ORIGINAL RESEARCH PAPER

Orthopaedics

MANAGEMENT OF IDIOPATHIC CLUBFOOT BY PONSETI TECHNIQUE OF MANIPULATION AND SERIAL CASTING

KEY WORDS: CTEV; Idiopathic clubfoot

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ABSTRACT

Background and objective: Idiopathic Congenital Talipes Equinovarus (CTEV) is a complex deformity that is difficult to correct. The treatment of clubfoot is controversial and continues to be one of the biggest challenges in paediatric orthopaedics. Most orthopaedicians agree that the initial treatment should be non-surgical and should be started soon after birth. We aimed to study a short term follow up of 26 patients treated by the Ponseti method at the department of Orthopaedics, GMC ,jammu to assess the efficacy of Ponseti's technique for the treatment of CTEV. **Methods:** 26 patients were selected from the Out-Patient section of the Department of Orthopaedics GMC jammu for correction of idiopathic CTEV using the Ponseti technique from June 2021 to March 2022. Children included in the study were assessed for the severity of the deformity using the Pirani severity scoring system and clinical photographs were obtained. Casting of the foot was started by the technique described by Ponseti. Before cast placement every week, the foot deformity severity was assessed using the Pirani scoring system. These patients were followed up in a prospective manner for a period of minimum of six months. **Results:** At 6 months' follow-up, Ponseti's technique gave us 89.7% Good results, 6.8% Acceptable results and a 3.5% poor results. 72.4 % required pecutaneous tenotomy, while 27.6% did not require tenotomy.. Interpretation and conclusion: The Ponseti method is a safe and cost effective treatment modality for congenital idiopathic clubfoot which gives excellent results, and radically decreases the need for extensive corrective surgery.

INTRODUCTION

Congenital Talipes Equinovarus (CTEV) or Clubfoot as it is commonly known, is one of the most common congenital pathological condition. The term was first described by Hippocrates [1]. It was Nicolas Andry in his "Orthopaedicia" described the term "Pedis Equinal" which meant the foot resembling the foot of a horse. The term "talipes equinovarus" is derived from latin: Talipes, a combination of words- Talus (ankle) and pes (foot); equinus meaning "horse like" (the heel in plantar flexion) and varus meaning inverted and adducted. Incidence is 1-1.4 cases per 1000 live births. Boys are affected twice as often as girls. Bilateral involvement is found in 30-50% of cases [2]. The etiology of club foot is still obscure although too many theories have been proposed. Many studies report a higher incidence of CTEV in patients with a positive family history [3].

There has been much debate in the past as to whether a nonoperative or operative treatment was more effective in the treatment of clubfoot. Those feet usually which have had numerous manipulations and operations, are stiff, deformed and rigid due to scar tissue formation. The recommended treatment of CTEV ranges from nonoperative casting & stretching to complete peritalar surgical release and bony procedures for neglected CTEV cases. The methods of J.H. Kite5, Ignacio V. Ponseti [1] and French methods as described by Masse & Bensahel are examples of non-operative methods of correction of CTEV. The technique of gradual and simultaneous correction of all deformities of CTEV using manipulation and casting at weekly interval and a possible percutaneous Achilles tenotomy described by Dr.Ignacio V. Ponseti has gained wide acceptance throughout the world. He introduced it in North America in the late 1940s and has become a primary treatment option in many countries more recently [1]. Now, most Orthopaedic surgeons agree that the initial treatment of congenital clubfoot should be non-operative, beginning from the first day of life when the deformity can be easily dealt to achieve a plantigrade foot at the earliest because it gives better functional results. The mainstay at present, in management of clubfoot is to diagnose the condition as soon as possible and then to deal with the deformity at the earliest to realign the foot biomechanically stable. The cooperation of the parents and their education regarding the condition is another important but neglected aspect in achieving successful results [6]. In this study, we have attempted to analyse the functional outcome of Idiopathic clubfoot using Ponseti's technique in children presenting to us within the first year of age without any prior treatment.

2. MATERIALS & METHODS

Eligible patients were selected from the Out-Patient section of the Department of Orthopaedics GMC Jammu and subjected to Ponseti's technique of idiopathic CTEV correction between the period from June 2020to March 2022.. These patients were followed up in a prospective manner for a period of minimum of six months. The severity of the deformity was assessed using the Pirani severity scoring system, and clinical photographs were obtained. Casting after manipulation was started by the technique described by Ponseti. A thorough general & local examination was carried out & the deformity was scored according to Pirani's classification at each visit before applying cast. Manipulations were done by Ponseti's method followed by corrective casts at weekly interval without anaesthesia. Children were evaluated and graded for severity of clubfoot by Pirani severity scoring system [7], which registers the deformity of six different components of the clubfoot.

The congenital clubfoot undergoing treatment was assessed at each visit and assigned; a. A Midfoot Score (MS) of up to 3 (0=normal, 3= severe deformity) b. A Hindfoot Score (HS) of up to 3 (0=normal, 3= severe deformity) c. A Total Score (TS) of up to 6 (0=normal, 6= severe deformity) Consequently, the total Score was from 0 to 6 points, with 6 Ponseti management was "Scored" at each week for HS, MS, and TS (Total Score). The Scores were plotted on a graph to know how the foot was recovering on the roadmap of treatment. Tenotomy was

indicated when HS > 1, MS < 1, and the head of the talus was covered. Assessment was made using the Pirani Severity Score at initial presentation and at weekly interval, during follow up and it was noted in the proforma specially made for it. **Categorization of feet**

The feet were then classified into three categories with respect to the severity of the deformity on basis of initial Pirani Score.

