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THE PONSETI METHOD FOR TREATMENT OF CLUBFOOT

Orthopaedics

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ABSTRACT

Aim: The aim of the study was to observe the Ponseti method for the treatment of clubfoot.
Material and methods: 40 cases with 68 clubfoot were assessed at their presentation and divided into 3 groups depending on their initial Pirani score, and treated by Ponseti method June 2017 to December 2019. Tenotomy was performed in 55 cases of clubfoot.
Result: In the present study, about 79% had good and about 9% had fair result, and 12 % had poor result. Group 1 and 2 had 100% good to fair result whereas Group 3 had about 88% good to fair result and poor result was about 12 %. The initial mean Pirani score of groups were 2.5, 3.81, and 5.46 respectively.
Conclusion: The clubfoot can be manged effectively using the Ponseti method which is a simple, non-invasive, and also avoids the needs of extensive surgical procedures and gives functional and plantigrade foot.

KEYWORDS

Clubfoot, Pirani score, Ponseti method

INTRODUCTION:

Clubfoot or Congenital Talipes Equinus Varus deformity is a congenital developmental disorder which occurs in second trimester of pregnancy, and present in 1:1000 live births [1]. Clubfoot is more common in males compared to females, and may present as unilateral or bilateral condition which comprises about 50% of cases and next common presentation is in the right side [2]. Presence of clubfoot in the family also predisposes the chance of a new born having clubfoot [3]. The treatment of clubfoot by gentle manipulation and serial casting was first described by Kites [4]. The surgical correction for clubfoot has come down considerably in western world, and the management of clubfoot has been shifted to conservative method [5, 6, 7]. The Ponseti serial corrective cast management has been demonstrated to give good result, and includes serial corrective manipulation, a specific technique of POP cast application which were changed weekly for 6 weeks followed by percutaneous tendoachilles tenotomy when required, and application of another cast for 3 weeks, and the foot abduction bracing is recommended immediately after removal of post tenotomy cast [8, 9, 10]. The severity of the deformity could vary and simple scoring system was given by Pirani *et al* describes six components of clubfoot which are divided into mid foot score (MFS) and hind foot score (HFS)[11] (Table 1). This study is conducted to observe the Ponseti method for the treatment of clubfoot..

MATERIAL AND METHODS:

This study was conducted from June 2017 to December 2019 in Mata Gujri Memorial Medical College and LSK hospital, kishanganj, Bihar. Forty babies of 68 clubfoot were taken for the present study, and the inclusion criteria was babies with age less than 2 years, unilateral or bilateral clubfoot with parents consenting for treatment. The exclusion criteria was age more than 2 years, babies treated earlier elsewhere, secondary clubfoot, and parents not willing to give consent. At arrival of babies the related history regarding birth, earlier treatment, and any event during the pregnancy was recorded. Any history in the family regarding clubfoot and other congenital disorders were enquired and recorded. All the babies were subjected to general physical examination which also included examination of spine, hip and other extremities. All the 6 components of clubfoot were given a score depending on their severity. The minimum score is 0 and maximum is 6, and the higher score defined more severity. At every visit, score of each foot was recorded before application of the POP cast. All the clubfoot were recorded with their initial Pirani score and divided into 3 groups (Table 2). The first cast was applied to correct the cavus deformity by supination of forefoot and dorsiflexion of first metatarsal which aligns the forefoot with the hindfoot. Subsequent weekly casts were applied by gentle abduction of forefoot by keeping counter pressure on the head of talus bone to correct the adduction and varus deformity. The final cast was applied by keeping the foot in 70° of abduction and 15° of dorsiflexion, and if this was not achieved then a percutaneous tendoachilles tenotomy was performed. Post tenotomy, a cast was applied for 3 weeks keeping the foot in 70° of abduction and 15° of dorsiflexion for tendon healing. After the removal of final cast, a foot ankle orthosis was given which was to be applied for 23 hours for first 3 months and then in night time up to 3 years. All the cases were followed up once monthly for 3 months, and once in 3 months, and the compliance was monitored along with education of the parents regarding the importance of the application of foot ankle orthosis and any signs of recurrence like tight tendoachilles and adduction of already treated foot.

