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Original article

Important factors affecting the outcome of arthroscopic decompression in patients with Haglund's syndrome

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ABSTRACT

Purpose- Around 24-45% of the patients having Haglund's syndrome do not respond to conservative therapy, and need surgical intervention. It is often a dilemma for the practitioner, whether to advice surgery, and if yes then what type of surgery would be most beneficial for the patient.

Aim and Objective: In this study we compared the effect of various diagnostic radiological indices, on the outcome of arthroscopic decompression in symptomatic Haglund's syndrome patients.

Material and Methods- A prospective study of 37 patients, who did not respond to at least six months of conservative therapy. Group I (n=20) included the patients having FPA$\leq 69^0$, S&E angle $\leq 60^0$ and CLA $\leq 12^0$. Group II (n=17) included the patients having either FPA$> 69^0$ or S&E angle $> 60^0$ or CLA $> 12^0$. The CPA, PPL, ATT, and grade of TA degeneration were also studied in both groups but not compared.

Results- There was a statistically significant improvement of the AOFAS and OHS scores in both the groups. However, the group I patients showed better improvement in the AOFAS score after surgery as compared to group II (p=0.003). Similarly, the group I patients showed better improvement in OHS score after surgery as compared to group II (p=0.007). Hence, the overall functional outcome was better in group I as compared to group II.

Conclusion- Higher values of FPA, S&E angle and CLA indicate that more bone and soft tissue needs to be removed, which is not easy to achieve using arthroscopic technique. We recommend that arthroscopic technique should be reserved for the patients having FPA$\leq 69^0$, S&E angle $\leq 60^0$ and CLA $\leq 12^0$; and open decompression should be preferred in the patients having either FPA$> 69^0$ or S&E angle $> 60^0$ or CLA $> 12^0$.

Keywords- Haglund's syndrome, Posterior heel pain, Arthroscopic decompression.

Introduction

Posterior heel pain is a very common ailment encountered in daily practice.[1,2] Many pathological processes have been implicated to cause posterior heel pain, including Haglund's syndrome, retrocalcaneal bursitis and Achilles tendinopathy.[3] Haglund's syndrome was first described by Patrick Haglund in 1928 as the prominence of posterosuperior aspect of calcaneus.[4] Around 24-45% of the patients do not respond to conservative therapy, and hence surgical intervention needs to be considered in these. This involves removal of the bursa and resection of the posterosuperior prominence of the calcaneus.[5] Several surgical methods have been described including excision of retrocalcaneal bursa, calcaneal osteotomy, and arthroscopic or open decompression.[6-8]

In many such patients, we face a dilemma whether to advice surgical intervention or not, and in case we decide to go for surgical intervention what type of surgery would be most beneficial for the patient. It would be of great help if a well defined set of selection criteria could guide us in selecting the patients as well as the type of surgery.

Many radiological indices have been described in the literature for diagnosis of Haglund deformity.[9-13] Although, the relation of symptomatic Haglund's syndrome and these indices has not been well established.[14-16] These radiological indices have been described in the literature since many years, and one thing which is fairly easy to understand is that all these indicate the size of posterosuperior eminence of the calcaneus, which is supposedly is the most important cause of the posterior heel pain. No study has reported the effect of these indices on the outcome of

arthroscopic decompression of symptomatic Haglund's syndrome patients. Hence, we tried to find out that, when taken into consideration in symptomatic Haglund's syndrome patients who need surgery, can these radiological indices be of help in deciding whether to go for arthroscopic decompression or open decompression.

Material and Methods

This was a prospective study of 37 patients, presenting at our tertiary care hospital with posterior heel pain and swelling. Adult patients having posterior heel pain due to Haglund deformity and retrocalcaneal bursitis, who did not respond to at least six months of conservative therapy, were included in the study. Patients with previous calcaneal fracture, localized infection, foot deformities and previous surgery were excluded from the study.

Preoperative true size lateral radiographs were taken in all the patients, and following indices were calculated (Fig. 1 and Fig. 2):

i) Fowler & Philip angle (FPA)
ii) Steffensen & Evensen angle (S&E)
iii) Calcaneal pitch angle (CPA)
iv) Chauveaux-Liet angle (CLA)
v) Parallel pitch lines (PPL1 and PPL2)

