ORIGINAL ARTICLE

FREQUENCY OF PERCUTANEOUS ACHILLES TENDON TENOTOMY IN CLUB FOOT CHILDREN TREATED BY PONSETTI METHOD

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Background: The Ponseti technique of congenital clubfoot therapy includes interventional Achilles tenotomy. The goal of this research was to evaluate the frequency and effectiveness of interventional Achilles tenotomy in the Ponseti method's conservative management of congenital clubfoot. **Methods:** Between August 2023 and June 2024, a randomized controlled trial was conducted of all congenital club foot deformity patients between the ages of 0 and 2 years who visited our clubfoot clinic was conducted. Upon presentation, each clubfoot had a clinical evaluation, a Pirani grading system rating, and a Ponseti procedure cure. The distribution and associations of percutaneous Achilles tenotomies were statistically examined using IBM SPSS version 26. **Results:** Ninety-seven individuals in all, 147 of them had a club foot, were examined. Midfoot contracture score (MFCS), hindfoot contracture score (HFCS), and total Pirani score (TPS) medians were 4.5, 2.5, and 2.5, respectively, upon presentation. 66.4% (97) feet belonging to 63 individuals had percutaneous Achilles tenotomies done. With an initial total Perini score of 3.0 or higher, 85 out of 108 feet needed percutaneous Achilles tenotomy to correct the problem (*p*-0.001). **Conclusion:** A tenotomy rate of 66.4% was seen while treating bilateral clubfoot by using the Ponseti procedure. Percutaneous Achilles tenotomy was required when the patient had high Pirani ani scores and was becoming older at the time of presentation.

Keywords: Ponseti Method; Clubfoot; Congenital

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INTRODUCTION

With a frequency of around 1 in 1,000 live births, congenital clubfoot has indeed been generally described as the most frequent congenital abnormality of the lower limb.[1,2] Orthopaedic surgeons all around the world are increasingly using the Ponseti conservative method of serial adjustment and plaster installation.[3–6] Numerous writers in the literature have noted great success rates using this approach.[7–11] An essential part of the Ponseti technique of clubfoot therapy is percutaneous Achilles tenotomy.[12,13] Following the repair of midfoot and forefoot abnormalities, it is often necessary to cure chronic equine deformity, which is an extremely secure and straightforward technique.[14] The incidence of percutaneous Achilles tenotomy has been reported in the literature to range from 60% to over 90%.[15,16] Under local anaesthetic, percutaneous Achilles tenotomy is often performed in clubfoot clinics. There have been a few documented problems, including as partial release and haemorrhage brought on by damage to the tibial or sural nerves, ulnar vein, tibial arteriole, or lesser anterior vein. Percutaneous Achilles tenotomy under general anaesthetic has the potential benefits of improved pain management, the capacity to do the treatment in a more controlled way, the potential to minimize the infant's pain reaction, as well as a lower chance of complications.[17,18] Babies' safety while under general anaesthesia is still a worry.[19]

The Achilles tendon has been demonstrated to recover after percutaneous tenotomy as part of the Ponseti method for congenital clubfoot.[20] After a percutaneous Achilles tenotomy, excellent functional results in terms of gait analysis have been described. Congenital clubfoot patients who unintentionally had a full Achilles tenotomy showed identical functional outcomes to those whose tendon continuity was preserved after percutaneous Achilles' tendon extension.[21] The goal of this research was to evaluate the prevalence and form of percutaneous Achilles tenotomies used in the Ponseti method's conservative management of congenital clubfoot.

MATERIAL AND METHODS

We conducted prospective research on all idiopathic clubfoot patients who visited our clubfoot clinic between August 2023 and June 2024. The research excluded studies with symptomatic clubfeet and those who had idiopathic clubfeet who had had treatment

before presenting. Patients older than 2 years old were also disqualified from the investigation. Each clubfoot was evaluated clinically and given a score using the Pirani grading method during the presentation. The Ponseti procedure was used to apply a cast and serially manipulate each foot in a cautious manner. Before the final cast was put on feet with chronic equine abnormalities, percutaneous Achilles tenotomies were done. This was done after the forefoot component abnormalities had been corrected. After 3 weeks had passed since the final cast was removed, the percutaneous Achilles tenotomy areas were evaluated. Additionally, all treated feet were evaluated for passive dorsiflexion and clinically scored using the Pirani method. After that, the correction was kept up using a locally made Steenbeek foot abduction splint while the patients' follow-up was prolonged beyond the time frame of this research.

RESULTS

The study included 97 individuals (56 boys and 41 girls) with 147 clubfeet (50 bilateral, 24 left, and 23 right). (Figure 1). At presentation, the patients ranged in age from 0 months to 24 months. The majority of the patients (n=81; 83.5%) were under 6 months old. Males made up the majority of the patients with bilateral deformity 56.0% (28). (Table 1) Total Pirani score (TPS) median was 5 while the hindfoot contracture score (HFCS) median was 2 and the Midfoot contracture score (MFCS) median was 4 at presentation. With median HFCS, MFCS, and TPS of 2.5, 2.5, and 4.5, respectively, 66.4% (97) feet corresponding to 63 patients underwent percutaneous Achilles tenotomy. However, the median TPS, MFCS, and HFCS for feet that did not need percutaneous tenotomy were 2.5, 1.5, and 1.5, respectively. 108 feet with first Pirani estimates of 3.0 or higher, 85 (78.7%) needed percutaneous Achilles tenotomy to resolve the issue (p-0.001). With starting midfoot rigidity scores of 2.0 and above with p-value=0.004 and starting rear foot stiffness values of 2.0 and above with p-value = 0.003, percutaneous Achilles tenotomy was required to treat 82 (78.1%) out of 105 feet and 78.1% (82) out of 106 feet, respectively (p-value = 0.002).

