Benha Journal of Applied Sciences (BJAS) **print: ISSN 2356–9751**
Vol. (7) Issue (7) (2022), (29-39) **online: ISSN 2356–976x**
http://bjas.journals.ekb.eg

Endoscopic Treatment of Insertional Achilles Tendinopathy

A.I.M.Ghonim, H.H.Ahmed and E.M.Mohamady
Orthopedic Surgery, Faculty of Medicine, Benha University
E-mail: aliighoniim@gmail.com

Abstract

Background: Achilles tendinopathy is a common hindfoot disorder which affects both the active and non-active population. It can be classified as insertional and non- insertional tendinopathy. Insertinal acilles tendinopathy presents 20% to 25% of total Achilles tendon related disorders. Operative treatment in cases of failure of conservative treatment for 6 months in the form of open surgery and minimally invasive endoscopic treatment. The aim of this study was to evaluate the outcome of endoscopic treatment of insertional Achilles tendinopathy. **Methods:** In our study we had 15 patients with endoscopic treatment of insertional achilles tendinopathy with mean Pre-operative AOFAS hindfoot scale was 58.2 (36-80) and mean post-operative AOFAS hindfoot scale after 6 months was 86.53 (67-97) with P value.001 which showed significant improvement. **Results:** In our study there were two cases showed non improvement of pain and function postoperatively which maybe due to high BMI (35.05 and 33.44), they were have triple pathology in the form of (haglund deformity, retrocalcaneal bursitis and retrocalcaneal exostosis) and more Achilles tendon degeneration. There were no postoperative complications in the form of deep venous thrombosis, sural nerve injury, Achilles tendon rupture and wound infection but only 3 cases have postoperative scar tenderness. **Conclusion:** Endoscopic technique for treatment of insertional achilles tendinopathy seemed to be a safe and efficient as the open technique and has the advantage of small incisions with better cosmetic scar, early wightbearing which decrease the risk of deep venous thrombosis, less risk to weaken the Achilles tendon insertion that can cause tendon rupture, and also fewer wound complications such as dehiscence, painful or ugly scars, nerve entrapment within the scar and hypoesthesia.AAA

Key words: insertional Achilles tendinopathy, endoscopic treatment**,** the outcome**.**

1. Introduction

Achilles tendinopathy is a common hindfoot disorder which affects both active and non-active population. It can be classified as insertional and non- insertional tendinopathy [1].

Insertional Achilles tendinopathy presents 20% to 25% of total Achilles tendon related disorders and usually associated with retrocalcaneal bursitis [2].

The pathology is located at the insertion of Achilles tendon and commonly associated with formation of bone spurs and calcifications of Achilles tendon. Insertional Achilles tendinopathy is a clinical syndrome consisting of pain, swelling and impaired function [3]

Pain appears at the beginning and ending of walking, associated with stiffness and occasionally swelling of the hindfoot [4]

The swelling is tender and located at postero-lateral aspect of the calcaneus [5]

There are a myriad of diagnoses that can present reflective of insertional Achilles tendinopathy such as Haglund deformity, retrocalcaneal bursitis and retrocalcaneal exostosis [6]

Conservative measures for treatment in form of rest, ice packs, NSAIDS, heel lifts and physiotherapy are successful in nearly 89% of patients [7]

In resistant cases other methods can be tried before operative treatment including extracorporeal shock wave therapy and local PRP injection. Local steroid injection is not recommended as a line of treatment because of hazards of tendo Achilles rupture secondary to direct injection of steroids [8]

Surgical intervention is recommended for failed non-operative treatment. The surgical principles involve removal of the inflamed bursa, thickened synovium , resection of postero- superior part of calcaneus (Haglund's deformity) and debridement of degenerated fibers to restore vascularity. Open Surgeries around the Achilles tendon can lead to catasrophic complications in wound healing, dehiscence, and infection [9[

Endoscopic treatment of insertional Achilles tendonopathy is gaining popularity among surgeons to avoid hazards of open procedures [10]

The value of endoscopic surgery as a minimally invasive treatment is well recognized and good visualization,, small incision, cosmetically acceptable scar, low morbidity and minimal blood loss, less postoperative pain, and early return to work and sports due to quick postoperative recovery with minimal rehabilitation. Endoscopy has been successfully applied to the treatment of Haglund‘s syndrome and retrocalcaneal bursitis [11]

The aim of this study was to evaluate the outcome of endoscopic treatment of insertional Achilles tendinopathy.

