MIDTERM RESULTS OF PONSETI METHOD IN CONGENITAL CLUB FOOT; SUBJECTIVE AND OBJECTIVE OBSERVATIONAL STUDY OF CHILDREN.

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ABSTRACT

Objective: To analyze midterm results of Ponesti technique in congenital club foot. **Material And Methods:** After taking informed consent, the parents of the children who had a club foot (congenital talipesequinovarus) deformity, treated in our club foot clinic, Dow University hospital by a single orthopedic surgeon during the period of Jan 2020 to March 2020 were included in the study.It is a cross sectional study, with a sample size of 292, sampling technique was non probability type. The study was conducted after taking approval from Institutional review board, Dow University of health sciences. Research team members, who are ponseti trained practitioners, filled questionnaire by asking the parents directly in the clinic. Inclusion criteria was children who have completed stage of casting and bracing (treated with Ponseti technique) whose affected children are less than 5 years of age. Exclusion criteria were Children with Syndromic club foot. Children with recurrence and relapse of club foot requiring surgery, Children who have been treated surgically. Final data were imported and analyzed by SPSS v.16. **Results:** Mean Pirani score was 0.4164.Calf circumference of foot is normal in 254(82.7%) where as it was reduced in 37(12.1%). Regarding length of foot, it came out to be normal in 253(82.4%) babies where as in 38 (12.4%) it was small. Satisfaction level of the parents from Ponseti technique was 278(90.6%) and 149(4.6%). Foot function was 282(91.9%) normal and only 9(2.9%) had function below normal. Regarding limitations in routine activities, 279(79%) had no limitations, 11(3.1%) had occasional limitation and only 2(0.6%) had usual limitation.Regarding pain 278(78.8%) had no pain, 9(2.5%) had occasional pain on strenuous work and 5(1.4%) had occasional pain on routine work and none had always pain on walking. **Conclusion:** Ponseti technique is an efficient and effective method of treatment in clubfoot. The success rate of this method in this study is more than 90% in midterm follow up. The subjective and objective outcome equally shows satisfactory results. Therefore, it is highly recommended that children born with clubfoot should be treated with Ponseti technique soon after birth in order to achieve complete correction and to prevent the complications caused by this deformity.

Key Words: Club foot, Ponseti, Brace.

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INTRODUCTION:

Club foot is the most common complex deformity present at birth with an incidence of 1.2 per thousand live births[1.] There are 2 types of club foot:.Idiopathic club non idiopathic. Idiopathic foot is as a single deformity which is usually bilateral and respods well to conservative treatment.[2]Initially it was treated surgically, that resulted in painful arthritic feet[3]. In recent years there has been increased interest in Ponseti method for treatment of club foot[4].It consists of serial corrective manipulations followed by cast application. At the end of treatment percutaneous tenotomy is done in majority of cases. Ponseti method has a short-term success rate of 90% and long-term results are also high[5,6]. Objective measures have been used previously to evaluate the success rate. On the other hand some authors believe that patients are the best judges whether they have a good foot. Cosmetic acceptability can be judged by subjective evaluation whereas movement, position and range of motion can be better evaluated by objective assessment. A more comprehensive final result of the treatment of club foot can be obtained by combining both subjective and objective evaluation[7]. There are certain objective measures to assess outcome of including range of movement at ankle, calf circumference, gait, shoe size. Some authors also advocate radiographic assessment for evaluation of the results[8]. Surgical treatment of club foot ie posteromedial release of soft tissue resulted in un satisfactory results in 15 years followup[9,10]. The purpose of this studywas to evaluate the subjective and objective outcome of Ponsetitechnique in treatment of congenital club foot.

MATERIAL AND METHODS:

After taking informed consent, the parents of the children who had a club foot (congenital talipesequinovarus) deformity, treated in our club foot clinic, Dow university hospital, by a single orthopedic surgeon during the period of January 2020 to March 2020 were included in the study. The study was conducted after taking approval from Institutional review board, Dow University of health sciences. Research team members, who are ponseti trained practitioners, filled questionnaire by asking the parents directly in the clinic.

Ponseti technique was applied without any modifications, including serial long leg casting on weekly basis. On average 7-8 casts are applied. The casting phase is followed by a percutaneous tenotomy under local anesthesia (1 ml of Inj. Xylocaine 2%), the procedure is performed in clinic. After tenotomy, a cast is applied for three weeks. Abduction brace was fitted to the child when last cast is removed, three weeks after tenotomy. The brace is recommended for 23 hours/day for three months followed by at night and during sleeping hours in the day time till 4 years of age. Clinical assessment included the examination to see the residual and recurrent deformities. Passive range of motion, appearance, muscle power, calf atrophy, muscle bulk and foot size.Pirani score was used to assess the outcome of treatment. Maximum score is 6 and minimum score being 0. For satisfaction and functional outcome of the treatment data has been recorded by the parents considering the patient as minor. A questionnaire comprising of two parts was given to the families of treated children.Demographic features of the patients, problems arising during the phases of casting, bracing and tenotomy, familial support, functional outcome of the babies were asked. Questionnaire was administered in English in their validated form during clinic appointments. In those cases where the care givers face any difficulty in filling the questionnaire due to illiteracy or language barrier, a member of staff assisted those parents in order to fill the questionnaire comfortably in a proper way. It is a cross sectional study, with a sample size of 292, sampling technique was non probability type. Inclusion criteria was Parents or care givers of the Children with idiopathic club foot. Children who have completed stage of casting and bracing (treated with Ponseti technique) whose affected children are less than 5 years of age. Exclusion criteria were Children with Syndromic club foot. Children with recurrence and relapse of club foot requiring surgery, Children who have been treated surgically. Final data were imported and analyzed by SPSS v.16.

