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A comparative study to assess idiopathic clubfoot treatment between less than 3 month and more than 3 months of age by Ponseti's Technique in a tertiary care hospital in Udaipur (southern Rajasthan)

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Abstract

Introduction: Globally, Clubfoot is the most serious cause of physical disability among congenital musculo skeletal defects. Etiology and risk factor are unknown but there is female predominance and increased prevalence in monozygotic twins. The goal of study to provide a brief knowledge regarding management of clubfoot via Ponseti's method i.e. simple manual correction of Deformity and plaster cast application and to reduce the need of extensive surgery for the clubfoot.

Aims and Objectives: To analyze the efficacy of Ponseti's method in management of CTEV and To evaluate the outcome of Ponseti's method for treatment of clubfoot and to compare the result between two age group i.e. less than 3 months of age and between 3 months to 1 year of age.

Material and Methods: For study purpose two groups were made with 50 babies in each group with congenital idiopathic clubfoot. Group A 50 babies from birth to upto 3 months of age and Group B of 50 babies from 3 months- 1 year of age were selected from outdoor patient department at Depts of Orthopaedics, RNTMC & Hospital, Udaipur from 1st July 2017 to 31st May 2019.

Results: Group-A Required less number of casts (1.2) as compared to group B(1.6) for Cavus correction, Required less number of cast (2.6) as compared to group B(3.2) for correction of Varus & Adduction, Required no surgical correction or procedure except than Percutaneous Tenotomy.

Conclusion: At the end of study all babies were free from deformity and having flexible, plantigrade, cosmetically acceptable foot which implies that Ponseti method can be used easily up to 1 year of age. The Ponseti method is very useful in our country which having less resources and huge patient load.

Keywords: Clubfoot, ponseti method, pirani severity score, manipulation & corrective cast

Introduction

It is estimated that more than 100,000 babies are born worldwide each year with congenital clubfoot. Eighty percent of the cases occur in developing nations ^[1]. The physical, social, psychological and financial burdens on the patients, their families, and the society are very high and unbearable and treatment of neglected clubfoot focuses on soft tissue release surgery (Turco's PMSTR) ^[2], osteotomy (Dillwyn-Evan osteotomy) or fixators (JESS) ^[3]. Further, the good short-term results have shown to deteriorate over longer follow up resulting in rigid painful feet. This complexities calls for a simpler method that can be easily applied to larger population with better results.

A dramatic reduction in radical clubfoot operation has been reported in parts of the world where Ponseti treatment has been introduced ^[4]. The purpose of the this study is to examine the results of Ponseti's method in clubfoot children i.e. Manual manipulation of Deformity (Concentric reduction of subluxated Talocalcaneonavicular joint) and POP cast, Quick correction Of equinus and Maintain of Reduction by DB splint and CTEV shoes.

Aims & Objectives

Aims

To compare the outcome of Ponseti 's method for the management of clubfoot patients between less than 3 months of age and 3 months to 1.0 year of age.

Objectives

To analyse the efficacy of Ponseti's method in management of CTEV.

To evaluate the outcome of Ponseti's method for treatment of clubfoot and to compare the result between two age group i.e. less than 3 months of age and between 3 months to 1 year of age and To analyse the usefulness of Ponseti's method in elder age child (1 year of age).

Material and Methods

Study Design

The aim of the study —To compare outcome of ponseti's method for management of CTEV in babies more than 3 months of age with babies age less than 3 months.” A prospective survey over last from 1st June 2017 to 31st May 2019 at Ravindra Nath Tegore Medical college, Udaipur patient's outdoor department.

Source of Data

50 babies from birth to upto 3 months of age with congenital idiopathic clubfoot and 50 babies from 3 months- 1 year of age were selected from outdoor patient department at Department of Orthopaedics, RNTMC, Udaipur, Rajasthan from 1st July 2017 to 31st May 2019. Pirani severity Score is assessed at beginning of the treatment, during the correction phase, during the bracing phase and at later follow up.

Inclusion Criteria

Infants with idiopathic clubfoot.

Infants of age of upto 1 year of age with clubfoot.

Exclusion Criteria

Infants with non-idiopathic clubfoot like myelodysplasia, complex idiopathic clubfoot, paralytic clubfoot.

Previously operated for clubfoot.

Age is more than 1 year of age.

Infants who have isolated clubfoot like metatarsus adductus, heel varus.

Infants who are medically unstable.

Overview of clubfoot treatment using the ponseti's method [5, 6, 7, 8]

Basic Guideline

Simultaneously correction of deformities;

Cavus→Mid foot inversion&Heel Varus →the rigid equines [9]. It all necessary to be corrected to attain Reduction of Subluxated Talocalcaneal Navicular Joint.

The tenotomy of the achillies tendon is strongly suggested in most of the cases to correct the equinus [10]. After full correction a relapse needs to be prevented. This is done by Bracing [11, 12, 13].

