationwide audit of management of club foot reported male to female ratio of 2:5.²⁰ In our study male to female ratio was 2.4:1. It is observed that club foot deformity is more common in males which is comparable with other similar series.

Club foot deformity may be unilateral or bilateral. Cartlidge I, 1983 observed that bilateral club foot deformity was marginally less common than unilateral. It was bilateral in 48 (41%) Polynesian of Auckland and in 59 (49%) Caucasian of Glasgow.²¹ Yamoamto H, 2002 in his study from

Table 1:

Gender			
Males = 31 (62%)		Females = 19 (38%)	
Side Involvement			
Both = 28 (56%)	Left = 9 (18%)	Right = 13 (26%)	
Age at treatment in weeks			
6 th weeks = 20 (45)	8 th week = 15 (30%)	10 th week = 8(16%)	14 th week = 7 (14%)

Japan reported bilateral and unilateral case of club foot deformity in equal numbers.²² Chesney D BMC, 2007 reported 45% bilateral and 55% unilateral cases of club foot deformity in a study of 204 patients from UK.²³ Morokawa 2001 reported ratio of bilateral to unilateral involvement of club foot 1:1.2 from Japan.¹⁵ Hussain SA et al 2008 reported a series of 70 patients with club foot deformity. Among them 23 (32.8%) patients had bilateral and 47(67.2%) had unilateral club foot deformity.¹⁴ Chesney D 2004 in a study of 216 patient reported that 99 (45.7%) patients had bilateral and 117 (54.3%) had unilateral club foot deformity.²⁰ Cardy AH 2007 reported 51% bilateral and 49% unilateral club foot deformity.²⁴ In our study of 50 patients, 22 patients had unilateral and 28 had bilateral club foot deformity.

In unilateral club foot deformity either right or left foot is affected as Cartlidge I, 1984 reported that in 70 patients with unilateral club foot deformity right foot was involved in 38 patients and left foot was involved in 32 patients in Polynesian children. He also reported a study of 120 Caucasian children with club foot deformity from Glasgow and reported that among 61 patients of unilateral club foot deformity 35 had right and 26 had left club foot deformity.²¹ Chesney D 2007 while reporting a series of 204 children with club foot deformity observed 112 children had unilateral involvement, among them, 51 had left sided and 61 had right sided involvement of the foot.²³

Morokawa 2001 in a study of 1215 patients of club foot deformity reported the ratio of right to left side involvement 1.8:1 from Japan. He also reported ratio of right to left side involvement 1.5:1 from Sweden.¹⁵ Chesney DJ 2004 reported in a study of 216 patients in which there was right sided involvement in 52 children and left side involvement in 65 children.²⁰ Cardy AH 2007 reported that in unilateral cases there was more involvement of right foot than the left (48% of males, 55% of females). Females who were affected unilaterally were more than twice as likely to be affected on the right than the left, where as in males left and right sides were equally affected (female 29% left, 71% right, males 48% left 52% right.²⁴ In our study of 50 patients with 78 club foot deformity 22 patients who had unilateral club foot deformity 13 had right and 9 had left side involvement of club foot deformity.

Club foot deformity may be mild, moderate or severe. In our study all the 78 club feet in 50 patients were of severe

variety. Cartlidge I, 1984 reported that bilateral cases were more severe than the unilateral.²¹ This fact was also observed in our study. Severe club feet are associated with thin calves due to retracting fibrosis of soft tissues distal to the knee joint. On one hand it does not allow normal growth of the calves and on the other hand it causes shrinking of the soft tissues. Ippolito and Ponseti 1980 documented the presence of increased fibrous tissues in muscles, fascia, ligaments and tendon sheaths and concluded that retracting fibrosis may be a primary etiological factor of club foot deformity.²⁵ In our study of 78 club feet 24 calves were normal and 54 calves were thin. Therefore, thin calves are index of severity of the club foot deformity.

Conclusion

In this study all the patients presented for delayed treatment. During this time even soft and supple club foot deformities became rigid and required surgery for their correction. Males were affected more than the females which is comparable with other similar studies. More patients had bilateral club foot deformity. Among the unilateral cases right foot was more involved than the left. All the patients had severe deformity. There were more patients with thin calves. It was due to retracting fibrosis of soft tissues which resulted in rigidity of the deformity and caused failure of the conservative treatment.

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