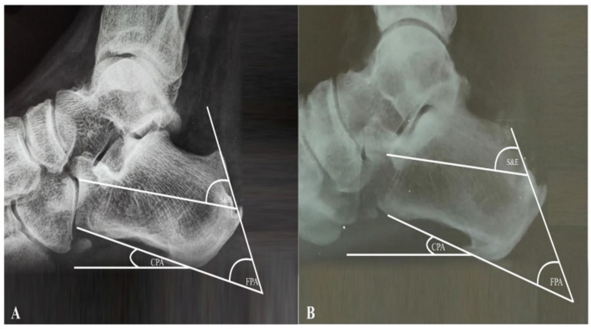

Fig. 1 (A) Pre-op and (B) Post-op: Fowler & Philip angle (FPA), Steffensen & Evensen angle (S&E) and Calcaneal pitch angle (CPA)

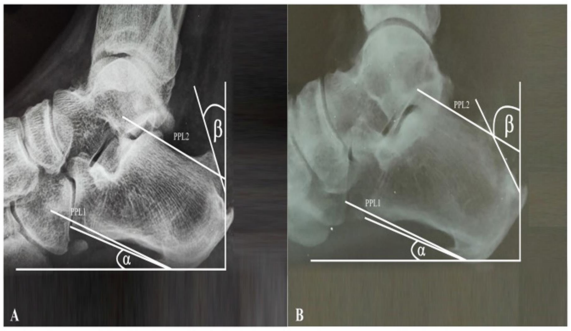

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Fig. 2 (A) Pre-op and (B) Post-op: Chauveaux-Liet angle (CLA) i.e α – β; and Parallel pitch lines (PPL1 and PPL2).

Preoperative ultrasound was done in all the patients to calculate the Achilles tendon thickness (ATT) approximately two centimetre above its insertion (Fig. 3); and to know the grade of degeneration of the Achilles tendon using the ordinal scale.[17]

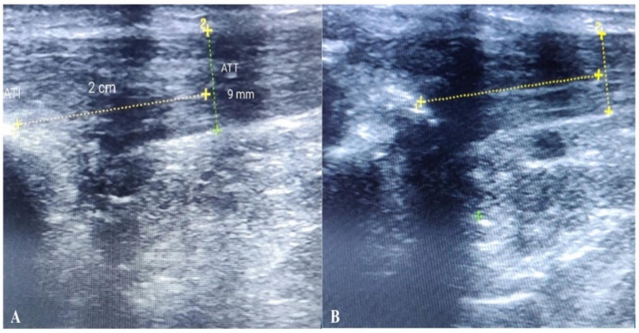

Fig. 3 (A) Pre-op and (B) Post-op: Ultrasound for measurement of Achilles tendon thickness (ATT).

The patients were divided into two groups. Group I (n=20) included the patients having FPA≤ 69^0, S&E angle ≤ 60^0 and CLA ≤ 12^0. Group II (n=17) included the patients having either FPA> 69^0 or S&E angle > 60^0 or CLA > 12^0. The CPA, PPL, ATT, and grade of TA degeneration were also studied in both groups but not compared.
The functional outcome was assessed by comparing the preoperative American orthopaedic foot & ankle society (AOFAS) score, and Ogilvie Harris System (OHS) score with the scores at one year of follow up.

Surgical technique

The procedure was done under spinal anaesthesia, with the patient in prone position, and the foot hanging over the edge of table. The bursa was inflated with 5-8 ml of normal saline. The standard posteromedial, and posterolateral portals were used, and accessory portals were made whenever necessary. We used 4 mm and 30^0 arthroscope for visualization through the lateral portal first, and the 2.5 mm shaver and burr for decompression through the medial portal (Fig. 4). The portals were switched after this to remove the impinging bone, or soft tissue which was left behind. Elimination of any bony impingement in maximum dorsiflexion was taken as the end point.

Fig. 4 Intra-op patient positioning and portal placement.

STATISTICAL ANALYSIS

At the end of the study, the data was collected and analysed statistically by using Independent t-test, Paired t-test and Chi-square test for quantitative and qualitative data. A p value of <0.05 was considered as significant.

Results

The mean age was 42.6 years (range 31 to 53) in group I, and it was 43 years (range 34 to 51) in group II (p = 0.831). The mean FPA was 60.9 ± 3.89^0 (range 53 to 67) in group I, and it was 72.65 ± 2.06^0 (range 70 to 76) in group II (p < 0.001). The mean S&E angle was 57.9 ± 2.67^0 (range 50 to 60) in group I, and it was 68.12 ± 3.86^0 (range 62 to 74) in group II (p < 0.001). The mean CLA was 7.1 ± 4.24^0 (range -2 to 12) in group I, and it was 16.82 ± 2.58^0 (range

