SHORT TERM OUTCOME OF CLUBFOOT CORRECTION BY PONSETI METHOD

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ABSTRACT

Background: Congenital Talipes Equino Varus (CTEV) is a common complex congenital deformity of the foot. Treatment still continues to challenge the skills of the pediatric orthopedic surgeon as it has a notorious tendency to relapse, irrespective of whether the foot is treated by conservative or operative means. **Objective:** To evaluate the short term outcome of Ponseti method of serial manipulation and casting in Congenital Talipes Equino Varus (CTEV) in children up to 6 months of age. **Methodology:** A descriptive case series study was carried from 16th February to 15th August 2012 in the department of orthopaedic surgery, Sheikh Zayed Medical College/Hospital Rahim Yar Khan. A total of 200 feet were included in this study. The first cast application corrects the cavus deformity by aligning the forefoot with the hindfoot, supinating the forefoot to bring it in line with the heel, and elevating the first metatarsal. One week after application, the first cast was removed, and after about 2-3 minutes of manipulation, the next toe-to-groin cast was applied. Manipulation and casting continued weekly for the next 5 to 6 weeks. **Results:** Mean age of patients was 3.9±1.7 months. Ninety one patients (62.3%) were male while remaining 55 patients (37.7%) were female. Left foot deformity was seen in 48 (33%) patients, right foot deformity was found in 34 (23%) patients and 64 (44%) patients were suffering from bilateral deformity. Percutaneous tenotomy of Tendo-Achilles was performed in 167 patients (83.5%). Out of 200 feet, correction was achieved in 177 feet (88.5%) with zero Pirani score. **Conclusion:** Ponseti's method is simple, easy to learn, effective and reproducible method for correction of Congenital Talipes Equino Varus (CTEV) deformity in children.

Key words: Ponseti's method, Congenital Talipes Equino Varus, Short term outcome

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INTRODUCTION

Congenital Talipes EquinoVarus (CTEV) is a common complex congenital deformity of the foot occurring about one in every 1,000 live births. Approximately 50% cases of the clubfoot are bilateral.[1] This occurs in males more often than females by a ratio of 2:1.[2] Treatment still continues to challenge the skills of the pediatric orthopedic surgeons as it has a notorious tendency to relapse, irrespective of whether the foot is treated by conservative or operative means.[3] The clubfoot deformity occurs mostly in the tarsus. The tarsal bones, which are mostly made of cartilage, are in the most extreme positions of flexion, adduction, and inversion at birth. The talus is in severe plantar flexion, its neck is medially and plantarly deflected, and its head is wedging shaped.[4] previously surgery was performed in 90% of feet but now a days surgery has been pushed to less than 10% of patients only after the popularity of Ponseti method worldwide.[5] The success rate of previously used Kite method of casting was 10%-63% but the success rate of recent Ponseti casting is more than 90%.[6, 7] Long term results of correction of club foot by ponseti method are available for sixty years.[8] Surgery was the only option for correction of severe clubfoot deformity in children before 2000.

But with surgical treatment, the child ends up with a stiff, fixed ankle, and will always limp. The child can walk but not with a "normal" gait.[8] Ponseti proved through many experimental studies in large number of patients who walk without limps or deformity of the foot and ankle after his record keeping attitude and many publications in the international journals.[9]

Most of the time this correction of club foot by ponseti method is done on outdoor basis. This has reduced lot of operation theater burden on the busy schedule of the orthopedic surgery. The objective of this study was to evaluate the short term outcome of Ponseti method of serial manipulation and casting in Congenital Talipes Equino Varus (CTEV) in children up to 6 months of age.

METHODOLOGY

This descriptive case series study was carried out over a period of six months from 16th February to 15th

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August 2012 in department of orthopaedic Surgery Sheikh Zayed Medical College/ Hospital Rahim Yar Khan. Two hundred feet in children with clubfoot of both sexes up to 6 months of age were included in the study by non probability purposive sampling through outpatients clinics of orthopedic surgery. All the patients were without resistant deformity. Patients with more than six months of age, congenital contractures, neurological disorders and syndromic feet were excluded from the study. The informed consent was taken. Manipulation and casting was started as soon as the patient presented in outpatient department. After about 2 to 3 minute of manipulation, toe-to-groin cast was applied. Manipulation and casting continued weekly for the next 5 to 6 weeks. The final cast was applied in the position of maximum abduction and 15 degrees of dorsi-flexion for 3 weeks after percutaneous tenotomy if needed. On every visit correction was assessed by Pirani score and was noted in the proforma attached. After completion of casting Pirani score of zero was considered as corrected and any score more than zero was accepted as uncorrected. This was followed by abduction foot orthosis up to six months.

Data was analyzed by SPSS version 11. The quantitative variables like age presented as mean and standard deviation. The qualitative variables like gender and final outcome i.e correction of club foot deformity (Corrected and not corrected) presented by frequency and percentage.

