

OUTCOME OF PONSETI TECHNIQUE FOR IDIOPATHIC CLUBFOOT USING PIRANI SCORING SYSTEM

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ABSTRACT

Objectives: To determine the outcome of Ponseti technique for Idiopathic Clubfoot.

Material and Methods: This descriptive cross sectional study was carried out at Department of Orthopedic, Khyber Teaching Hospital Peshawar, from Sept 2009 to sept 2010 recruiting 70 patients with club foot deformity. Patients were scored according to Pirani scoring system and then Ponseti protocol of manipulation and casting was followed. Each cast remained for 7 days. On each visit with the removal of cast, improvement in Pirani score was noted followed by manipulation and casting. Data was entered in software SPSS version 10.0.

Results: A total of 70 patients with clubfeet were included in the study. Forty three (61.4%) were male while 27 (38.6%) were female. Twenty-seven (38.6%) were bilateral while 43 (61.4%) had unilateral clubfoot. Twenty-six (37.1%) were right sided while 17 (24.3%) were left sided. Sixty three (90%) cases were fully corrected by Ponseti method as evaluated by Pirani scoring system while 7 (10%) cases could not achieve full correction.

Conclusion: Patients with Idiopathic Clubfoot can be successfully treated in children from birth to 8 months of age by Ponseti technique of serial casting.

Key Words: Congenital, Talipes equinovarus, Ponseti technique, Pirani scoring.

INTRODUCTION

Idiopathic Clubfoot is a common congenital deformities. It affects about one infant in every 750 births. If uncorrected, infant can face a life of disability. Ponseti serial castings yield excellent results. It is a common musculoskeletal birth defect affecting an average of 1 in 750 newborn¹. The deformity has four components namely cavus of the midfoot, adductus of the forefoot, varus of the hind foot and equinus². Many different methods of treatment are used most of which involve manipulation and casting³. When Ponseti method was properly followed including initial casting, compliance with brace and treatment of recurrence by recasting and/or Achille's tenotomy the success rate was reported to be 93%⁴. The Ponseti method is safe and effective treatment for congenital idiopathic clubfoot and radically decrease the need for extensive corrective surgery⁵. It is reported to provide a lower complication rate and pain and better function as the patient ages as compared to operative treatment⁶. The Ponseti method involves serial manipulation, specific technique of cast application and possible percutaneous Tendo Achille's tenotomy⁶.

Treatment of clubfoot with the Ponseti method is successful when performed immediately after birth⁷, but this technique is reported to be effective in children upto two years of age even after previous unsuccessful non-surgical treatment⁸. Correction of the deformity is in the order of; Cavus Adductus Verus and Equinus (CAVE) the cavus is corrected first followed by adductus, varus and equinus at last. At this point there is often a residual equinus which requires percutaneous Achille's tenotomy².

Pirani introduced a scoring system to assess the severity of clubfoot deformity and response to treatment. It is based on hindfoot and midfoot deformities. A corrected idiopathic congenital clubfoot deformity may still score 0.5-1 on the Pirani scale due to mild deformity of the hind foot or skin creases². While the etiology of Idiopathic Clubfoot is considered to be complex and the cause is remains unknown genetic, maternal and environmental factors have been suggested to play an etiological role⁹.

Conservative treatment is the best option for Idiopathic Clubfoot, which starts at an early age almost since birth of the child¹⁰. Ponsetti casting and French physical therapy methods have gained interest of orthopaedic surgeons eager to find a less aggressive treatment method that can assure a lasting good result. Both methods have proven successful in reducing the number of patients requiring extensive surgical releases and as a result become integral part of paediatric orthopaedic

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practice¹¹. However, the incidence of recurrence of the deformity was reported by many authors and some sort of soft tissue release of boney procedures were done later on after conservative management¹².

Though the initial treatment of Idiopathic Clubfoot is conservative. when it does not respond to conservative management then surgical intervention is necessary. Any surgical treatment of foot deformities must be preceded by an exact preoperative analysis of every aspect of the deformity and its functional consequence. The goals of surgical treatment are correction of deformity, reestablishment of stability of the foot and preservation of functionally important ranges of motion and muscle strength¹⁰. Indication for surgery is failure to correct or maintain the correction after conservative treatment¹³.

In our setup, patients of idiopathic clubfoot deformity are admitted for surgery. This causes a lot of burden on the patients and available resources. This study will help us to reduce the surgical burden on our unit, and economical burden on the family by treating them by Ponseti method.

MATERIAL AND METHODS

This descriptive cross sectional study was conducted in Department of Orthopedics and Traumatology, Khyber Teaching Hospital, Peshawar from September 2009 to September 2010, recruiting 70 patients convenience sampling. All cases of unilateral and bilateral Idiopathic Clubfoot between birth and eight months of age of either gender were included. Patients with other congenital anomalies like Arthrogyriposis, Meningomylocele, spina bifida and patients who had undergone previous treatment non surgically or surgically were excluded from the study.

All the patients of clubfoot were seen in the OPD meeting. The parents were explained in detail about the Ponseti method. A written informed consent was taken. The selected patient's foot were scored according to Pirani scoring system, and entered into the proforma. Then Ponseti protocol of manipulation and casting followed. The cast remained for 7 days. On each visit, after removal of cast, the foot was assessed and Pirani score was noted. This process continued weekly up to fourth cast. Any extra cast needed was noted in the proforma. At fifth visit if the equinus was not corrected, percutaneous Achilles' tenotomy under local anaesthesia was done and cast was applied for three weeks. Separate proforma was used for each cast and each foot. Outcome was measured in terms of improvement in Pirani score treated by Ponseti method.