2. Patients and Methods

This prospective study was held on 15 patients suffered from insertional Achilles tendinopathy, all patients signed an informative consent form general, local and radiological examination was done for all patients. All patients will be treated with endoscopic technique.

2.1. Inclusion criteria:

Patients with insertional Achilles tendonopathy with failed conservative treatment for 6 months.

2.2. Exclusion criteria:

- Previous surgery to calceneus or achillles tendon.
- Achilles tendon rupture.
- Vascular insufficiency (impalpable posterior tibial or dorsalis pedis pulse).
- Rheumatoid arthritis.
- Patients less than 18 years old.
- Insertional Achilles tendinopathy with more than 50% affection of tendon circumferance.

Pre-Operative Assessment

1) Clinical Assessment:-

General examination of all patients was done in the form of vital signs, height, weight (for assessment of BMI) and manifestations of rheumatoid arthritis.

Local examination of all patients was done in the form of:-

Inspection:-

Inspection for scars of previous operations in the calcaneus and Achilles tendon. Haglund deformity maybe seen in the posterolateral aspect of calcaneus (fig.1). Assessment of hindfoot deformity (varus or valgus) (fig.2).

Fig. (1): Haglund deformity.

Fig. (2): Assessment of hindfoot deformity.

Palpation:-

- Assessment of localized tenderness at insertion of Achilles tendon.
- Two finger squeeze test for retrocalcaneal bursitis (fig. 3).
- Assessment of integrity of achilles tendon by Thompson test(fig.4).
- Posterior tibial and dorsalis pedis artery should be palpated for assessment of any vascular insufficiency together with neurological examination of the foot.

Fig. (3) Two finger squeeze test.

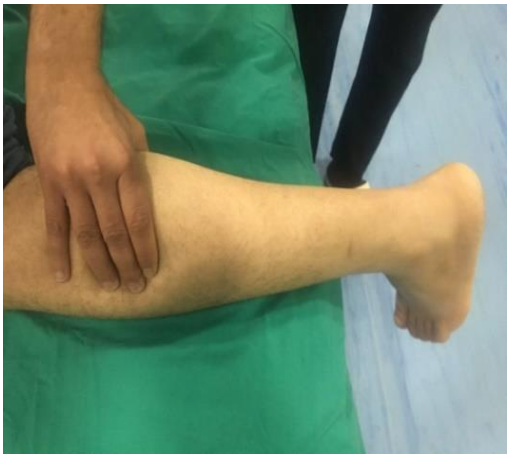

Fig. (4) Thompson test.

2) Radiological Assessment:-

A)Lateral weightbearing xray of the ankle:-

It was done as routine pre-operative investigation for all patients in our study for assessment enlarged posterosuperior part of calcaneus as in haglund deformity using posterior calcaneal angle(fowler and philip angle)(fig.5) and parallel pitch lines(fig.6) and retrocalcaneal exostosis (fig.7).

Fig. (5) Left standing x-ray of ankle showing posterior calcaneal angle (fowler and Philip angle).

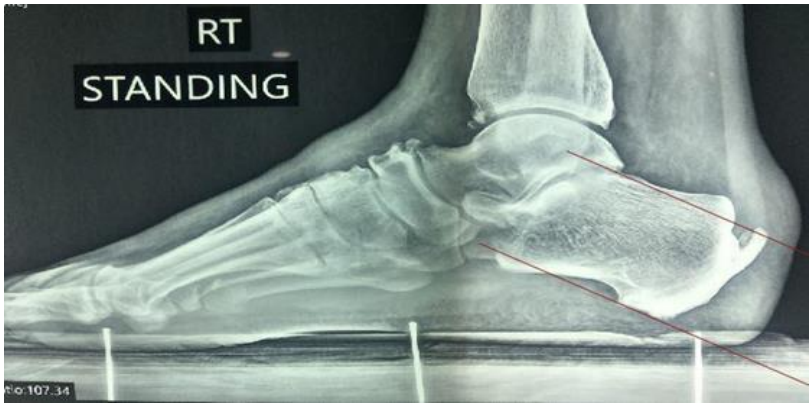

Fig. (6) Right standing x-ray of ankle with parallel pitch lines.

Fig. (7) Right standing xray of ankle with retrocalcaneal exostosis.

