

OUR EXPERIENCE IN TREATMENT OF CONGENITAL TALIPES EQUINOVARUS - SEVEN YEARS

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Abstract

Congenital talipes equinovarus, also referred to as clubfoot is one of the most common pediatric orthopaedic conditions requiring comprehensive treatment.

The aim of this study is to provide an overview of the cases of congenital talipes equinovarus that underwent treatment in the Clinic for Pediatric Surgery and Orthopedics of the Emergency Children's Hospital "Louis Țurcanu" Timișoara, Romania between January 2007 and December 2013.

We retrospectively analyzed the clinical data of 321 patients with congenital talipes equinovarus.

They have been taken in consideration gender, groups of age, localisation, associated abnormalities, type of treatment (orthopaedic and/or surgical). The treatment was orthopaedic in all 321 patients and 100 patients had indication for surgical treatment. The Ponseti method had been introduced in our clinic three ago being treated with this method a number of 15 patients.

The results using Ponseti method were good and after the orthopaedic treatment the surgical treatment is less necessary, this method being also the most effective and least expensive treatment of clubfoot.

Key words: clubfoot, orthopaedic treatment, surgical treatment, Ponseti method, most effective, least expensive

Introduction

Throughout the time, walking research had been approached by numerous researchers from different specialities. Borelli (1682) is most likely worthy of determining the position of the gravity center. Demeny and Carlet (1891) introduced in the pressure control on the soil as well as chromatography. Braune and Fischer (1885) offered a mathematic approach of walking (1).

"Human stepping has the general characteristic of the quadrupeds, which move their limbs cross like. When man walks, he moves his four limbs as a horse, cross like; first stepping with the right foot and outstretching the opposite hand in the same time "said Leonardo DaVinci(1,2).

Congenital talipes equinovarus occurs in one in 1000 live births and is one of the most common birth defects

involving the musculoskeletal system. Males are more commonly affected than females and up to 50% of cases are bilateral. When one parent is affected with clubfoot, there is a 3% to 4% chance that the offspring will also be affected. However, when both parents are affected, the offspring have a 30% chance of developing clubfoot (2).

Idiopathic clubfoot is an isolated deformity of the foot and leg that is identifiable in utero and consists of four components: equinus, hindfoot varus, forefoot adductus, and cavus. Clubfoot deformity may be associated with myelodysplasia, arthrogyryposis, or multiple congenital abnormalities(3).

The diagnosis is simple, it is based on the described deformities, which are obvious at the inspection from the birth, and eventually underlined by the radiography.

Objectives

The main objective is to compare the morphological and functional changes in patients treated with Ponseti method to French method.

We retrospectively analyzed the clinical data of 321 patients with congenital talipes equinovarus.

Materials and methods

This study includes 321 patients with clubfoot (<1 month to >4 years of age) who were admitted and treated in our clinic during the January 2007 – December 2013 time frame. Patients data was obtained from hospital admission records, clinical observation forms, surgical records and imagistic studies. The analysis employed looked at demographic and anamnestic data, therapeutic methods, clinical evolution and treatment results.

The treatment of clubfoot applied in the Pediatric and Orthopaedic Surgery Clinic Timisoara includes consecutive cast immobilisations at 2-3 days, the immobilisation periods alternates with massage and physiotherapy: 3-4 weeks immobilisation, 1 week massage (Figure 1).

In case of the failure of the orthopaedic treatment surgery is indicated, performing Codivilla operation, ± arthrotomy, plantar aponevrotomy (Figure 2).

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Figure 1. Steps of cast immobilisation.