RESULTS

A total of 200 feet of 146 children were included in this study. Majority of the patients 87 (59.6%) were between 4-6 months of age and 59 (40.4%) were between 1-3 months old. Mean age was noted 3.9±1.7 month (Table-I).

Table I: Distribution of cases by age. (N=146)

Age (months)	Number	Percentage
1-3	59	40.4
4-6	87	59.6
Total	**146**	**100.0**
Mean ± SD	**3.9 ± 1.7 month**	

Regarding gender distribution, 91 patients (62.3%) were male while remaining 55 patients (37.7%) were female.

Distribution of cases by deformity was as follows: left foot deformity was in 48 (33%), right foot deformity in 34 (23%) and bilateral deformity was 64 (44%). (Table II)

Percutaneous Tenotomy of tendo Achilles was performed in 167 patients (83.5%). Eighty eight percent of feet of patients were cured. (Table III).

Table II: Distribution of cases by deformity

Deformity	Number	Percentage
Left foot	48	33
Right foot	34	23
Bilateral	64	44
Total	**146**	**100**

Table III: Distribution of feet with corrected foot (outcome)

Foot corrected	Number	Percentage
Yes	177	88.5
No	23	11.5
Total	**200**	**100.0**

DISCUSSION

Congenital talipes equinovarus is the most common congenital orthopedic disease. Its etiology is unknown but appears to be complex.[10] The incidence is estimated to be 0.646.8 per 1,000 live births.[11, 12] Although it has been widely accepted that clubfoot is multi-factorial in origin, genetic factors clearly play a central role. In a study on identical twins, the concordance was 33%. Moreover, nearly 25% of all cases are familial.[13] This study has some limitations. There was no control group to compare our results with other surgical and nonsurgical methods. Deformities were assessed only clinically as no radiographs of the patients were used to assess the correction. Sharp et al stressed that low foliate status in pregnant women could cause several congenital malformations, and a reduction in the birth prevalence of idiopathic CTEV was observed in the United States and Denmark after fortification of grains with folic acid, or supplementation.[14] The method of serial manipulation and casting developed by Ponseti for congenital clubfoot was instituted in an effort to achieve a plantigrade, functional foot without the need to resort to major surgical intervention. A study reported that open surgery was avoided in 89% of cases by this technique of manipulation, casting and limited surgery.[15]

Before the introduction of Ponseti Method, the

treatment commonly used was stretching and strapping between three and five months which often resulted in partial correction. The partially corrected feet were then treated by postero-medial soft-tissue release. Various techniques of postero-medial soft-tissue release for resistant club foot have been described.[16, 17] and excellent or good results after open release have been achieved in 52% to 91% of patients. [18] However, most of these patients had a relatively short follow-up, ranging between two and eight years. The long-term results have been disappointing with increasing pain in the foot, and disability.[19]

The short-and medium-term complications of posteromedial soft-tissue release range from simple wound infection to distal necrosis requiring amputation. Overcorrection, loss of correction and relapse has also been reported.[20] Long-term complications include stiffness and weakness leading to premature arthritis. [21] In most patients the standard accepted practice of serial manipulations and posteromedial soft-tissue release produced excellent short-term but disappointing long-term results; this encouraged us to change to the Ponseti method. This series represents our early experience with this method. In more than 80% of feet, the deformity was corrected avoiding the need for posteromedial soft-tissue release.

In a study by Bhaskar and Patni,[22] tenotomy was performed in 89% feet which is comparable with present study where tenotomy was performed in 83.5% of feet. This figure is also close to the Singh et al who demonstrated need of tenotomy in 81.3% feet.[23] A study showed that percutaneous tenotomy of tendo Achillis performed during the first few months of life, is a benign procedure, with no long-term effect on muscle strength.[24]

However, a study reported bleeding complications after percutaneous tenotomy for congenital clubfoot and in present series, damage to neurovascular structures occurred in one child.[25] This was managed by open exploration, ligation of the artery and primary repair of the nerve. In present study, 88.5% deformities were corrected which is consistent with the study of Saif Ullah et.al reporting results of the Ponseti method showing that 95% of the deformities were corrected without need for extensive surgery.[26] Recovery rate in this study is also comparable with the results, reported by Herzenberg et al, whose study included similar population and follow-up.[27]

In present study male patients were 62.3% and female patients were 37.7%. Arif et al in their study, reported 53.3% males and 46.7% females.[7] Bilateral Congenital talipes equino varus (CTEV) was observed in 59% feet in current study whilst in Arora et al study, club foot deformity was seen in 42% of patients.[28]

CONCLUSION

Ponseti's method is simple, easy to learn, effective and reproducible method for correction of Congenital Talipes Equino Varus (CTEV) deformity in children.

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