Ponseti technique in the management of Idiopathic club foot

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ABSTRACT

284 feet in 182 children with clubfoot treated by Ponseti method in Government Medical College, Thiruvananthapuram during period of August 2011 to August 2013 were studied prospectively. Aim of the study was to evaluate the results and complications of Ponseti method of treatment and to assess the compliance of foot abduction orthosis by children and parents.

The severity of initial club foot deformity, age at the initiation of manipulation, total duration of treatment and the need for tenotomy were studied. Severity of club foot was evaluated by Pirani scoring. The children were followed up for an average duration of 20 months. The outcome has no relation with the severity of deformity, but the younger the age the less the number of the casts were needed.

Parents of 62 infants were feeling discomfort with the use of the orthosis but when explained properly they co-operated. 89% patients had post treatment score of 0 compared with average pretreatment score of 5.5. 56% needed tenotomy. Total average duration of the cast treatment was 2 months and we found excellent to good functional results in 80% in 20 months follow up.

Keywords: Club feet, Ponseti technique

INTRODUCTION

Idiopathic clubfoot is a complex deformity which is difficult to correct. The deformity has four components: forefoot equinus, hindfoot varus, forefoot adductus and midfoot cavus. The aim of the treatment is to reduce or eliminate all the components of the deformity to obtain a painless, plantigrade, pliable cosmetically and functionally acceptable foot with the minimum time duration and with least interruption in the socio-economical life of the parents and the child.

There is nearly universal agreement that the initial treatment of the clubfoot should be non-operative regardless of the severity of the deformity. Historically, the treatment consists of forcible serial manipulation by correcting all the deformities simultaneously with the fulcrum at the calcaneo-cuboid joint as described by the Kite.¹

If deformity persists, most surgeons prefer to do a postero-medial soft tissue release. Although all of these methods have the potential to be successful when applied correctly, most of the authors have reported a success rate of only 15% to 50%.³ A notable exception is the Ponseti Method⁴ which involves serial corrective manipulation, a specific technique of the cast application and a possible percutaneous Tendo Achilles tenotomy.

Ponseti followed up his patients for 25 to 40 years and found that, although conservatively treated clubfoot was less supple than normal foot, there were no significant differences in function or performance compared to a population of a similar age born with normal foot.⁴

The method has been reported to have short-term success rate approaching 90% and the long-term results have been equally impressive. Cooper and Dietz,⁵ in a review of the cases of forty-five patients who had been treated by Ponseti method and followed for a mean of thirty years, found that, with the use of pain and functional limitation as the outcome criteria, 35 patients (78%) had achieved an excellent or good outcome.⁵

The unsatisfactory results associated with complete soft tissue release at ten to fifteen years of follow-up and the long term success reported with the Ponseti method have led to a renewed interest in this method.⁶
**Aim of Study**

The aim of our study was to assess the results of Ponseti method of treatment in children with idiopathic club foot, the possible complications associated with it and compliance of foot abduction brace by the children and parents.

**Patients and Methods**

This study was done at Government Medical College, Thiruvananthapuram during the period August 2011 to August 2013. 284 feet in 182 children were studied. Study design was a prospective case series study. Only idiopathic cases of both gender less than 6 months were included. Syndromic, relapsed, neglected, resistant and recurrent cases were excluded.

After a thorough clinical examination and confirmation of diagnosis, photographs of the deformity were taken. Severity was assessed by Pirani scoring system. Manipulation of foot and long leg plaster of Paris application was done as described by Dr. Ponseti.

In all patients, the cavus is corrected first by supinating the forefoot and dorsiflexing the first metatarsal. To correct the varus and adduction, the supinated foot is abducted with counter pressure applied with the thumb against the head of the talus. Four to eight long leg casts, changed weekly after proper manipulation of the foot, are usually sufficient to obtain good correction. Casting was stopped when midfoot and hindfoot scores were zero with 70 degrees of abduction of the forefoot.