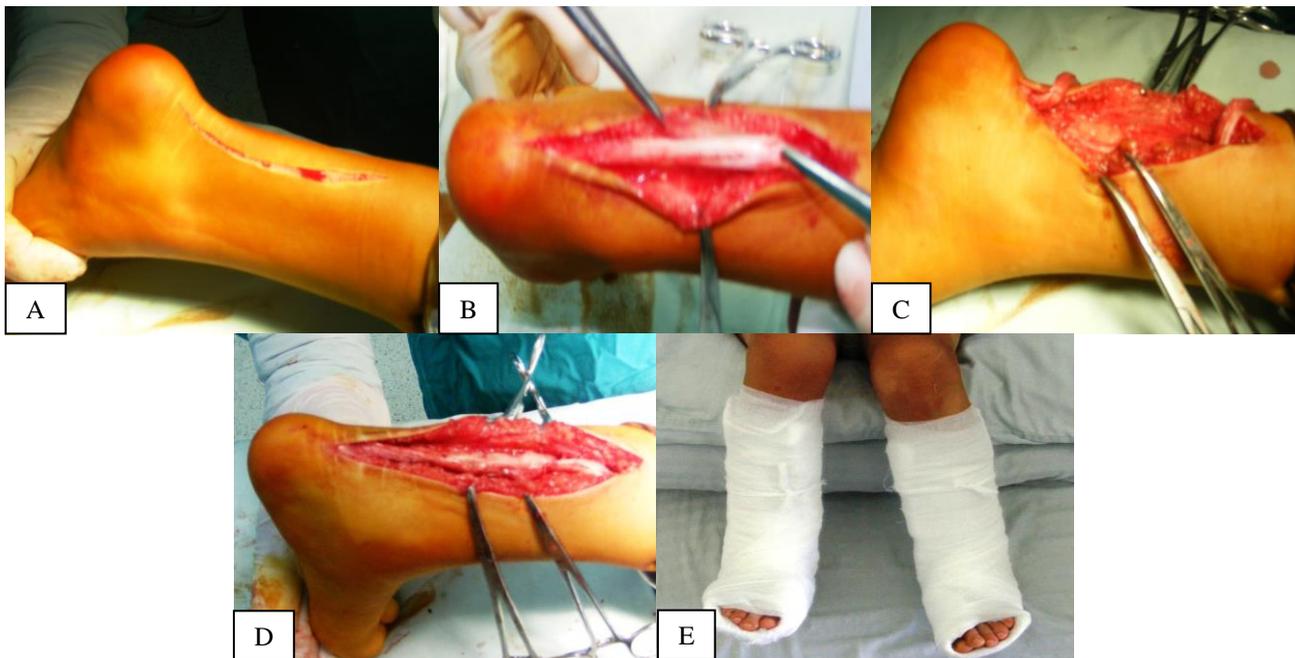


Figure 2. Steps of Codivilla operation. **A.** Slightly curved with concavity medial incision along the lateral aspect of the tendon relief achilian. **B.** Dissect and guide the tendon by locating the route of the future tenotomy in equin club foot the achillion tendon section is being made in a frontal “Z” incision. **C.** Dissect and guide the tendon by locating the route of the future tenotomy in varus equin club foot the achillion tendon section is being made in a sagittal “Z” incision. **D.** Guide the foot at 90 degrees on the leg suturing the foot with the leg in easy hypercorrection. **E.** The cast immobilization postoperatory has to be kept for 30 days.

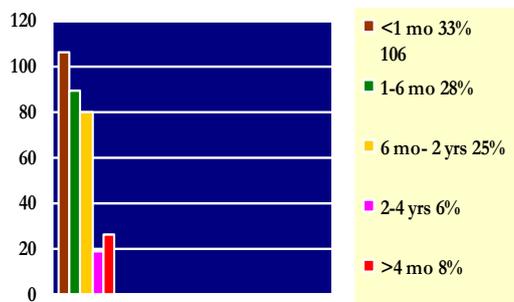


Figure 3: Patient distribution by age.

Results

Of the 321 patients included in the study, 87 are girls and 234 are boys (27% girls and 73% boys).

Figure 3 summarize patient distribution by age. 106 (33%) were less than one year of age at the time of admission. In 56% of cases (180 patients) the clubfoot was bilateral, in 77 patients the right foot was affected (24%) and

64 patients were with the left foot affected (20%). Table 1 indicates the associated disorders which were found at these

patients.

Table 1. Associated disorders.

Associated disorders	No. patients
Talipes valgus	32
Congenital hip dysplasia	11
Arthrogyposis	7
Cleft lip, cleft palate	6
Scoliosis	7

The treatment used in the Pediatric Surgery and Orthopaedic Surgery Clinic Timisoara in children <1 year old initiate with 7-14 days of massage, gymnastics, recovery in elastic bandages and adhesive tapes. After 3-4 months continue recovery in splints and plaster casts. Finally after the age of 4 months surgery is indicated: the elongation of the achillion tendon and optionally the elongation of the tibialis posterior, minimal posterior tibio-talus capsulotomy, plantar aponevrotomy. In case of relapse or in children 1-2 years old the surgical treatment is used such as Codivilla, Ugo-Camera-Judet or Heymann interventions. Postoperative

indicatios are cast immobilisations 1-3 months intervals, orthopaedic footwear, gymnastics, physiotherapy until the age of 5-7 years. In children >10 years old initially is indicated Codivilla intervention and duple or triple arthrodesis.

The orthopaedic treatment was applied in all 321 cases, surgery being indicated in treatment of 100 patients. 75 patients needed elongation of achillion tendon, in 10% of cases was used plantar aponevrotomy-capsulotomy, 3 patients plantar aponevrotomy and only 3% needed bone surgery (Figure 4).