Pirani's Severity Scoring [14, 15]

6 clinical signs of a Clubfoot are compared to a normal foot -3 signs evaluate the Mid Foot Contracture (MFC)→A) Curvature of Lateral Border of foot (CLB) B) Medial Crease (MC), C)Lateral part of the Head of the Talus (LHT), -3 signs evaluate the Hind Foot Contracture (HFC)→D) Posterior Crease (PC), E) Rigid Equinus(RE) F)Empty Heel(EH), Each sign is scored with 0= no abnormality, 0.5 = moderate abnormality, 1= severe abnormality Higher score indicates a more severe deformity.

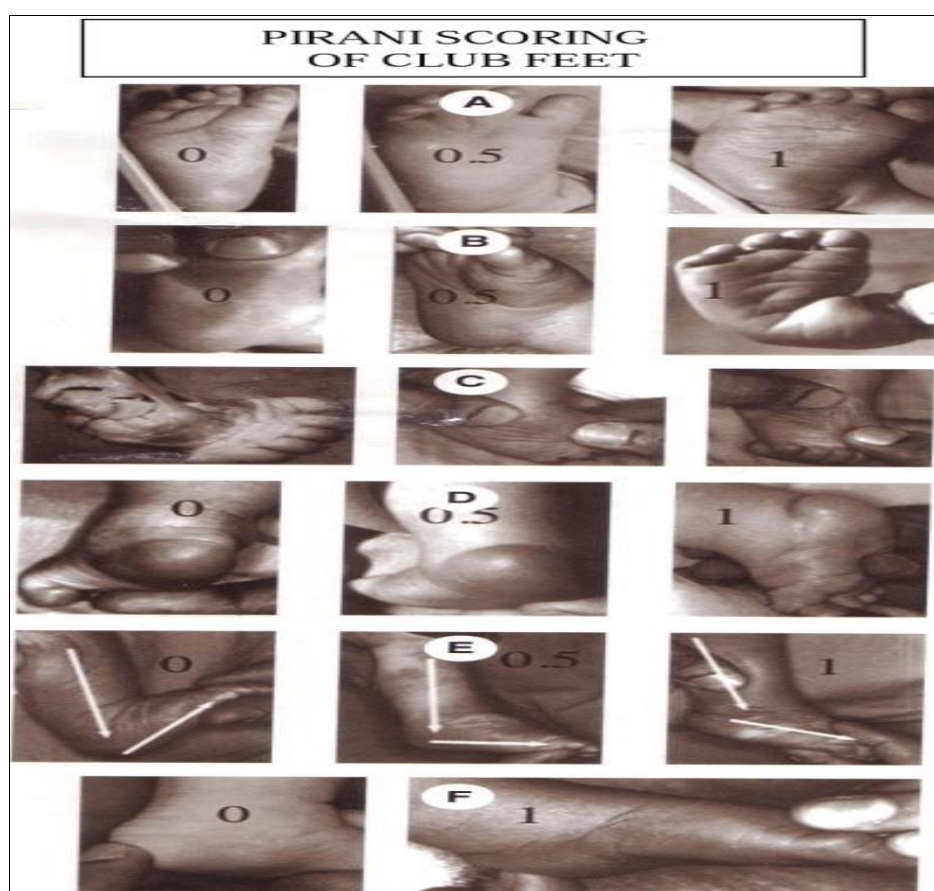


Fig 1: Pirani Severity Score for Assessment of club foot Source: *global clubfoot initiative*

Manipulation and cast application

Precise identification of the head of the Talus and Talocalcaneo-navicular joint. Grasp the (right) forefoot with the (right) hand & Move the (left) thumb and index finger forward to clasp the head of the Talus. Manipulate the foot with Supination or Elevate the first ray For Cavus Correction followed by Abduction around the pivot point of Talocalcaneo-navicular joint. Hold the corrected position while an assistant applies padding and above knee plaster. Change hand positions and mould well at the heel, Malleoli and sole of the foot.

For Equinus

Last cast (s). Correction of Rigid Equinus in the ankle (after Achilles tendon tenotomy in most cases) + Improvement of Mid foot Abduction and Heel Valgus. For Tenotomy The Pirani's Severity Scoring Method indicates when sufficient correction has been obtained:

Mid foot Contracture Score under 1

Hind foot Contracture Score over 1

LHT= 0 (in older children or children with associated defects, the Talus head may not be fully covered). Under local anaesthesia or mild sedation About 1 cm above the Calcaneus, the scalpel blade with the sharp side in proximal direction is inserted from the medial side parallel to the Achilles tendon. The blade is to rotate gently to cut the tendon completely. A "pop" is felt and the foot immediately dorsiflex more. The position to aim in the "younger child" is 15°- 30° Dorsiflexion with 60°- 70° Abduction and in the "older child" 10°- 20° Dorsiflexion with 30°-60° Abduction.

The Bracing [16, 17]

It is used to maintain the correction. Failure to use the brace in the correct way and for the required time is the most common cause of recurrence. After Equinus correction by Cast or Tenotomy bracing protocol:

For Next 3 month Most time = 18-20 hours a day

Next 3- 4 Month Reduced time = 16 hours a day, Due time CTEV shoes.

Till age 4-5 Year Night time = 12-14 hours a day and in day time CTEV shoes.

Bilateral Clubfoot: Both feet in 70° Abduction and 10°- 20° Dorsiflexion.

