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Original Article

Tendoscopic management of posterior tibial tendinitis: 24-month outcomes

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Abstract

Objective: The aim of this study was to present a case series of patients undergoing posterior tibial tendoscopy, assess their clinical outcome, and describe surgical findings and treatment complications.

Methods: This is a clinical, retrospective, observational study of 11 consecutive cases of tenosynovitis of the posterior tibial tendon. All 11 patients underwent tendoscopy of the posterior tibial tendon. All procedures were performed by the same surgeon in 2 different hospitals. Minimum follow-up was 2 years.

Results: All patients had their preoperative and postoperative AOFAS and VAS scores assessed. Both scores had an important improvement at 12 months that persisted at 24 months. Moreover, 72.72% of the patients were very satisfied with the procedure, and no patient reported to be dissatisfied. Additionally, 90.91% of the patients had no postoperative complications. The present results are consistent with those previously reported in the literature.

Conclusion: Endoscopic or tendoscopic repair of the posterior tibial tendon is a simple and reproducible procedure that provides good functional and cosmetic outcomes with a low complication rate. It is important to increase the number of patients in this series in order to expand our conclusions.

Level of Evidence IV; Therapeutic Studies; Case Series.

Keywords: Arthroscopy/methods; Tendinopathy; Posterior tibial tendon dysfunction; Treatment outcome.

Introduction

Posterior tibial tendinitis is commonly observed in patients who participate in sports activities. It may be caused either by excessive overload or sudden strain on the tendon. Some studies with runners report incidences of posterior tibial tendinitis ranging from 2.3 to 6%[1,2]. It was possible to determine that sports activities are not the only cause of tendinitis. Most patients present with associated anatomical changes (accessory navicular, hyperpronation of the foot) or previous knee or foot injuries (osteophytes, fracture sequelae). Partial or total posterior tibial tendon rupture is extremely rare in young patients, although very few cases among athletes have been reported in the literature[3,4].

In non-sports settings, tendinitis is the early stage of posterior tibial tendon insufficiency or dysfunction. This occurs mainly in middle-aged women with systemic inflammatory diseases associated with rheumatoid arthritis, which predisposes them to tendon rupture. In cases of stage I posterior tibial tendon dysfunction (PTTD) according to Johnson and Strom classification[5], the treatment of choice is based on temporary immobilization with immobilization boots for 4 to 6 weeks, followed by an appropriate rehabilitation program and gradual return to sports. This approach has a high rate of resolution of pain. In some cases, the treatment may be supplemented with the use of insoles with longitudinal arch support. Topical corticosteroids are contraindicated since they increase the risk of tendon rupturte[6].

Study performed at the Hospital Medica Sur, Mexico City, Mexico and Hospital General Dr. Manuel Gea Gonzalez, Mexico City, Mexico.

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Athlete patients who do not show a positive evolution between 3 and 6 months after implementation of initial management become candidates for surgical intervention to explore the tendon, and tenosynovectomy is conducted in cases of tenosinovitis[2]. In stage II patients or in stage I patients who do not respond to conservative management, endoscopic management provides an appropriate visualization of the tendon and has shown good results[7-9]. Advanced cases presenting with major tendon injuries require procedures of tendons transfers and bone realignment to reduce workload on the posterior tibial tendon, with a prolonged recovery period[10,11].

The diagnosis of tibial tendinitis is not always possible with imaging studies such as conventional radiography. Magnetic resonance imaging (MRI) is a very useful diagnostic tool. However, 20% of partial tears may go undetected even by MRI[12].

With the development of minimally invasive techniques and aiming to prevent complications secondary to extensive skin wounds, especially in patients with concomitant diseases (diabetes, rheumatoid arthritis), endoscopic and tendoscopic techniques have emerged as valuable tools in the treatment of patients unresponsive to conservative management[8-10].

The aim of this study was to present a case series of patients undergoing posterior tibial tendoscopy, assess their clinical outcome, and describe surgical findings and treatment complications.

Methods

This retrospective, observational, clinical study assessed the medical records of 11 consecutive patients who underwent endoscopic surgery from 2014 to 2017. All participants had stage I and IIa posterior tibial tenosynovitis and PTTD, according to Johnson and Strom classification. Exclusion criteria were patients with advanced PTTD and those with previous knee surgery. All patients were operated on by the same surgeon in 2 different hospitals.