RESULTS:

As per results mean age of the patient was 39.7 months with an SD 1.812. Regarding sex, 162(52.8%) were male, 130(42.2%) wasfemale.Mean age at which treatment started was 2.12(SD 2.05) months. Time duration for which brace was used 3.24 years, Mean Pirani score was 0.4164.Calf circumference of foot is normal in 254(82.7%) where as it was reduced in 37(12.1%). Regarding length of foot, it came out to be normal in 253(82.4%) babies where as in 38 (12.4%) it was small (as shown in table 1and 3). Satisfaction level of the parents from Ponseti technique was 278(90.6%) and 149(4.6%). Foot function was 282(91.9%) normal and only 9(2.9%) had function below normal. Regarding limitations in routine activities, 279(79%) had no limitations, 11(3.1%) had occasional limitation and only 2(0.6%) had usual limitation. Regarding pain 278(78.8%) had no pain,9(2.5%) had occasional pain on strennous work and 5(1.4%) hadoccasional pain on routine work and none had always pain on walking. Problem in shoe wearing was not observed in 257(72.8%), 34(9.6%) had problem during strennous work and only 5(1.4%) had problem in routine activities. Regarding relapse 275(77.95) had no relapse, 17(4.8%) had varus deformity. Satisfaction level of the parents came out to be 91.9%.

Table 1:Calf circumference

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	254	82.7	87.3	87.3
	Less than normal	38	12.1	12.7	100.0
	Total	292	94.8	100.0	

Table 2:Length of foot					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	253	82.4	86.6	86.6
	Less than normal	38	12.4	13.0	99.7
	21	1	.3	.3	100.0
	Total	292	95.1	100.0	

Table:3 Satisfaction of parents					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Satisfied	278	90.6	95.2	95.2
	Not satisfied	14	4.6	4.8	100.0
	Total	292	95.1	100.0	

DISCUSSION:

Idiopathic club foot deformity has been corrected with successive manipulation and casting as proposed by Professor Ponseti in 1948. Ponseti technique has three phases; the corrective phase is the first phase which consists of serial manipulations followed by casting on weekly basis. Second phase is the maintenance phase which a brace known as DB splint is used. Third phase is the transition phase in which splint is discontinued and baby is encouraged to wear normal shoes[11].In our study 86.5% of cases there was no family history of club foot, this finding is consistent with study by McConnel et al.who reports 94% patients with club foot had no family history of this deformity[12]. According to results of our study mean age at which treatment was started was 2.12 months. In this regard our study is in line with the world literature which shows in order to achieve good results treatment should be started as soon as possible.[13,14] Regarding Sex of the babies current study shows more prevalence In males, this finding is consistent with the results of studies carried out by Desai et al(2010) and Dobbs et al 2004.[16,17] Time duration for which brace was used 3.24 years, Mean Pirani score was 0.4164. These results showing excellent compliance by the parents which is reflected by average 3.24 years of brace used and low Pirani score. A study carried by Nogueria et al which shows noncompliance with bracing in clubfoot has been contributed to systematic challenges and inequities.[18]Another study done by Porecha et al which reveals poor compliance with bracing protocol is a major reason of recurrence in club foot treatment with Ponseti teshnique.[13] There are certain factors which directly affects the subjective outcome of patient including parents expectation and the services provided by physicians and staff and the physical appearance of foot after treatment.[7] Satisfaction level of the parents is 90% in our study where as a study conducted by Chesney et al shows the satisfaction level of the patient is directly related to the appearance of foot. Those who have broad and short feet, wasting of calf muscles with ankles stiffness had worst satisfaction level. "Patient is the final judge of weather he has a good foot" as stated by Bjonness[18]. Good results (>85%) have been reported in literature with this technique[19, 20, 21]. Excellent results have been seen by some authors as well which is consistent with our study.[22,23] As far as objective outcome is concerned, the parameters are Pain, ankle motion, problems in shoe wearing, foot size, calf muscle circumference and signs of relapse. These are easy to measure and reproducible. The current study shows all the parameters to be up to the mark in short terms follow up which is in consistent with world literature which shows 92-98% success rate with Ponseti technique in idiopathic club foot.[24, 25, 26] A study done in India by Saini et al shows good results in 79% cases, fair in 5 % and poor in 16%.[27]

There are certain limitations in this study. This is a midterm follow up of the patients showing good results. Long term follows up studies should be done in order to evaluate the results in long run.

CONCLUSION:

Ponseti technique is an efficient and effective method of treatment in clubfoot. The success rate of this method in this study is more than 90% in midterm follow up. The subjective and objective outcome equally shows satisfactory results. Therefore, it is

highly recommended that children born with clubfoot should be treated with Ponseti technique soon after birth in order to achieve complete correction and to prevent the complications caused by this deformity.

ETHICS APPROVAL: The ERC gave ethical review approval

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin

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CONFLICT OF INTEREST: No competing interest declared.

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