Unilateral clubfoot: Clubfoot in 70° Abduction and 10°- 20° Dorsiflexion. Normal foot in about 40° Abduction and 10-20° Dorsiflexion. Length of the bar: • Distance from one shoe heel to the other should be about the width of the child's shoulders. The early recognition followed by correction of the relapse is important to continue to obtain a good result.

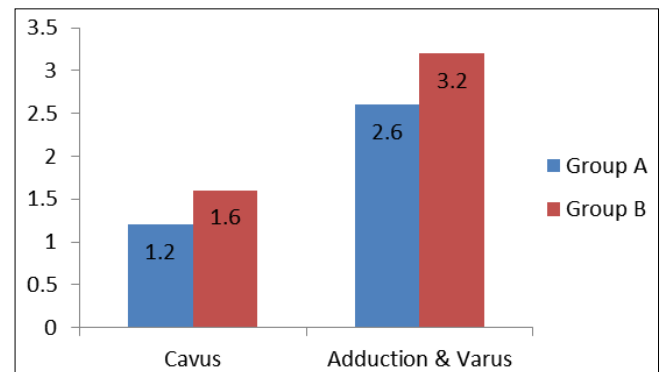
The discontinuation of Bracing or to declare cured from Clubfoot is assessed by Pirani severity score is 0 and radiologically normal Angles of Talocalcaneal angle (A/P view- 30°-55° & Lateral view-25° -55°), Talus-1st Metatarsal angle in A/P view (5°-15°), And Tibiocalcaneal angle (10°-40°) [18, 19].

Results

In our study 100 Babies selected. Out of them 56 were male child and 44 were female children.

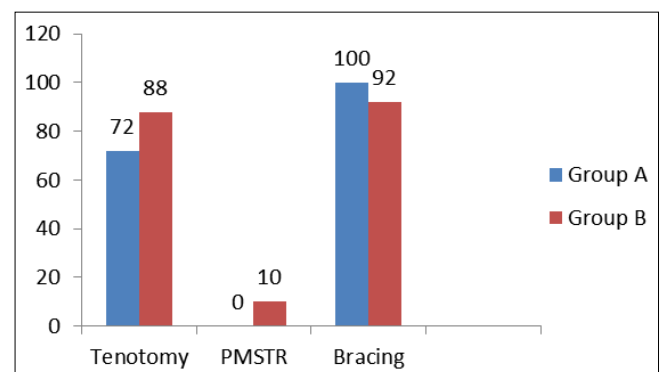
In group –A (<3 months of age) Out of 50 Babies Right foot was affected in 20 babies (40%), Left foot was affected in 14 babies (28%) and bilateral involvement is seen in 16 babies (32%). In group- B (3 months-1 year of Age) Out of 50 babies Right side affected in 30 babies (60%), Left foot affected in 16 babies (32%) and bilateral affection seen in 4 babies (8%).

For cavus In group –A (<3 months of age) the number of casts required correction was 1 to 2 (Avg. 1.2) whereas in Group- B (3 months to 1 year of age) the number of casts ranges from 1 to 3 (avg. 1.6). For correction of adduction and varus in group –A (<3 months of age) the no. of casts ranges from 2 to 4 (Avg. 2.6) whereas in group-B (3 months-1 year) of age Ranges from 2 to 5 (Avg. 3.2).



Tenotomies performed in group –A (<3 months of age) in 36 babies out of 50 babies (72%) whereas in group-B tenotomies done in 44 babies out of 50 babies (88%).

In <3 months of age PMSTR not done in a single baby whereas PMSTR done in 5 babies in group-B 3 months to 1 year of age). In Group-A compliance for Foot Abduction Brace/Denis Brown Splint was good. All children were advised brace and bracing were continue till date. In group-B out of 50, 46 children properly followed the instruction and were compliant with Bracing.



Discussion

Around 70 percent of babies were referred from peripheral PHC. Early referral from Department of Obstetric and Pediatrics also contributed for better result.

Babies with CTEV with institutional delivery were giving good result due to early recognition and starting of prompt treatment with Ponseti method.

Study conducted by RA Agrawal, MS suresh in 2005 in Gorakhpur in 2005, the mean number of cast to obtain correction was 6 (Range 4 to 9) whereas in our study the, mean of corrective cast is 4.3 (Ranges from 3 to 8) [20].

In study of Vijaykumar Kulambi, M Gaurav, DS Naveen in 2017 tenotomy done in 37 feet out of 55 feet (67%) [21] whereas in this study tenotomy done in 80% babies however in their study the eldest baby was age of 5 month.

Regarding the final outcome; the study of Labib Abd El-Latief, Ismaaiel A yassin [22] of Egypt in 2013 concluded Parents of 13 babies out of 15 babies (87%) found the final appearance of the foot acceptable in their study. In our study this ratio is 96 out of 100 babies.

Conclusion

At the end of study result was excellent, all babies were free from deformity and having flexible, plantigrade, cosmetically acceptable foot which implies that Ponseti method can be easily used up to 1 year of age and is very useful in Our country which having less resources and more prevalence of clubfoot.

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