B) MRI:-

MRI was done as routine pre-operative investigation for all patients in our study for assessment of integrity of Achilles tendon, Achilles tendon degeneration (fig.8), retrocalcaneal bursitis (fig.9) and intratendineous calcification.

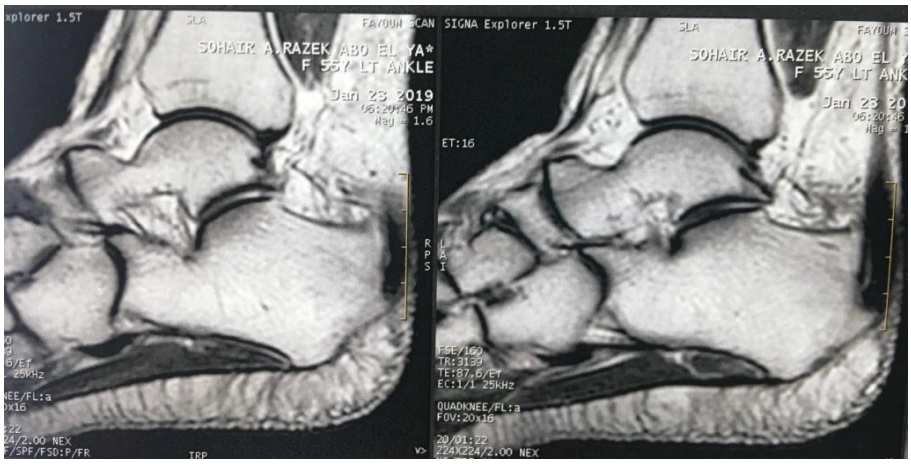

Fig. (8) MRI of the left ankle with acilles tendon degeneration.

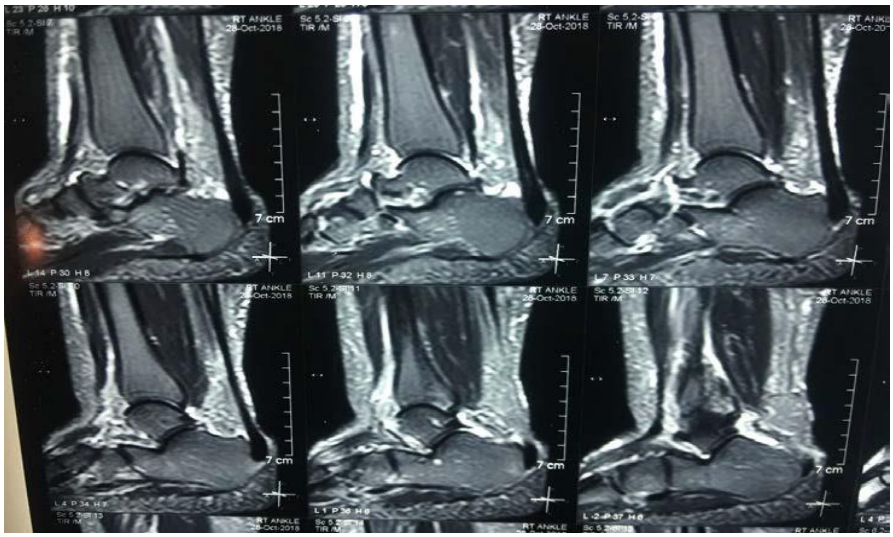

Fig. (9) MRI of right ankle with retrocalcaneal bursitis.

3) AOFAS Hindfoot scale:-

All patients were assessed pre-operatively by AOFAS hindfoot scale. (12)

Operative Technique

The operation was performed with the patient prone and under spinal anesthesia. A thigh tourniquet was inflated after Esmarch ischemia. The foot was positioned at the edge of the operating table (fig.10) to enable us to control ankle dorsiflexion and plantarflexion during the operation.

Fig. (10) Position of the foot during operation.

The posterolateral portal is located 1.2 to 2.5 cm proximal to the tip of the lateral malleolus adjacent to the lateral border of the Achilles tendon(fig.11).

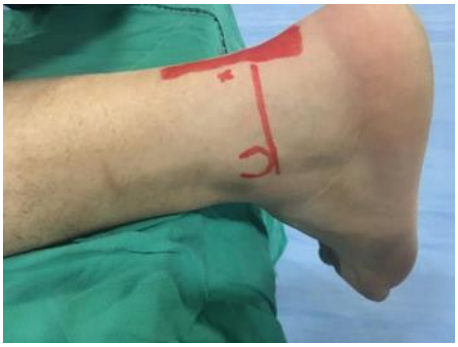

Fig. (11) Posterolateral portal.