Preoperative clinical evaluation revealed medial retromalleolar pain. Pain and sensitivity increased when patients stood on their toes, although they showed negative results for Rodriguez Fonseca maneuver. Ancillary examinations confirmed the disease. Plain radiographs revealed the presence of osteophytes at the medial malleolus in 2 cases (18.18%). MRI showed posterior tibial tenosynovitis and presence of increased fluid in the tendon sheath in 100% of cases, in addition to partial posterior tibial tears in 3 cases (27.27%). All patients were unresponsive to conservative treatment, which consisted of non-steroidal anti-inflammatory drugs, rest, and physical therapy for at least 3 months.

Study participants underwent preoperative and postoperative monitoring. Such monitoring included the following clinical variables: American Orthopaedics Foot and Ankle Society (AOFAS)[13] score or ankle and hindfoot, whose results were subdivided into excellent (91-100 pts), good (81-90 pts), fair (61-80 pts), and poor (<60 pts); visual analog scale (VAS) for pain; and level of satisfaction as measured through a Likert scale at the end of a 24-month follow-up[14].

Surgical technique

Patients were placed in the supine position with the maximum external rotation of the hip and the feet to expose the medial region of the tendon. The procedure was conducted under local anesthesia with subarachnoid blockade. Ischemia was induced with tourniquet at 250mmHg. Two 3-mm portals were made; one at nearly 2cm proximal to the distal end of the medial malleolus and another at 2cm distal to the distal end of the medial malleolus along the path of the posterior tibial tendon (Figure 1), as described by Van Dyck et al.[9].

All procedures were performed using a 30-degree angled lens for small joint arthroscopy measuring 2.7mm. Tendoscopic examination allowed to explore almost the entire posterior tibial tendon. The following surgical findings were identified: roughening of the tendon surface, partial tears, impingement with the medial malleolus, and presence de fibrous bands. Partial tears and fibrous bands were removed with a shaver blade and a radiofrequency probe for small joints (Figure 2). The roughened area was debrided using radiofrequency ablation. Surgical wounds were sutured with one simple nonabsorbable stitch for each wound.

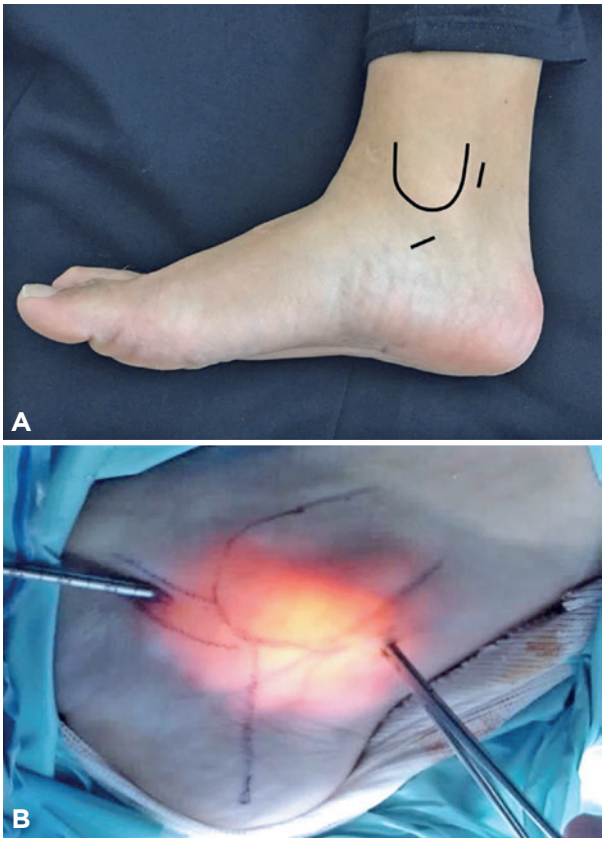

Figure 1. Tendoscopy portal layout. A. Planning of portals. B. Intraoperative identification of proximal portal site.

Postoperative care

During the postoperative period, immobilization was done with ankle CAM Walker walking boots. Crutches were also used to support walking for the first 2 weeks. Subsequently, patients followed a rehabilitation program for restoration of mobility, muscle strengthening, and ankle range of motion for 8 weeks.

