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Original Research Article

Management of Idiopathic Congenital Talipes Equinovarus (CTEV) by Ponseti Technique- A Prospective Study

L. Labango Singh[1], H. Shantikumar Singh[2], Kishorchand Naorem[3], Lungsumpou Gonmei[4], Ph. Nickson Maku[5], Dinendra Chirom[6], O. Guneshwar Singh[7]

[1]Assistant Professor, Department of Orthopaedics, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Imphal, Manipur, India

[2]Assistant Professor, Department of Orthopaedics, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Imphal, Manipur, India

[3]Senior Resident, Department of Orthopaedics, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Imphal, Manipur, India

[4]Assistant Professor, Department of Orthopaedics, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Imphal, Manipur, India

5Medical Officer, Government of Manipur.

[6]Senior Resident, Department of Orthopaedics, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Imphal, Manipur, India

[7]Professor and Head, Department of Orthopaedics, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Imphal, Manipur, India

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Corresponding author: Dr. Lungsumpou Gonmei
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Abstract

Congenital talipes equinovarus (CTEV), also known as clubfoot, is common congenital orthopedic foot deformity in children characterized by four components of foot deformities: midfoot cavus, hindfoot varus, equinus and forefoot adduction. Although a number of conservative and surgical methods have been proposed to correct the clubfoot deformity, the relapses of the clubfoot are very common. Therefore, a study was conducted to determine the effectiveness of Ponseti technique in the management of CTEV in children less than 2 years of age. 40 cases were studied out of which 25 of them were bilateral CTEV. The sequence of correction of deformity were cavus, adduction, varus and equinus. Serial manipulation and casting were done. Tenotomy done for equinus deformity difficult to correct with cast followed by bracing. Average of 6 cast were required per feet. Initial mean Pirani score was 4.7. Almost 95.38% (62 out of 65) achieved correction using this method. Hence, we concluded that Ponseti technique is simple, effective and economical technique which can be useful for treatment of idiopathic clubfoot.

Keywords: Congenital talipes equinovarus, Cavus, Adduction, Varus and Equinus.

Introduction

Idiopathic clubfoot is a complex deformity which is difficult to correct[1]. The deformity has four components: forefoot equinus, hindfoot varus, forefoot adductus and midfoot cavus. A number of conservative treatment has been described in the literature and the surgical treatment has multiple complications[2]. Prof. Ignacio Ponseti devise a method which involves serial casting, percutaneous tenotomy and application of braces. Due to conservative nature of the treatment method and fewer complications associated with it, the treatment method has become popular[3]. The method has been reported to have short-term success rates approaching 90% and the long-term results have been equally impressive[1]. Hence the objective of this study was to assess the effectiveness of Ponseti technique in managing clubfoot and to stress the importance of percutaneous tenotomy in management.

Methods

This study was done at Jawaharlal Nehru Institute of Medical Sciences (JNIMS). 65 feet in 40 children were studied. Study design was a prospective case series study for a duration of 2 yearfrom May 2018 to April 2020. Only idiopathic cases of both genders less than 2 year 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 (Figure 1). Severity was assessed by Pirani scoring system. Manipulation of foot and long leg Plaster of Paris application was done (Figure 2). 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 was abducted with counter pressure applied with the thumb against the head of the talus. Four to nine long leg casts, changed weekly after proper manipulation of the foot, were usually sufficient to obtain good correction (Figure 3 and 4).

Casting was stopped when midfoot and hindfoot scores were zero with 70 degrees of abduction of the forefoot. With abduction of 70 degrees if dorsiflexion was less than 10 degrees then percutaneous tenotomy of the Achilles tendon was performed (Figure 5).

Figure1: Pre-casting clinical picture

Figure 2: First casting- correction of cavus deformity

All cases were done in operation theatre under local anaesthesia. Patients were monitored for 1hour post operatively. A long leg cast was applied (Figure 6) in 70 degrees 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 was removed, and Foot Abduction Brace (FAB) was applied (Figure 7).

Figure 3: Second casting- correction of adduction

Figure 4: Final correction before tenotomy

Figure 5: Tenotomy procedure

Figure 6: Post tenotomy cast

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Children were reviewed every monthly and Pirani scores were documented. FAB was worn for 23 hours during first three months after casting and then at night until child is about 4 years old. Each parameter was scored according to the Modified Pirani Score. Six clinical signs are each scored 0 (normal), 0.5 (mildly abnormal) or 1 (severely abnormal). 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 (Table 1).