Vertical stab incision about 0.5 cm was done, the subcutaneous layer was splitted by a straight mosquito clamp. This incision was just lateral to the Achilles tendon to avoid injury of the sural nerve. The retrocalcaneal space was entered with a blunt trocar (fig.12). A 4.0 mm arthroscope was then placed into the retrocalcaneal space.

Fig. (12) Posterolateral portal entry with blunt trocar.

A posteromedial portal made at the level of the tip of the medial malleolus just anterior to the Achilles tendon(fig.13).

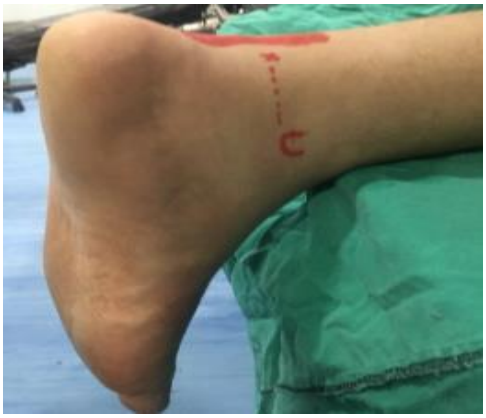

Fig. (13) Posteromedial portal.

A 4.0-mm arthroscopic shaver was introduced into the medial portal, and the inflamed bursae and thickened synovium were removed (fig.14).

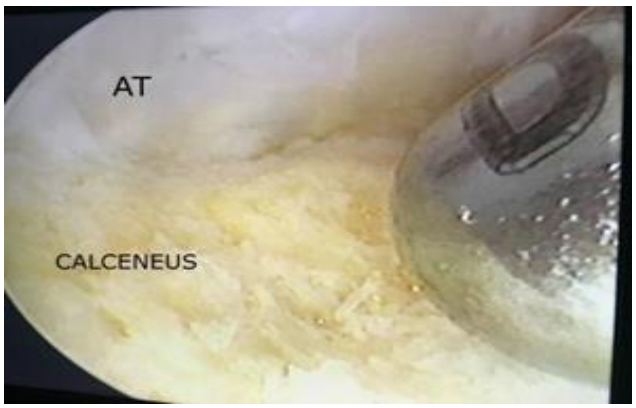

Fig. (14) Shaver introduced into retrocalcaneal space.

Once working space had been created there was access to the posterior calcaneus and Achilles tendon attachment. Depending on the quality of the bone, either the arthroscopic burr or curette or both were used to resect the posterosuperior calcaneal prominence (Haglund deformity)(fig.15).

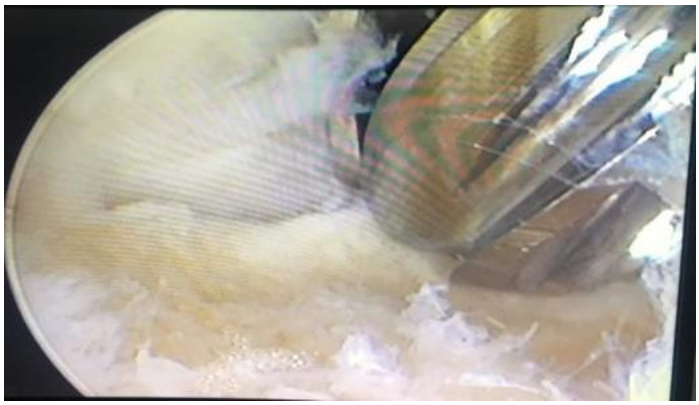

Fig. (15) Arthroscopic burr while removing haglund deformity.

The hooded portions of the instruments were kept toward the tendon to protect the tendon. Bone resection was done systematically usually from a posterior to anterior direction. The resection was carried out both medially and laterally into the sulcus of the calcaneus and down to the attachment of the Achilles tendon. Adequate exposure and resection of the osseous prominence were generally possible with visible and tactile guidance. C-arm was used to determine and document the extent of the resection fluoroscopically (fig.16).

Fig. (16) Intraoperative xray by c-arm while removing haglund deformity.

Damaged or diseased Achilles tendon was selectively exposed, identified, and removed with the arthroscopic shaver. A 18-gauge needle was inserted several times into the tendon (fig.17).