Data was analyzed with the help of SPSS version 10. Descriptive statistics was used to calculate mean and standard deviation for Age. Frequencies/percentages were calculated for gender, degree of abnormality, corrected or improved feet/cases and frequency of Achilles' tenotomy done.

RESULTS

Total of 70 patients with club foot deformity were included in the study comprising of 43 (61.4%) males and 27 (38.6%) females. The mean, mode and median for the age were 4.73 months, 5 months and 5.00 months respectively. The minimum age was 1 month while the maximum age 8 months. Bilateral deformity was present in 27 (38.6%) patients while 43 (61.4%) patients had unilateral deformity of unilateral clubfeet. 26 (37.1%) patients had right sided involvement while left side was involved in 17 (24.3%) patients.

Full correction evaluated by Pirani scoring system was achieved in 63 (90%) feet by Ponseti method of manipulation and serial casting (i.e. Pirani score < 1) as shown in Table 1. Seven (10%) feet in our study could not achieve full correction (i.e. Pirani score = >2) Achilles tenotomy was done in 43(61.4%) feet for the correction of equinus. While 27(38.6%) feet achieved corrected foot with Ponseti casting without tenotomy.

Table 1: Pirani scoring

Parameters in midfoot	Normal	Moderate	Severe
Curved lateral border	0	0.5	1
Medial crease	0	0.5	1
Talar head coverage	0	0.5	1
Parameters in hind foot		0.5	1
Posterior crease	0	0.5	1
Rigid equinus	0	0.5	1
Empty heel	0	0.5	1

DISCUSSION

Clubfoot occurs in one in 1000 live births and is one of the most common birth defects involving the musculoskeletal system. A trend over the last decade has been a move away from extensive soft-tissue release surgery and toward less invasive strategies focused more on manipulation and casting. There are both successful long-term and short-term data published on the Ponseti method demonstrating its effectiveness in achieving and maintaining correction over long-term without the need for extensive release surgery in the vast majority of cases. The Ponseti method consists of serial manipulation and casting, Achilles tenotomy, and foot abduction bracing¹⁴.

In our study, 61.4% were male while 38.6% were female. 38.6% were bilateral club feet and 61.4% were unilateral clubfeet. A study of college of surgeon reported 38 male and 12 female of clubfoot with bilateral involvement in 27 patients². A local study found

12 (30%) patients had bilateral deformity; There were 5 (12.5%) male and 7 (17.5%) female. The remaining 28 (70%) patients had unilateral deformity; 16 (40%) males and 12 (30%) female¹⁵.

In our study the mean, mode and median for the age were 4.73 months, 5 months and 5.00 months respectively. The minimum age was 1 month while the maximum age was 8 months. Noam Bor and Julie recorded 74 patients with 117 clubfeet (59 left feet, 58 right feet) in their study. Twenty-six were girls and 48 were boys with Forty-three patients had bilateral clubfoot, and 31 had unilateral clubfoot (15 right feet, 16 left feet). The mean age at presentation for treatment was 67.1 days (median, 7.5 days; range, 1–630 days)¹⁶. One local study recorded seventy patients of club foot, 38 (54.28%) males and 32 (45.71%) females, with an age ranging from 6 months to 3 years. Twenty three (32.857%) patients had bilateral deformity out of which 9 (12.85%) were male and 14 (20%) were female and the remaining 47(67.15%) patients had unilateral deformity, 29(41.42%) males and 18 (25.71%) females. The ratio was 38 Male to 32 female (1.2 to 1) in study¹⁷.

In our study 90% feet were fully corrected by Ponseti method as evaluated by Pirani scoring system. 10% patients in our study could not achieve full correction. Elshenawy and Hassanen reported 95.5% correction of clubfoot by Ponseti method and concluded that the Ponseti method is a very safe, efficient treatment for the correction of clubfoot that radically decreases the need for extensive corrective surgery. Furthermore, it can be used successfully in children up to one year of age when no previous surgical treatment has been attempted¹⁸. Kampa R, Binks K treated 24 children (39 feet) with Ponseti method and successful initial correction of the deformity was achieved in 37(95%) of the feet studied with a Follow-up for a mean of 31 months¹⁹. Abbas and Qureshi achieved correction in 95% of clubfeet in their study and concluded that the good results obtained by the Ponseti technique show that posteromedial soft tissue release may no longer be required for most cases of idiopathic Idiopathic Clubfoot. Pirani scoring and podography can be used to monitor the treatment. The Pirani score can also be used to estimate the duration of treatment²⁰. Gupta and Singh treated 154 feet in 96 children by the Ponseti method from January 2003 to December 2005. After six months of treatment the Pirani score was reduced to zero for all patients. The results show that corrective surgery, sometimes multiple, can be avoided in most cases which are usually associated with the development of a stiff, painful foot²¹.

Achilles tenotomy was done in 61.4% feet for the correction of equinus. Tenotomies were performed in

77.5% in Elshenawy and Hassanen study¹⁸ while it was 46% by Kampa R,¹⁹ 96% by Abbas and Qureshi,²⁰ and 95% by Gupta and Singh²¹ While Maris G and Nogueira quoted 83% and 93% respectively. The limitations of our study were a small number of patients, narrow range of their age and short follow-up period. Further research studies should be undertaken with similar groups to confirm our results and increase the liability of our findings.

CONCLUSION

Patients with Idiopathic Clubfoot can be successfully treated in children up to 8 months of age by Ponseti technique of manipulation and serial casting.

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