13 to 22) in group II ($p < 0.001$). The mean CPA was 16.15±5.4^0 (range 8 to 30) in group I, and it was 18.35±7.12^0 (range 8 to 36) in group II ($p = 0.292$). The mean ATT was 8.77±0.66 mm (range 7.2 to 9.7) in group I, and it was 9.01±0.37 mm (range 8.2 to 9.6) in group II ($p = 0.17$). The mean pre-op AOFAS score was 60.9±6.02 (range 52 to 72) in group I, and it was 61.41±4.9 (range 54 to 71) in group II ($p = 0.781$). The mean post-op AOFAS score at one year follow up was 89.45±4.62 (range 82 to 94) up in group I, and it was 85.59±3.86 (range 80 to 91) in group II ($p = 0.01$). The mean pre-op OHS score was 6.5±1.05 (range 5 to 8) in group I, and it was 5.82±1.59 (range 4 to 8) in group II ($p = 0.146$). The mean post-op OHS score at one year follow up was 12.7±1.56 (range 9 to 15) in group I, and it was 10.71±1.45 (range 9 to 14) in group II ($p < 0.001$) [Table 1].

Table 1. Comparison in terms of Age distribution, FPA, S&E angle, CLA, CPA, ATT, AOFAS and OHS in both groups.

	GROUP I(n=20)	**GROUP II(n=17)**	**t**	**p value**
	Mean ± sd	**Mean ± sd**		
Age	42.6±6.03	43±5.15	-0.215	0.831
FPA	60.9±3.89	72.65±2.06	-11.707	**≤0.001**
S&E	57.9±2.67	68.12±3.86	-9.207	**≤0.001**
CLA	7.1±4.24	16.82±2.58	-8.558	**≤0.001**
CPA	16.15±5.4	18.35±7.12	-1.069	0.292
ATT	8.77±0.66	9.01±0.37	-1.406	0.17
AOFAS-preop	60.9±6.02	61.41±4.9	-0.28	0.781
AOFAS-postop	89.45±4.62	85.59±3.86	2.731	**0.01**
AOFAS difference	28.55±5.31	24.18±2.79	3.202	**0.003**
OHS-preop	6.5±1.05	5.82±1.59	1.498	0.146
OHS-postop	12.7±1.56	10.71±1.45	4.005	**<0.001**
OHS difference	6.2±1.15	4.88±1.62	2.888	**0.007**

FPA (Fowler & Philip angle); **S&E** (Steffensen & Evensen angle); **CLA** (Chauveaux-Liet angle);
CPA (Calcaneal Pitch angle); **ATT** (Achilles tendon thickness); **AOFAS** (American orthopaedic foot & ankle society score) and **OHS** (Ogilvie Harris System score).

The mean difference in pre-op and post-op AOFAS score was 28.55±5.31 in group I, and it was 24.18±2.79 in group II ($p = 0.003$). The mean difference in pre-op and post-op OHS score was 6.2±1.15 in group I, and it was 4.88±1.62 in group II ($p = 0.007$) [Table 2].

Table 2. Comparison of Pre-operative & Post-operative AOFAS and OHS scores, within each group.

			Mean ± SD	**Mean difference ± SD**	**t**	**p value**
GROUP I (n=20)	**Pair 1**	**AOFAS-Preop**	60.9±6.02	-28.55±5.31	-24.06	**<0.001**
		AOFAS-Postop	89.45±4.62			
	Pair 2	**OHS-Preop**	6.5±1.05	-6.2±1.15	-24.08	**<0.001**
		OHS-Postop	12.7±1.56			
GROUP II (n=17)	**Pair 1**	**AOFAS-Preop**	61.41±4.9	-24.18±2.79	-35.74	**<0.001**
		AOFAS-Postop	85.59±3.86			
	Pair 2	**OHS-Preop**	5.82±1.59	-4.88±1.62	-12.46	**<0.001**
		OHS-Postop	10.71±1.45			

In group I 65% of the patients had positive PPL, and in group II 70.6% patients had positive PPL (p=0.717) [Table 3].

Table 3. Comparison in terms of positive PPL in both groups.

Positive PPL	**GROUP I(n=20)**	**GROUP II(n=17)**
Yes	13 (65%)	12 (70.6%)
No	07 (35%)	05 (29.4%)
p value	**0.717**	

PPL (Parallel pitch line)

In group I 25% patients had grade 3, 45% had grade 2, 20% had grade 1 and 10% had no degeneration of TA. In group II 23.5% patients had grade 3, 47.1% had grade 2, 23.5% had grade 1 and 5.9% had no degeneration of TA (p=0.967) [Table 4].

Table 4. Comparison in terms of grade of degeneration of Tendo-Achilles in both groups.