Fig. (17) Insertion of 18 gauge needle into Achilles tendon.

The rationale for this technique was to initiate a vascular response within the tendon for healing and was performed after debridement. An arthroscopic probe was inserted into the retrocalcaneal space to confirm attachment of the Achilles tendon. The foot was then hyperplantarflexed and dorsiflexed to verify any last areas of impingement (fig. 18).

Fig. (18) Arthroscopic probe into retrocalcaneal space.

The retrocalcaneal space was irrigated and suctioned to remove any loose tissue. The portal sites were closed with two skin mattress sutures(fig.19). A compressive dressing was applied, and the foot was splinted in slight equinus (fig.20).

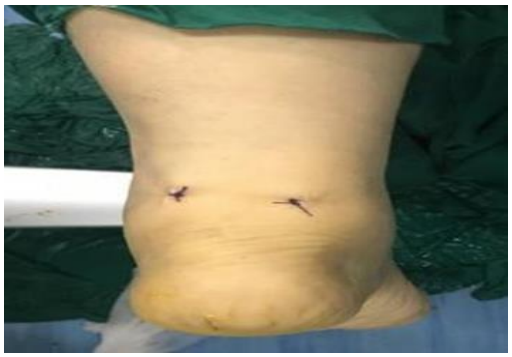

Fig. (19) Closure of portals with 2 mattress sutures.

Fig. (20) Post-Operative below knee splint in equinus.

Statistical methods:

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social Sciences) version 25. Data was summarized using mean, standard deviation, median, minimum and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparison between quantitative variables was done using the non-parametric Mann-Whitney test. For comparison of serial measurements within each patient the non-parametric Wilcoxon signed rank test was used (13). P-values less than 0.05 were considered as statistically significant.

3. Results

The mean Pre-operative AOFAS hindfoot scale was 58.2 (36 to 80) and mean post-operative AOFAS hindfoot scale after 6 months was 86.53 (67 to 97) with P value was.001 which showed significant improvement.(Table 1).

Assessment of pain using AOFAS hindfoot scale in our study showed that pre-operatively we had 2 patients with mild (occasional) pain, 9 patients with moderate(daily) pain and 4 patients with severe(almost present)pain and postoperatively we had 9 patients with no pain,2 patients with mild (ocassional) pain and 4 patients with moderate(daily)pain with P value.001 which showed significant improvement (Table 2).

The mean total function of patients in our study preoperatively was 33.27(28-40) and postoperatively was 43.13(38-47) with P value.001 which showed significant improvement in total function of patients(Table 3)

There was significant relation between BMI and improvement as with decrease of BMI, there was increase in improvement according to AOFAS hindfoot scale with P value.019.(Table 4)

There were no postoperative complications in the form of sural nerve injury, Achilles tendon rupture, deep venous thrombosis and wound infection but there were 3 cases complicated with scar tenderness(Table 5).

Table (1) Pre-Operative and Post-Operative AOFAS hindfoot scale.

	Mean	Standard Deviation	Median	Minimum	Maximum	P-value
AOFAS score pre	58.20	13.47	60.00	36.00	80.00	0.001
AOFAS score post	86.53	11.49	93.00	67.00	97.00	

Table (2) Pain Assessment.

	None		Mild (occasional)		Moderate (daily)		Severe (almost present)		P value
	Count	Row N %	Count	Row N %	Count	Row N	Count	Row N %	
Pain (pre-operative)	0	0.0%	2	13.3 %	9	60.0%	4	26.7%	
Pain(post-operative)	9	60.0%	2	13.3%	4	26.7%	0	0.0%	0.001

Table (3) Total function in pre-operative and post-operative patients.

	Mean	Standard Deviation	Median	Minimum	Maximum	P-value
Total function (pre-operative)	33.27	4.32	32.00	28.00	40.00	0.001
Total function (post-operative)	43.13	3.20	44.00	38.00	47.00	

Table (4) Relation between BMI and improvement.

	Improvement										
	Yes					No					P-value
	Mea n	Standard Deviation	Median	Minimum	Maximum	Mea n	Standard Deviation	Median	Minimum	Maximum	
BMI	28.10	4.57	29.90	19.59	33.31	34.25	1.14	34.25	33.44	35.05	0.019

Table (5) Post-operative complications.

