Original Article

Evaluation of Result of Idiopathic Club Foot/Feet within 1 year of Age by Ponseti Technique

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Abstract

Clubfoot is the commonest congenital deformity in babies. Around 80% of the cases occur in developing nations. There are many options for treating club foot, Ponseti technique is one of them. This observational study was carried out at Chittagong Medical College Hospital, From July 2014 to December 2015 to evaluate the results of idiopathic club foot / feet within 1 year of age by Ponseti technique. Patients with idiopathic congenital club foot (CTEV) is attended at the outpatient department of CMCH. Among the 35 patients, 1 patients 2.85% required 1 plaster, 2 patients (5.74%) required 2 plaster, 3 patients (8.57%) required 4 plaster, 5 patients (4.28%) required 5 plaster, 16 patients (45.71%) required 6 plaster, 5 patients (14.28%) required 7 plaster cast and 3 patients (8.57%) required 8 plaster cast with or without percutaneous tonotomy. The final score after completion of the management (with or without tenotomy) were 0 of 39 feet (75%) which were normal and 0.5 of 10 feet (19.24%) and score 1 of only 3 feet (5.76%) which were better than moderately abnormal.

Keywords: Club Foot, Tonotomy, Ponseti technique.

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Introduction

There are many options for treating club foot, Ponseti technique is one of them[1]. Idiopathic club foot is the most common congenital deformity of the foot. The incidence and prevalence of congenital talepes equinovarous (CTEV) deformity has yet to be determined in our country, but according to western literature it is about 1-2 in 1000 live birth. It may vary from country to country and even in the same country in different sex. The ratio of Male to Female sex is 3 to 1 and 40% of cases are bilateral[1].

The precise cause of idiopathic club foot is unknown, but club foot seems to be a developmental deformity that occurs during the second trimester of pregnancy. The genes responsible for club foot deformity are active starting from the 12th to 20th weeks of foetal life and lasting until three to five years of age. Club foot can be transmitted genetically. If one parent has a club foot, offspring have a 3% to 4% chance of being affected. When both parents club foot, each of their children has a 15% chance of being affected[2]. Many cases are associated with Neuromuscular diseases, chromosomal abnormalities, Mendelian and Nonmendelian Syndromes and in rare cases with extrinsic causes[3]. In my study we are limiting ourselves to the study of idiopathic congenital club foot deformity, occurring in otherwise normal infants. The pathology, the functional anatomy of club foot, and the structural changes in its ligaments, tendons and muscles, must be well understood to arrive at a sound approach to early non-surgical treatment of this deformity[4]. The congenital club foot is a complex three-dimensional deformity having four components: Equinus, Varus, adductus & cavus[5].

The goal of treatment is to reduce or eliminate these four deformities, so that patient has a functional, painfree, plantigrade foot, with good mobility and without calluses, does not need to wear modified shoes[6]. The deformity of the foot was known from the time of Hippocrates, the father modern Medicine. He identified the deformities, described its pathoanatomy and had practiced manipulation and strapping by some sorts of bandaze. After Hipperates numerous studies have been done on CTEV[7]. Most orthopaedic Surgeon have agreed that the

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initial treatment of club foot should be non operative[8]. The method is manipulation & application of a plaster cast at weekly intervals. Other methods of initial treatment are in Physiotherapy, Stretching & adhesive strapping, Denis Browne splints[9].

Objectives

i) To carry out the evaluation of the results of the treatment of congenital club foot by Ponseti technique.

ii) To improve the quality of life of affected idiopathic club foot, thereby to prevent the future handicapped life.

Materials and Methods

This observational study was carried out at Chittagong Medical College Hospital, From July 2014 to December 2015 to evaluate the results of idiopathic club foot / feet within 1 year of age by Ponseti technique. Patients with idiopathic congenital club foot (CTEV) are attended at the outpatient department of CMCH. Patients with Children under the age of 1 year. Only idiopathic congenital club foot and non rigid and rigid type of foot were included in this study. Patients beyond the age of 1 year with other congenital deformity (Registant rigid type), with skin disease and parents who were not willing to come under this study were excluded in this study. An elaborate history of selected patients age with emphasis of clinical examination, family history, treatment history and any co-existing diseases were ruled out. A data was collected in a sheet designed consisting of variable related to patients, treatment timing & deformity management. Data collection protocol included patient's information, history, clinical examination, management & follow up. The collected data was compiled, tabulated according to key variables. Analysis of different variable was done according to standard statistical method and calculations done by using scientific calculation.