- Group-I: feet with a Pirani Score of 1.5 to 2.5 points
- Group-II: feet with a Pirani Score of 3 to 4.5 points
- Group-III: feet with a Pirani Score of >5 points.

Inclusion Criteria

- Isolated idiopathic CTEV.
- Age less than 1 year.

Exclusion Criteria

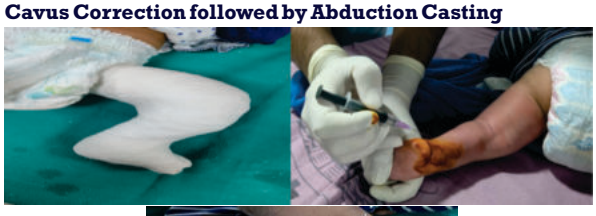
- Neglected clubfoot.
- Relapsed clubfoot
- Clubfoot associated with any other congenital abnormality.
- Arthrogyposis Multiplex Congenita.

RESULTS

The study includes treatment and follow-up of 30 children with idiopathic CTEV, treated using Ponseti's technique, between may 2020 to June 2022 The following results were observed from the data collected in our study.

I[st] Cast for Cavus Correction

Cavus Correction followed by Abduction Casting



Percutaneous Tenotomy followed by Post tenotomy cast 3weeks

26 feet (89.7%) had Good results, 2feet (6.8%) had Acceptable results and only 1 foot (2.7%) had a poor outcome at the end of treatment. At 6 months follow up, the results were more or less similar with only 1 feet (2.7%) landing up with a poor result, 26 feet (89.7%) having Good result and 2 feet (6.8%) with good result. This proves that Ponsetis technique is indeed an ideal method in treating idiopathic CTEV. In the present study follow-up was of short duration, however we anticipate equal results in the long run. Clearly, the true functional outcome of these patients cannot be determined until the child has completed growth, and perhaps not until later in life. Still, the results of treatment at the end of casting, using this validated scoring system, allow an accurate assessment of the ability of casting and Achilles tenotomy to correct the clubfoot to a supple, plantigrade position.

Table 1: Age Distribution of Patients

Age in years	No. of Patients	%
< 1 month	13	50%
1 – 6 months	10	38.4%
>6 months	3	11.6%
Total	26	100%

Table 3 : Side ofFeet Involved

Side	No. of Feet	%
Left	16	55.2%
Right	10	34.5%
Bilateral	3	10.3%
Total	29	100%

Table 2 : Gender Distribution of Patients for correction

Gender	No. of Patients	%
Female	7	27%
Male	19	73%
Total	26	100%

Table 4: Number of Casts required

No. of Castings	No. of Feet	%
1 - 2	0	0%
3 - 5	8	27.6%
6 - 10	21	72.4%
Total	29	100%

Table 5 : Frequency of PT required for correction

PT	No. of Feet	%
Yes	21	72.4%
No	8	27.6%
Total	29	100%

Table 6 : Final result of Ponseti Casting Technique

Outcome	No. of Club Feet	%
Good	26	89.7%
Acceptable	2	6.8%
Poor	1	3.5
	29	100%

Table 1 : Age Distribution of Patients

Table 2 : Gender Distribution of Patients for correction

4. DISCUSSION

A clinical study on the most common congenital deformity of foot, which is CTEV, was carried out in the Department of Orthopaedic GMC jammu, to evaluate the early results of the conservative treatment using Ponseti technique. We studied Twenty six children (29feet) who were treated by Ponseti's technique.

Clubfoot is a complex deformity of foot that requires meticulous and dedicated efforts on the part of the treating physician and parents for the correction of the deformity. The Ponseti method of correction of clubfoot deformity requires serial corrective casts with long-term brace compliance for maintaining correction. The guidelines regarding patient selection and treatment protocol vary between investigators but in general the treatment needs to be started as soon as possible and should be followed under close supervision. In this series, the male to female ratio is high (male: female 3:1) in comparison to the series of Cowell and Wein (14) and Yamamoto (15) (male: female 3:1). Palmer (16) explained this by suggesting that females require a greater number of predisposing factors than males to produce a clubfoot deformity. Social The earliest cast applied was at an age of one we The number of casts per feet in our study was three to ten (average 4.9). In a series by Ponseti et al (4), the number of cast per feet was five to ten (average 7.6). In another study by Laaveg et al (13), the mean number of casts during their treatment was seven. Morcuende (17, 18) reported that 90.0% of the patients required five or fewer casts. Over a period of time, with more experience, people have started changing plaster casts at shorter intervals (17). Those feet which required a greater number of casts in our study had a Pirani score of 6 at the onset of treatment. The duration of casts for more than 85.0% of feet was seven weeks or less .The duration decreased over time as we mastered the technique and started getting better correction early. Ponseti et al (4) reported five to twelve week's duration of casts (average 9.5 weeks). In another study by Laaveg et al (13), the average duration was 8.6 weeks. Morcuende et al (17) reported an average time from the first cast to tenotomy as 16 days for one group and 24 days for another group in the same study. Their study showed that the duration of plaster casts can be decreased by using the accelerated The Ponseti method is an excellent method of treatment of clubfoot . The follow-up of patients treated with this deformity has been over forty years in some studies and these patients are leading a normal life now. It avoids the complications of surgery and gives a painless, mobile, normal-looking, functional foot which requires no special shoes and allows fairly good mobility. Results of the clubfoot treatment by Ponseti technique in our study have been good and rewarding and now all the clubfeet are treated in our institution by this technique.

6. REFERENCES

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