		Count	%
Complications	**No complications**	12	80.0%
	Scar tendermess	3	20.0%

4. Case Presentation

History: Male patient 45 years old with BMI 26.23, no medical history, no special habits and no previous PRP injection complained of right hindfoot pain and swelling mainly at Achilles tendon insertion with failed conservative measures for more than 1 year.

Examination: There was localized tenderness at Achilles tendon insertion with haglund deformity that was prominently felt at posterlateral calcaneal tuberosity, two finger squeeze test was positive and intact Achilles tendon by Thompson test.

Preoperative Lateral xray and MRI of the right ankle were done and showed haglund deformity, retrocalcaneal bursitis and Achilles tendon degeneration (fig.21,22).

Preoperative AOFAS hindfoot scale: pain (20) +function (30) +alignment(10) =60

Fig. (21) Pre-operative lateral xray Right ankle showing haglund deformity.

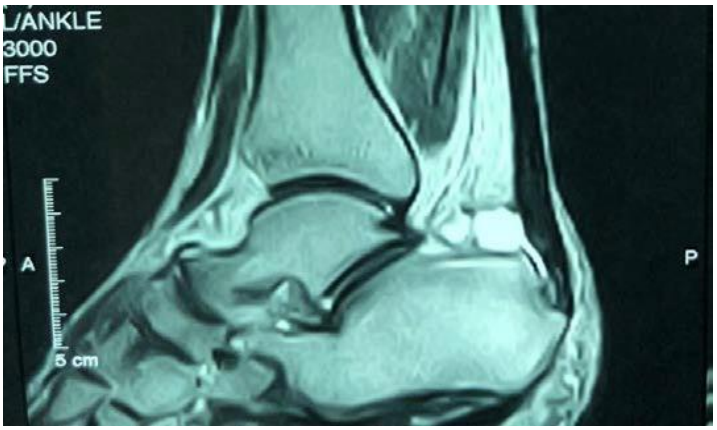

Fig. (22) Pre-operative MRI of right ankle showing retrocalcaneal bursitis and AT degeneration.

Postoperative lateral xray of the ankle was done (fig.23).

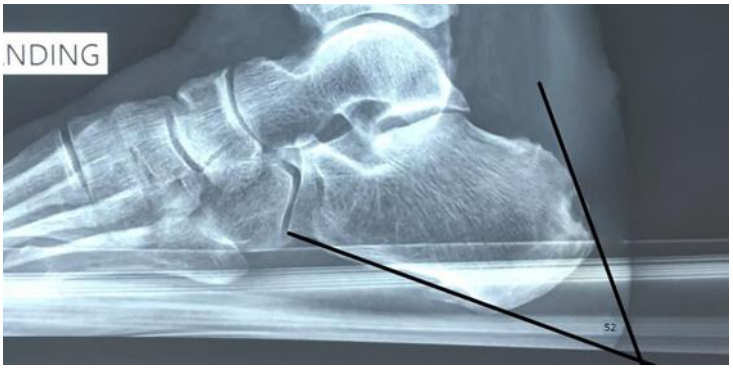

Fig. (23) Postoperative lateral xray of right ankle

Postoperative AOFAS hindfoot scale at 6 months follow up: Pain (40) +Function (46) +Alignment (10) =96

5. Discussion

In our study there were two cases showed non improvement of pain and function postoperatively which maybe due to high BMI (35.05 and 33.44), they were have triple pathology in the form of (haglund deformity, retrocalcaneal bursitis and retrocalcaneal exostosis) and more Achilles tendon degeneration.

There were no postoperative complications in the form of deep venous thrombosis, sural nerve injury, Achilles tendon rupture and wound infection but only 3 cases have postoperative scar tenderness.

In van Dijk and colleagues [10] initial series of 20 patients, 19 had good to excellent results with return to sport after 12 weeks.

Ortmann and McBryd [14] reported on 28 patients (30 heels) with an average follow-up of 35 months with AOFAS hindfoot scale improved from 62 preoperatively to 92 postoperatively. No wound complications or postoperative infections were noted, but there was one patient with poor outcome that had residual pain and swelling postoperatively and required an open procedure. One major complication occurred in 30 heels as one patient sustained an acute Achilles tendon rupture 19 days after endoscopic decompression.

Leitze et al [15] reported a prospective cohort study in which 33 patients underwent endoscopic decompression of the retrocalcaneal space and were compared to 14 patients who underwent an open procedure. Compared to the open group, patients in the endoscopic group had greater AOFAS scores and fewer complications, including infection, altered sensation, and scar tenderness. However, a limitation of the endoscopic approach is that it may not be possible to entirely remove the bone spur or all diseased tissue in patients with full-thickness intratendinous calcifications.