The observational study was conducted in Orthopaedic Ward. 35 (thirty five) patients were selected for the study. 52 (Fifty two) feet were treated and followed up thoroughly.

The purpose of this study was to evaluate our experience and to see the results by Ponseti technique in the management of congenital club foot.

Results

Table I showed out of 35 cases 17 (seventeen) patients (48.57%) were within the age of 0-1 month, 14 (fourteen) patients (40%) were between the age of 1-6 months and 4 (four) patients were between the age of 6 to 12 months.

Table-I: Demographic characteristics of the study population.

Duration of age in months	Numbers	Percentage
0-1	17	48.57
1-6	14	40.0
6-12	4	11.43
Total	**35**	**100**

Figure 1 showed there are 23 patients (65.72%) were male and 12 patients (34.28%) were female.

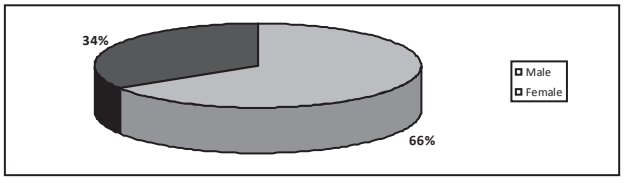

Figure-1: Sex distribution of the study population.

Table II shows ten (28.60%) patients had right sided involvement among the 06 were males and 04 were females. Eight (22.85%) patients had left sided involvement among the 04 were males and 04 were females. Seventeen (48.55%) patients had bilateral involvement among them 13 were males and 04 were females.

Table-II: Distribution of foot involvement.

Foot Involvement	Male	Female	Total
Right	06	04	10(28.60%)
Left	04	04	8(22.85%)
Bilateral	13	04	17(48.55%)
Total	**23**	**12**	**12**

Table III shows out of 52 feet, 22 (42.3%) feet had rigid variety and 30 (57.7%) had non rigid variety.

Table-III: Distribution of type of foot involvement.

Type of foot involvement	Number of Patients	Percentage
Rigid	22	42.3%
Non Rigid	30	57.7%
Total	**52**	**100**

Among the 35 patients, 1 patients 2.8% required 1 plaster, 2 patients (5.7%) required 2 plaster, 3 patients (8.6%) required 4 plaster, 5 patients 14.3%) required 5 plaster, 16 patients (45.7%) required 6 plaster, 5 patients (14.3%) required 7 plaster cast and 3 patients (8.6%) required 8 plaster cast with or without percutaneous tonotomy (table IV).

Table-IV: Number of Plaster required for correction of mid foot deformity.

Number of Plaster	Unilateral	Bilateral	Total N (%)
1	01	00	01 (2.8)
2	00	02	02 (5.7)
4	01	02	03 (8.6)
5	02	03	05 (14.3)
6	10	06	16 (45.7)
7	02	03	05 (14.3)
8	02	01	03 (8.6)
Total	**18**	**17**	**35 (100)**

The final score after completion of the management (with or without tenotomy) were 0 of 39 feet (75.0%) which were normal and 0.5 of 10 feet (19.24%) and score 1 of only 3 feet (5.76%) which were better than moderately abnormal (table V).

Table-V: Score wise final result

Score	Number of Patients	Percentage
00	39	75.0%
0.5	10	13.24%
01	03	5.76%
Total	**52**	**100**

Six (17.14%) patients had only plaster cast, 27(77.14%) had plaster with tenotomy and 02(5.72%) had PMR (table VI).

Table-VI: Type of treatment required.

Procedure	Rigid	Non Rigid	Total N (%)
Only plaster cast	02	04	6(17.14)
Plaster with tenotomy	14	13	27(77.14)
PMR	02		02(5.72)
Total	**18**	**17**	**35 (100)**

Discussion

Club foot deformity is the commonest congential anomaly which has been treated in the past by several methods by several Orthapacdic sugeons with variable success. Several surgical option were also tried by several surgeons later, but the results have not proven to be superior and more complication have been reported after surgical intervention, I.V Ponseti has been the pionerer of the manipulation and casting technique and he has practiced and perfected his technique form over 50 years.