If midfoot score is one or less and hindfoot score more than one due to limited dorsiflexion, percutaneous tenotomy of the Achilles tendon is performed. Forty five minutes before the procedure, local anesthetic EMLA (Eutectic Mixture of Lignocaine and prilocaine Anaesthetic) cream is applied at the tenotomy site. 20 minutes before the procedure Midazolam 0.5 mg/kg was given orally. All cases were done in operation theatre under local anaesthesia. Patients were monitored for 1 hour post operatively. A long leg cast is applied in 70° of abduction and maximum available dorsiflexion immediately after tenotomy and maintained for further 3 weeks to allow healing of the tendon.

After 3 weeks cast removed and Steenbeek foot abduction orthosis [FAO] was given and checked for heel touch. Children were reviewed every month and Pirani scores were documented. FAO is worn fulltime for first three months after casting and then at night until child is about 4 years old. The severity of the foot deformity was assessed according to Pirani scoring system. (Table 1) Each parameter is scored according to the following principle: 0 for no abnormality, 0.5 for moderate abnormality and 1 for severe abnormality. Thus, each foot can receive a Midfoot score between 0-3 and a hindfoot score between 0-3 and a total score between 0-6. We assessed final functional results by a rating system devised by Ponseti with 100 points indicating a normal foot.

**Results**

Most of our patients have average age of 1 month with a male female ratio of 3:1. 89% cases were full term normal deliveries with an average pre treatment Pirani score of 5.5. 56% children required tenotomy. 99% children had good compliance with treatment. 88% of children had a post treatment Pirani score of zero, 9% had 0.5 and remaining 4% had a score of one. 4 cases relapsed. We followed the functional rating system of Dr. Ignacio Ponseti and had 80% excellent to good functional score, 15% with fair and 5% with poor scores.

We have not given any importance to radiological correction of the deformity. Children who started the treatment early had better functional outcome. Number of casts also increased proportionately with age of starting treatment. Average number of cast needed was 6. Sixty two infants were feeling discomfort with the use of the brace but when parents were explained properly they co-operated well. Four cases of recurrences were due to the non-adherence to the FAB protocol.

**Discussion**

Although this study represented our learning curve with the Ponseti method of treatment, we are very satisfied with our initial results. The major concern in the operative treatment of congenital clubfoot is functional outcome. Open surgical release often leads to scarring and stiffness of the ankle, with resultant limitation of motion and strength. Aronson and Puskarich studied the disability associated with various clubfoot treatment options. Their results showed that patients who underwent casting or casting with heel cord lengthening had the least deformity and disability. Patients who had...
undergone posteromedial release had reduced ankle movements and diminished push off strength.

Our patients who were treated with the Ponseti method had much better ankle range of motion, both in dorsi-flexion and plantar-flexion. Few authors describe their technique of casting precisely. Kite illustrated his method in 1964 and comprehensively outlined his technique of manipulation. He recommended abducting the forefoot against pressure at the calcaneo cuboid joint. Ponseti called this maneuver “Kite’s error” because it blocks the correction of the hindfoot varus and internal rotation

Zimbler reported poor follow up results for 75 patients (90 feet) who were treated using the Kite method. Only 10% of the patients responded to the conservative treatment, all others required surgery. Another important factor in clubfoot casting is the need to use long leg casts. Kite used below the knee casts in children younger than 12 months. Ikeda used short leg casts in all of his patients. A below knee cast is not suitable for holding the foot abduction and therefore should not be used at any age.

Percutaneous tenotomy performed during the first few months of life has been shown by Cooper and Dietz to be a benign procedure, with no negative long term effect on muscle strength. Although Ponseti suggests a relapse rate closer to 10%, the diminution being attributed to an improved appreciation of the need for careful follow-up treatment with the foot abduction brace [FAB]. FAB splinting after the casting period seems to be crucial to avoid relapse of the treated feet and should be administered by any means. Bensahel et al and others from France have described a method of serial manipulations by well trained physiotherapists to avoid postero medial release. However, it has been pointed out that the French treatment involves a very lengthy procedure and a long casting time and has a relatively low success rate compared with Ponseti’s method.

REFERENCES


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