Jerosch [16] has described the minimally invasive endoscopic treatment as a suitable alternative to the open technique for symptomatic Haglund‘s syndrome with insertional achilles tendinopathy. This can achieve reproducible results and has fewer complications than the open technique with short learning curve.

Complete avulsion after endoscopic calcaneoplasty has not been reported. Although Achilles tendon avulsions after open resection of a Haglund spur have been described in the literature. The reason for this may be that, with endoscopic calcaneoplasty, the surgeon protects the medial and lateral insertional fibers of the Achilles, which protect the tendon, whereas during the open resection these fibers also are released. [14]

A multicenter retrospective series of open and endoscopic techniques by Bohu and colleagues [17] in 2009 proposed endoscopic techniques for insertional Achilles tendinopathy and retrocalcaneal pathology.

Huber and Waldis [18] found a considerable amount of residual complaints in 32 patients who were clinically and radiologically reviewed at a mean follow-up of 18.6 years after being treated with open surgical removal of haglund deformity and debridment of Achilles tendon. Out of 32 patients, 14 had soft tissue problems, not enough resection in 8 patients, and 2 patients had new bone formation.

Systematic reviews of open versus endoscopic debridement have shown better results with the endoscopic approach. [11)

A recent retrospective case series by Ettinger et al [19] (2016) found that patients with insertional achilles tendinopathy who were treated with double-row fixation or 2-suture anchors showed significantly greater postoperative AOFAS scores compared to single-row anchors (79.6 vs 90.2, $P < 0.05$).

The consistently good postoperative outcomes, despite variations in approach and reattachment techniques continue to support the use of operative treatment for IAT. Postoperative outcomes, including patient satisfaction and self-reported function, for operative debridement are generally positive. Postoperative AOFAS ankle-hindfoot scores range from 81 to 96 and patient satisfaction is generally greater than 87 percent. Yet there are potential complications including superficial would infection, scar abnormalities (hypersensitivity, hypertrophy, and numbness), skin necrosis, hematoma, delayed wound healing, sural neuritis, tendon avulsion, deep vein thrombosis, and recurrence of pain. [20]

Den Hartog [21] reported on a case series of 26 patients with insertional achilles tendinopathy that underwent Flexor Hallucis Longus transfer with tendon debridement and decompression. The study found that FHL transfer improved patient outcomes in patients older than 50 years with more advanced tendinosis.

As of Irwin‘s [20] 2010 review, there were no studies on the use of corticosteroid or glucocorticoid injections specifically for the insertional form of Achilles tendinopathy.

A 2012 prospective case series by Monto (22) found PRP to be effective in a mixed cohort of 30 patients with AT (8 insertional, 22 midportion) leading to satisfaction with treatment in 28/30 patients at 2-year follow-up. However, both treatment failures in this study occurred in patients with IAT (2/8).

Two retrospective case series examining the use of PRP for IAT have recently been reported patient satisfaction was just 53% (10/19) at 6-month follow-up.[23]

6. Conclusion

Endoscopic technique for treatment of insertional achilles tendinopathy seemed to be a safe and efficient as the open technique and has the advantage of small incisions with better cosmetic scar, early wightbearing which decrease the risk of deep venous thrombosis, less risk to weaken the Achilles tendon insertion that can cause tendon rupture, and also fewer wound complications such as dehiscence, painful or ugly scars, nerve entrapment within the scar and hypoesthesia.

References

[1] CN.van Dijk, MN.van Sterkenburg, JI.Wiegerinck, J.Karlsson, N.Maffulli, Terminology for Achilles tendon related disorders. Knee SurgSports Traumatol Arthrosc.vol.19(5),PP.835-841,2011.