In present study observed that out of 35 cases 17 (seventeen) patients (48.57%) were within the age of 0-1 month, 14 (fourteen) patients (40%) were between the age of 1-6 months and 4 (four) patients were between the age of 6 to 12 months. There are 23 patients (65.72%) were male and 12 patients (34.28%) were female. In Rahman et al[10] study, the age distribution of the patients was done. Among 30 cases, the highest numbers are in the age group of below 6 month which is 60%. The second highest numbers of cases (33.4%) are the age group between 6 months to 18 months. The lowest number of cases is the age group between 18 months to 24 months which is only 6.7%. Percentage of the child within the age group 0-6 month is significantly higher than the other age group[11]. In Rahman et al.[10] study, within 30 cases, the male patients were more frequent than female patients which are 21 (70%) and 9 (30%) respectively. Percentage of male patients was higher than female. In study of Pulak and Swamy[12] observed those total 40 children 80.0% males and 20.0% females.

In this study showed 10 (28.60%) patients had right sided involvement among the 06 were males and 04 were females. Eight (22.85%) patients had left sided involvement among the 04 were males and 04 were females. Seventeen (48.55%) patients had bilateral involvement among them 13 were males and 04 were females. Rahman et al[10] study revealed in 30 clubfoot patients, bilateral involvement of foot was observed in 15 (50%) cases. The unilateral right foot involvement is 10 (33.3%) and left foot involvement is 5 (16.7%). In study of Pulak and Swamy[12] showed fourteen children had bilateral whereas 25 children had unilateral clubfoot.

In this study out of 52 feet, 22(42.3%) feet had rigid variety and 30(57.7%) had non rigid variety. Simillar observation was found Rahman et al[10] they showed among all deformed feet (45 in number) 40 (88.9%) feet of 26 patients had rigid variety and 5 (11.1%) feet of 4 patients had non-rigid variety. Percentage of rigid was higher than non rigid variety[13].

In present study among the 35 patients, 1 patients 2.8% required 1 plaster, 2 patients (5.7%) required 2 plaster, 3 patients (8.6%) required 4 plaster, 5 patients 14.3%) required 5 plaster, 16 patients (45.7%) required 6 plaster, 5 patients (14.3%) required 7 plaster cast and 3 patients (8.6%) required 8 plaster cast with or without percutaneous tonotomy. In Rahman et al.[10] study out of 45 feet 40(88.9%) feet of 26 patients was corrected by plaster with tenotomy and 5 (11.1%) feet of 4 patients by plaster only. Percentage of ten otomy was higher than in comparison to without tenotomy.

In present study observed that the final score after completion of the management (with or without tenotomy) were 0 of 39 feet (75.0%) which were normal and 0.5 of 10 feet (19.24%) and score 1 of only 3 feet (5.76%) which were better than moderately abnormal. Rahman et al[10] out of forty five feet, after correction 36 feet (80%) had final Pirani score 0 which is normal, in 7 feet (15.6%) final Pirani score was 0.5 which is moderately abnormal, in 2 feet (4.4%) final Pirani score was 1 which is severely abnormal. Percentage of final score 0 was higher than in comparison to with final score 0.5 and 1. Pulak and Swamy[12] study observed tenotomy was required in 50 feet (94.3%) and most of these had Pirani scores of more than 5. Six (17.14%) patients had only plaster cast, 27 (77.14%) had plaster with tenotomy and 02 (5.72%) had PMR.

The difficult part of study was maintenance of bracing protocol. The parents reported the initial two or three days were the critical period, during which patients were restless and tries to remove the Dams brown splint. After that the patients were adjusted with splint. I agree with the most of the author that correction of foot also depend on the brace protocol. To ake it compplaits, parents should be taught about the advantage & disadvantage to gain the more success during maintaining phase of the ponseti technique. Another difficult part of the study was follow up. Correction of foot by serial cast with or without tenotomy is the part of total management. In my study, average follow-up period was 6 months. Whenever the correction was done, the parents used to think that the greater and difficult part of the treatment had completed. At this moment if they have some trouble to communicate such as leaving in a distant. Could not make time to visit hospital.

Conclusion

It is concluded that the treatment of congenital club foot (CTEV) by ponseti technique is very effective method with excellent result and negligible morbidity. The method is simple, effective, minimally invasive, inexpensive, ideally and can be performed at outpatient department. As the series was conducted with only 52 feet of patients 35 cases

followed up period was average 6 months, so further prospective study with larger sample and longer follow-up is recommended.

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