Results

The average age of the patients at the initiation of treatment was 11.35 weeks. 15 (37.5%) patients were below 4 weeks, 14 (35%) patients between 4-<16 weeks, 4(10%) patients were between 16 to 24 weeks, 7(17.5%) patients were more than 24 weeks at the time of initiation of treatment. Out of 40 patients, 19 (47.5%) patients were of first birth order, 7 (17.5%) patients were second birth order, 12 (30%) patients were of third birth order and 2 (5%) patients were offourth birth order. Of the 40 patients (65 feet), 25 (62.5%) patients had

bilateral involvement, 15(37.5%) had unilateral involvement, 8 patients with right foot and 7 with left foot involvement. There were 24 males (60%) and 16 females (40%). Average Pirani score was 4.7 (range 3 to 6). The mean number of casts that were applied to obtain correction was 6.03 (range four to nine casts). Tenotomy was required in 58 feet (89.23%) while in 7 feet (10.76%) did not require tenotomy. The average follow-up was for 15 months. Sixty-two feet were treated successfully using the Ponseti method (95.38%). Three patients have relapsed and was due to poor compliance with the foot abduction brace (FAB).

Figure 7: Baby in Foot abduction brace

Figure 8: corrected bilateral CTEV

Table 1: Components of Pirani severity score

Parameters	Mild	Moderate	Severe
Midfoot			
Curved lateral border	0	0.5	1
Medial foot crease	0	0.5	1
Talar head coverage	0	0.5	1
Hindfoot			
Posterior crease	0	0.5	1
Rigid equinus	0	0.5	1
Empty heel	0	0.5	1

Maximum score is 6; Minimum score is 0. Higher the score, the more severe the deformity.

CTEV is one of the commonest congenital deformities. It is a complex deformity comprises of equinus, varus, adductus and cavus, which are difficult to correct. It requires meticulous anddedicated effort on the part of treating physician and parents for the correction of the deformity[12].The goal of treatment is to reduce or eliminate these deformities so that patient has a functional, pain free, plantigrade foot with good mobility without calluses and does not need to wear modified shoes[10]. Ponseti treatment for clubfoot has been gaining in popularity due to the good results demonstrated by Ponseti and other institutions.The Ponseti method has shown excellent outcome for the management of club foot and its ability to radically decrease the need for extensive corrective surgery[13].

Ponseti reported that by this method of manipulation surgery was avoided in 89%

of cases[4]. In Ponseti method of management the first element of correction is the cavus deformity by positioning the forefoot in proper alignment with the hindfoot[5,6]. Cavus, which is due to the pronation of the forefoot in relation to the hindfoot requires only elevating the first ray of the forefoot to achieve a normal longitudinal arch of the foot. The forefoot is supinated not too high or too flat so that the plantar surface of the foot reveals a normal appearing arch. For subsequent correction of adducts and varus, alignment of the forefoot with the hindfoot is necessary to give an effective abduction movement of the foot. Using the stabilized talar head as fulcrum the foot is abducted. Pronation or eversion of the foot and external rotation of the foot to correct adduction while calcaneus remains in varus are to be avoided. Evertion of the calcaneus to correct heel varus (Kites error) is not possible unless the calcaneus is abducted (i.e., laterally rotated) under the talus. Kite explained in his method of correction to abduct the forefoot against pressure at the calcaneocuboid joint which Ponseti described as Kites error[7].

Ponseti technique has been reported with 92 to 98 % successful results for the treatment of idiopathic clubfoot[3,8-10]. This study have successfully corrected 62 (95.38%) of the 65 clubfoot deformities using Ponseti method. Three feet (in 3 patients) developed relapse; all three feet in adductus. In all cases due to non-compliance to Foot abduction brace. For correcting adductus deformity, two feet required three casts and one foot required two casts applied in weekly interval. Serious bleeding complications have been reported following percutaneous tendo-achilles tenotomy[11]. However, we encounter only few wound ulcerations as complication.

Conclusion

Ponseti method with a complete percutaneous tenotomy of tendoachilliswas found to be an efficient technique to correct clubfoot. The effectiveness of this method was proved in this study particularly if the treatment is initiated during the first few weeks of life. It avoids the surgical complications and gives a painless, mobile, normal looking functional foot which requires no special shoes and allows good mobility. In a developing country like India, where there is poverty, ignorance and lack of operative facilities, this technique is found to be good option in management of clubfoot. This method of treatment is easy, effective, minimally invasive, result-oriented and economical. It can be ideally performed at outpatient department. Therefore, it is highly recommended that newborns with clubfoot should be provided with treatment by Ponseti treatment.

Limitations of the study:

- This study has several limitations including small sample size.
- A study with larger sample size would be more informative.
- This study was hospital based. So, many congenital talipes equino varus cases whichwere being lying neglected in the community could not be reached.
- Time limitation was there as the study period was short. As congenital talipes equinovarus patients requires long term follow up upto 3-4 years.
- Follow up could not be done regularly on time in some patients due to inconveniencecause by Covid-19.

Conclusion

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India, where there is poverty, ignorance and lack of operative facilities, this technique is found to be good option in management of clubfoot. This method of treatment is easy, effective, minimally invasive, result-oriented and economical. It can be ideally performed at outpatient department. Therefore, it is highly recommended that newborns with clubfoot should be provided with treatment by Ponseti treatment.

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