Grade of degeneration on USG	**GROUP I(n=20)**	**GROUP II(n=17)**
0	02 (10%)	01 (5.9%)
1	04 (20%)	04 (23.5%)
2	09 (45%)	08 (47.1%)
3	05 (25%)	04 (23.5%)
p value	**0.967**	

Within group I 65% of the patients had CPA $\leq 17^0$; the mean post op AOFAS score was 89.92 and mean post op OHS score was 13 in these patients, compared to 35% of the patients having CPA > 17^0 in whom the mean post op AOFAS score was 88.57 and mean post op OHS score was 12.14. Within group II 52.94% of the patients had CPA $\leq 17^0$; the mean post op AOFAS score was 87 and mean post op OHS score was 11.22 in these patients, compared to 47.06% of the patients having CPA > 17^0 in whom the mean post op AOFAS score was 84 and mean post op OHS score was 10.12.

Within group I 65% of the patients had positive PPL, the mean post op AOFAS score was 88.38 and mean post op OHS score was 12.38 in these patients, compared to 35% of the patients not having positive PPL in whom the mean post op AOFAS score was 91.43 and mean post op OHS score was 13.28. Within group II 70.6% of the patients had positive PPL, the mean post op AOFAS score was 84.66 and mean post op OHS score was 10.33 in these patients, compared to 29.4% of the patients not having positive PPL in whom the mean post op AOFAS score was 87.8 and mean post op OHS score was 11.6.

Within group I 45% of the patients had ATT of 9 mm or more, along with degeneration of grade 2 or more, the mean post op AOFAS score was 87.11 and mean post op OHS score was 12.55 in these patients, compared to 55% of the remaining patients of this group in whom the mean post op AOFAS score was 91.36 and mean post op OHS score was 12.81. Within group II 52.94% of the patients had ATT of 9 mm or more, along with degeneration of grade 2 or more, the mean post op AOFAS score was 84.66 and mean post op OHS score was 10.66 in these patients, compared to 47.06% of the remaining patients of this group in whom the mean post op AOFAS score was 86.22 and mean post op OHS score was 10.75.

Discussion

Posterior heel pain is a common ailment. Many treatment modalities have been described, with a consensus that conservative therapies should be tried for at least 6 months before proceeding to surgery.[18] Various surgical techniques have been described including arthroscopic decompression, open decompression, and calcaneal osteotomy.[6-8] The arthroscopic approach has the advantage of being minimally invasive, smaller scars, early rehabilitation and lower risk of infection and weakness of TA.[8,18]

The various radiological indices described for diagnosis of this problem have not shown very good accuracy in differentiating symptomatic from asymptomatic patients.[14-16] But the effect of these indices on the outcome of

arthroscopic decompression of symptomatic Haglund deformity, and retrocalcaneal bursitis needs better evaluation. As obvious from the methods of measurement of various angles, it is understandable that higher values indicate more prominence of the posterosuperior aspect of the calcaneus, and hence more bone needs to be removed for better outcome.[9-11] We tried to evaluate whether sufficient bone and soft tissue can be debrided using minimally invasive arthroscopic technique.

We observed, that there was a statistically significant difference in the improvement of the AOFAS and OHS scores of the two groups. The group I patients showed better improvement in the AOFAS score after surgery compared to group II (p=0.003). Similarly, the group I patients showed better improvement in OHS score after surgery compared to group II (p=0.007). Hence, the overall functional outcome was better in group I as compared to group II.

We also observed that the CPA, ATT along with degenerative changes and presence of positive PPL were the other important factors, which independently affected the functional outcome in both the groups irrespective of the FPA, S&E angle and CLA. The patients with higher values of CPA, and those having positive PPL showed less functional improvement within both the groups. Similarly, the patients having more thickness of TA along with higher grades of degeneration showed less functional improvement within both the groups.

Hence although the FPA, S&E angle and CLA have got reasonably high false positive and false negative values, but when taken into account in symptomatic patients with Haglund deformity these indices give a fair idea of the amount of bone we need to remove in order to achieve adequate decompression.[16] Since higher values indicate that more bone and soft tissue needs to be removed, which is not easy to achieve using arthroscopic technique. As is obvious from the statistically significant difference in the functional outcome of two groups, we recommend that arthroscopic technique should be reserved for the patients having FPA$\leq 69^0$, S&E angle $\leq 60^0$ and CLA $\leq 12^0$; and open decompression should be preferred in the patients having either FPA$> 69^0$ or S&E angle $> 60^0$ or CLA $> 12^0$.

Conclusion-

Higher values of FPA, S&E angle and CLA indicate that more bone and soft tissue needs to be removed, which is not easy to achieve using arthroscopic technique. The arthroscopic technique should be reserved for the patients having FPA$\leq 69^0$, S&E angle $\leq 60^0$ and CLA $\leq 12^0$; and open decompression is probably better in the patients having either FPA$> 69^0$ or S&E angle $> 60^0$ or CLA $> 12^0$.

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