Percutaneous Achilles tenotomy was necessary for a somewhat higher percentage of boy patients (67.9%) compared to female patients (60.9%). Look at Table-2. Additionally, more individuals who were older than 6 months at the time of presentation (73.33%) than those who were younger than 6 months (64.19%) needed a percutaneous Achilles tenotomy to treat the issue. Figure-2.

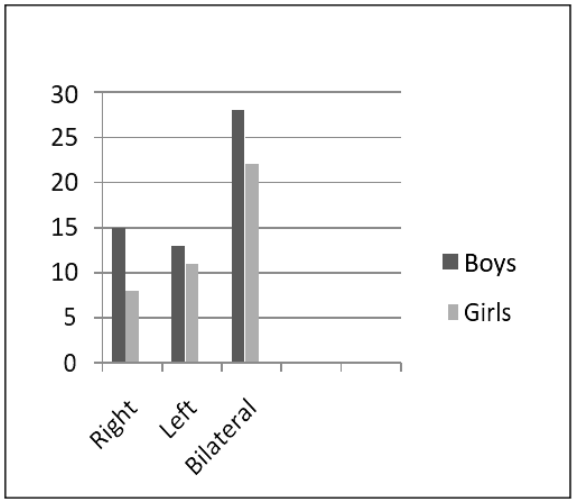

Figure-1: Gender distribution and deformity laterality.

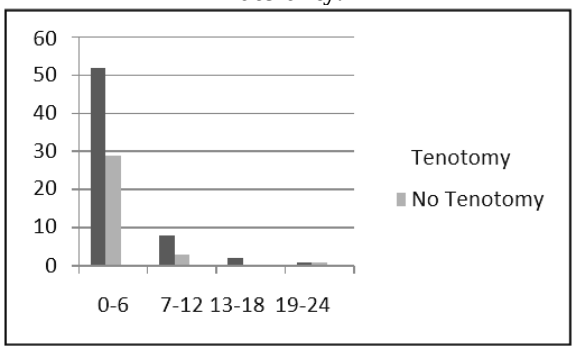

Figure-2: Age-related distribution of tenotomies

Table-1: Patients' Gender and Age Distribution

	Age (in months)				Laterality		
	0 – 6	**7 – 12**	**13 – 18**	**19 – 24**	**Bilateral**	**Left**	**Right**
Boys	51	2	2	1	28	13	15
%	63	16.7	100	50	56	54.2	65.2
Girls	30	10	0	1	22	11	8
%	37	83.3	0	50	44	45.8	34.8
Combined	81	12	2	2	50	24	23
%	100	100	100	100	100	100	100

Table-2: Percutaneous tenotomy distribution in relation to Pirani score, gender, and deformity laterality

	Initial Total Pirani Score			Gender		Laterality	
Variables	4.5 - 6.0	2.5 - 4.0	≤ 2.0	Female	Male	Left	Right
No Tenotomy	15	23	11	16	18	25	24
Tenotomy	75	18	4	25	38	59	49
	p<0.001						

DISCUSSIONS

The Ponseti technique of treating clubfoot has often been characterized as including percutaneous Achilles tenotomy as a key component.[22,23] Percutaneous Achilles tenotomy is a highly safe treatment, despite the fact that a few problems have been reported.[24] No complications related to percutaneous Achilles tenotomy were noted in this investigation. This result is consistent with that of prior research, in which 58 clubfeet underwent percutaneous Achilles tenotomy without experiencing any complications.[25] The Ponseti method's mini-open Achilles' tendon lengthening has the benefit of giving the orthopaedic surgeon more visibility and control, but the results are identical to those of percutaneous Achilles tenotomy.[26]

The majority of patients in this research, 83.5%[27,28] were younger than 6 months at presentation. Due to the correction being made with only serial manipulation and casting,[29] of these patients, or 35.8%, did not need percutaneous Achilles tenotomies (p=0.004). This may help to explain why the relatively low Achilles tenotomy rate in the research, at 66.4%, was lower than rates of 85% and greater documented in the literature, which suggests that tenotomies are less common with the early presentation.[29,30] Between gender and deformity laterality, there was no discernible trend for percutaneous Achilles tenotomy (p=0.483).

The median TPS, MFCS, and HFCS were higher in the foot that had percutaneous Achilles tenotomy at presentation. There was shown to be a strong link between TPS and percutaneous Achilles tenotomy (p-0.001), indicating that the higher the TPS at presentation, the more likely it is that the foot would need tenotomy to achieve correction. A stronger connection between HFCS (p=0.002) and percutaneous Achilles tenotomy was found compared to MFCS (p=0.04). This suggests that the need for a percutaneous Achilles tenotomy is more strongly indicated by HFCS, which assesses the clubfoot's hindfoot components, specifically equines deformity.

CONCLUSIONS

The Ponseti technique of congenital clubfoot therapy includes percutaneous Achilles tenotomy, which is very efficient and safe. The Pirani ratings upon presentation may be used to forecast its frequency. Reduced rates of percutaneous Achilles tenotomy are linked to early presentation and low Pirani scores.

AUTHORS' CONTRIBUTION

AK, MY: Concept of study design, literature search, and proof reading. AGSK: Study design, write up, data collection, proof reading, analysis, write-up. MFA, SU, SIH, NS, KA, S, ZA: Data collection

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