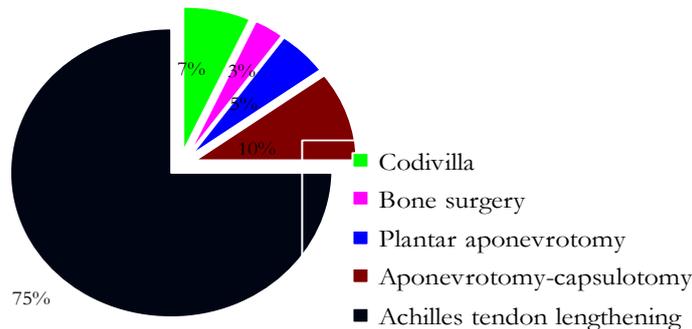


Figure 4. Patients distribution by surgical treatment.

The Ponseti method was applied in our clinic for the first time three years ago.

15 cases have been treated, at the moment when the treatment got started the patients were <1 month of age. The number of imobillisations varied on an average of 5/case. The period of imobillisation varied with an average of 2 months.

Discussions

Over the past decade, the Ponseti method has become the standard of clubfoot care around the world (4).

Hyounmin Noh and Soo-Sung Park (5) sustain that here is general agreement that the initial treatment for idiopathic congenital clubfoot should be nonoperative, regardless of the severity of the deformity, and should be started as soon as possible after birth. The goal of the treatment for clubfoot is to have a functional, pain-free, plantigrade foot with good mobility that does not require the

patient to wear modified shoes (Hegazy et al. 2009). In 1950, Ponseti developed a method for treating congenital idiopathic clubfoot that uses manipulation and casting followed by PAT (percutaneous Achilles tenotomy) if pes equinovarus deformity remains (Ponseti 1992). This method is successful in almost 90% of cases (Herzenberg et al. 2002, Hegazy et al. 2009), and PAT should be the treatment for almost 85% of clubfeet (Morcuende et al. 2005).

They suggest that the clinical Pirani score, lateral tibioacalcanal angle, and lateral talocalcanal angle should be measured at the time of PAT because they may predict residual equinovarus deformities that might show even after Ponseti treatment of severe idiopathic clubfoot.

Lajja Desai, Florin Opreescu, Andrew DiMeo and Jose A. Morcuende (6) say that the adherence to the bracing protocol is the main factor for the longterm success of the treatment.

Given the potential devastating complications and discouraging long-term results, treatment preferences have since changed to primarily a non-operative approach through the Ponseti method. The method has become the standard of care and completely eliminates the need for extensive operative correction in over 98% of patients if applied correctly (7). The treatment involves manipulation, a series of castings, percutaneous Achilles tenotomy and foot bracing. With correct application of the procedure and appropriate patient adherence, complete correction can be achieved in as little as 16 days with an accelerated casting protocol.

According to Shawne Faulks and B. Stephens Richards (8) the Ponseti and French functional methods are equally effective.

Using gait analysis to evaluate the function of children treated with these techniques, there was no difference in cadence parameters between the two groups. More of the children treated with the French method walked with knee hyperextension, a mild equinus gait, and mild footdrop. In contrast, more of the patients in the Ponseti group demonstrated mildly increased stance-phase dorsiflexion and a calcaneus gait.

Matthew B. Dobbs and Christina A. Gurnett (9) believe that the avoidance of extensive soft-tissue release operations in the primary treatment should be a priority, and the use of surgery for clubfoot correction should be limited to an ‘a la carte’ mode and only after failed conservative methods.

They suggest that although current treatment methods appear to be effective for most patients irrespective of etiology, knowledge of etiology may be helpful for prognosis, risk of comorbidities (ie, hip dysplasia), and response to treatment. Personalized treatment based on etiology may also allow reduced brace wear if risk of relapse correlates with etiology or genetic profile. The primary treatment goal is to provide long-term correction with a foot that is fully functional and pain-free. To achieve this, a combination of approaches that applies the strengths of several methods (Ponseti method and French method) may be needed.

According to A. Siapkara, R. Duncan (10) the overriding principle of management of congenital talipes equinovarus is to achieve and maintain a painfree, plantigrade and pliable foot. The few long-term results of surgical correction are disappointing. The initial results of treatment with the Ponseti regimen used across the world are encouraging. Longer term followup will be required to see whether the technique lives up to it’s expectations. The management of resistant and recurrent deformities continues to remain a challenge.

Conclusion

The results using Ponseti method were good and after the orthopaedic treatment the surgical treatment is less necessary, this method being also the most effective and least expensive treatment of clubfoot.

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