Table 1: Pirani severity scoring system

COMPONENT	NORMAL	MODERATE	SEVERE
MID FOOT			
Curved lateral border	0	0.5	1
Medial crease	0	0.5	1
Talar head	0	0.5	1
HINDFOOT			
Posterior crease	0	0.5	1
Empty heel	0	0.5	1
Rigid equinus	0	0.5	1

Table 2: Group distribution

GROUP	INITIAL PIRANI SCORE
1	1.5-2.5
2	3-4.5
3	5-6

RESULT:

In the present series, 40 babies with 68 clubfoot were treated from June 2017 to December 2019 by the Ponseti method in which 27(67.5%) were male and 13(32.5%) were female. Bilateral clubfoot was present in 28(70%) and unilateral presentation was in 12(30%), and in the unilateral presentation the right sided clubfoot was present in 8(66.6%), and left sided clubfoot was present in 4(33.3%). The group 1 had 3 patients (7.5%), group 2 had 11(27.5%), and group 3 had maximum number of patients 26(65%). The group 1 had 6(8.82%) feet, group 2 had 20 (29.41%), and group 3 had 42 (61.76%) cases of

clubfoot [Table 4]. The initial mean Pirani score of groups were 2.5, 3.81, and 5.46 respectively. The number of casts applied ranged from 4 to 10, and 40 clubfoot required between 4-6 casts, 19 required 7-8 casts, and 9 required 9-10 casts. The tenotomy was performed in 55(80.88%) cases and tenotomy wasn't required in 13(19.2%) cases [Table 5]. The majority of the clubfoot (25, 86.20%) which required more than 6 serial casts needed tenotomy. In the present study, the good result was observed in 80% of cases and fair in about 8% cases where as the poor result was seen in about 12% cases [Table 6]. There were few minor complications which included abrasions in 6(8.82%) and blisters in 2(2.94%) cases, and other then that we didn't encounter any other major complications even in the post-tenotomy period like skin necrosis, bleeding or neurovascular compromise.

Table 3: Age wise distribution in the groups

AGE	Group 1	Group 2	Group 3	No. of feet
0-4 weeks	1	6	8	27
1-3 months	2	2	6	18
3-6 months	0	2	4	11
6-12 months	0	1	2	4
1-2 year	0	0	6	8
No. of cases	6	20	42	68

Table 4: Groups and their findings

Group	No. of babies	Unilateral foot	Bilateral foot	Total (%)	Initial mean Pirani score
1	3	0	6	6(8.82)	2.5
2	11	2	18	20(29.41)	3.81
3	26	10	32	42(61.76)	5.46

Table 5: Need of tenotomy

Group	No. of case	Tenotomy done (%)	Tenotomy not done (%)
1	6	2(33.33)	4(66.66)
2	20	17(85)	3(15)
3	42	36(85.71)	6(14.29)
Total	68	55(80.88)	13(19.12)

Table 6: Comparison of result

Group	No. of cases	Good(%)	Fair(%)	Poor(%)
1	6	6(100)	0	0
2	20	18(90)	2(20)	0
3	42	30(71.5)	4(9.5)	8(19)
Total	68	54(79.41)	6(8.82)	8(11.76

DISCUSSION:

The clubfoot is a developmental disorder where the Ponseti method is considered as the gold standard of treatment, and this method includes percutaneous tendoachilles tenotomy in about 70-80% of cases [12,13]. The Pirani score has been commonly used for follow up, and to predict the number of casts that are required and requirement of the percutaneous tendoachilles tenotomy [14,15].

Saini *et al* in their study to treat the clubfoot using the Ponseti method had similar result where they had 50 babies with 76 clubfoot, and observed good result in 84%, and fair in 4%, and poor in 12 % of cases [16].

Dyer *et al* had observed the relationship between number of casts and the initial Pirani score, the foot scoring more than 4 requires at least four casts, less than 4 would require three or fewer casts [14]. In the present study we observed majority (80%) of the cases where the initial Pirani score was less than 4.5 or less required less than 6 casts. Morcuende *et al* reported the 90% would require 5 or fewer casts in their study [17].

In our study, we performed tenotomy in about 86% cases where the initial Pirani score was more than 5. Pirani performed tenotomy in 90% of his cases of clubfoot, and Laaveg *et al* performed tenotomy in 78% cases[18].

The maintenance part of the treatment that starts after removal of post tenotomy cast where foot ankle orthosis is applied for longer duration of treatment which maintains the correction. The orthosis is applied for the prescribed period. Ponseti had observed the importance of the orthosis in the successful treatment which were also observed by Fukhuhara *et al* and Zimmy *et al* [10, 19, 20].

CONCLUSION:

The clubfoot can be manged effectively using the Ponseti method which is a simple, non-invasive, and economical, and also avoids the needs of extensive surgical procedures and gives functional and plantigrade foot. We also conclude that the age of initiation of treatment, mobility of the foot and the initial Pirani score affects the final outcome of clubfoot. The maintenance part is inconvenient to the baby but its importance is made well understood to the parents as it helps in maintaining the correction and also prevents the recurrence.

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