[2] SF.Baumbach, M.Braunstein, MG.Mack, F.Maßen, W.Böcker, S.Polzer, H.Polzer, [Insertional Achilles tendinopathy: Differentiated diagnostics and therapy]. Unfallchirurg.vol.120(12),PP.1044-1053,2017.
[3] XD.Miao, H.Jiang, YP.Wu, HM.Tao, DS.Yang, H.Hu, Treatment of Calcified Insertional Achilles Tendinopathy by the Posterior Midline Approach. J Foot Ankle Surg.vol.55(3),PP.529-534,2016.
[4] N.Maffulli, P.Sharma, KL.Luscombe, Achilles tendinopathy:aetiology and management. J R Soc Med. 2004; 97(10): 472-476.
[5] AA.Schepsis, H.Jones, AL.Haas, Achilles tendon disorders in athletes. Am J Sports Med.vol.30(2),PP.287- 305,2002.
[6] A.Watson, R.Anderson, W.Davis, Comparison of results of retrocalcaneal decom-pression for retrocalcaneal bursitis and insertional Achilles tendinosis with calcific spur. Foot Ankle Int.vol.21(8),PP.638–642,2000.
[7] WC.McGarvery, RC.Palumbo, DE.Baxter, BD.Leibman, Insertional Achilles tendinosis: surgical treatment through a centraltendon splitting approach. Foot Ankle Int.vol.23(1),PP.19-25,2002.
[8] JD.Rompe, J.Furia, N.Maffulli, Eccentric loading compared with shock-wave treatment for chronic insertional Achilles tendinopathy: a randomized controlled trial. J Bone Joint Surg Am.vol.90(1),PP.52-61,2008.
[9] D.Georgiannos, V.Lampridis, A.Vasiliadis, I.Bisbinas, Treatment of insertional Achilles pathology with dorsal wedge calcaneal osteotomy in athletes. Foot Ankle Int.vol.38(4),PP.381–387,2017.
[10] CN.van Dijk, PE.Scholten, R.Krips, A 2-portal endoscopic approach for diagnosis and treatment of posterior ankle pathology. Arthroscopy .vol.16,PP.871–876,2000.
[11] WE.Garrett, MF.Swiontkowski, JN.Weinstein, et al. American Board of Orthopaedic Surgery Practice of the Orthopaedic Surgeon: Part-II, certification examination case mix. J Bone Joint Surg Am.vol.88(3),PP.660-667,2006.
[12] F.Ceccarelli, F .alderazzi, G.Pedrazzi Is there a relation between AOFAS ankle-hindfoot score and SF-36 in evaluation of Achilles ruptures treated by percutaneous technique?. The Journal of Foot and Ankle Surgery.vol.53(1),PP.16-21,2014.
[13] YH.Chan, Biostatistics102: Quantitative Data – Parametric & Non-parametric Tests. Singapore Med J.vol.44(8),PP. 391-396,2003.
[14] FW.Ortmann, AM.McBryde, Endoscopic bony and soft-tissue decompression of the retrocalcaneal space for the treatment of Haglund‘s deformity and retrocalcaneal bursitis. Foot Ankle Int.vol.28(2),PP.149–153,2007.
[15] Z.Leitze, EJ.Sella, JM.Aversa, Endoscopic decompression of the retrocalcaneal space. J Bone Joint Surg Am.vol.85(8),PP.1488-1496,2003.
[16] J.Jerosch, Endoscopic calcaneoplasty. Foot Ankle Clin.vol.20(1),PP.149–65,2015.
[17] Y.Bohu, N.Lefèvre, T.Bauer,et al Surgical treatment of Achilles tendinopathies in athletes. Multicenter retrospective series of open surgery and endoscopic techniques. Orthop Traumatol Surg Res. Dec.vol.95,PP.S72-7,2009.
[18] HM.Huber, M.Waldis, Die Haglund-Exostoseeine Operationsindikation und ein kleiner Eingriff?. [Haglund‘s Exostosis—a surgical indication and a minor intervention?] Z Orthop.vol.127,PP.286–290,1989.
[19] S.Ettinger, R.Razzaq, H.Waizy, et al. Operative treatment of the insertional Achil- les tendinopathy through a transtendinous approach. Foot Ankle Int 2016;37(3): 288–293.
[20] TA.Irwin, Current concepts review: insertional Achilles tendinopathy. Foot Ankle Int.vol.31(10),pp.933–939,2010.
[21] BD.Den Hartog, Insertional Achilles tendinosis: pathogenesis and treatment. Foot Ankle Clin.vol.14(4),pp.639-650,2009.
[22] RR. Monto, Platelet rich plasma treatment for chronic Achilles tendinosis. Foot Ankle Int.vol.33(5),PP.379-385,2012.
[23] MJ.O’Malley, PRP Shows Potential For Treating Achilles Tendinosis. New Orleans, LA: American Academy of Orthopaedic Surgeons,2010.