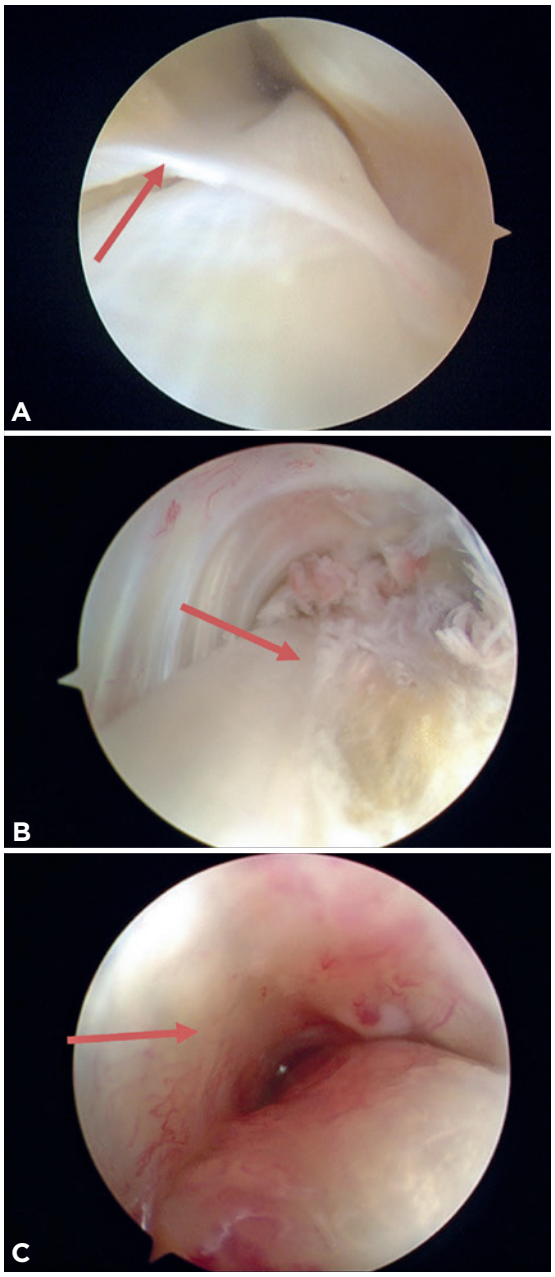

Figure 2. Surgical findings. A. Fibrous band. B. Partial tear. C. Tenosynovitis.

Statistical analysis

Statistical analysis was performed using SPSS, version 13 (SPSS Chicago, IL). Descriptive analysis was performed using measures of dispersion and central tendency for continuous variables and frequencies for categorical variables. The paired t test was used to measure the difference between means for continuous variables. The level of statistical significance was set at <0.05.

Results

Eleven patients were surgically treated, with a mean age of 37.54 years (SD, 20 years). Study sample included 2 men and 9 women. Seven patients were operated on the right ankle, and 5 patients on left ankle. Minimum patient follow-up was 24 months.

As for the level of athletic activity according to the competitive, leisure, active, sedentary (CLAS) classification, 3 patients were competitive athletes, with more than 2 training sessions per week, 4 patients were athletes performing regular recreational sports activities, none performed occasional sports activities, and 4 were sedentary (Table 1). The 7 physically active patients returned to their usual sports activity 8 weeks after surgery and to the same sports activity level 5.2 months after surgery, on average.

Clinical assessment included AOFAS functional scale (whose maximum value is 100 points) and VAS for pain (from 0 to 10), as shown in table 2. Mean AOFAS score at preoperative baseline was 75.7 points, and then increased to 94.36 points at 1-year follow-up and to 95.54 point at 2-year follow-up. The Mann Whitney test showed a statistically significant difference between the preoperative score and the final postoperative score, with p-value <0.001. VAS for pain also showed a significant improvement from baseline (preoperative) to 1-year follow-up and a slight improvement from 1-year to 2-year follow-up.

Table 1. Patient demographics

		n	%
Age	<37.54	6	54.54
	>37.54	5	45.45
Sex	Male	2	18.18
	Female	9	81.81
Side	Right	32	61.54
	Left	20	38.46
CLAS system	C: competitive	3	27.28
	L: leisure	4	36.36
	A: active	0	0
	S: sedentary	4	36.36
Sport	Running	3	27.28
	Soccer	1	9.09
	Weightlifting	1	9.09
	Zumba	1	9.09
	Ballet	1	9.09
	None	4	36.36

Table 2. Difference between AOFAS and VAS scores before and after posterior tibial tendoscopy

	Baseline (preoperative)	1-year follow-up	Final follow-up	t-value baseline-24 months)	p-value
AOFAS score	75.72±11.24	94.36±6.12	95.54±5.68	13.27	<0.00001
VAS score	7±1.67	1.54±1.02	1.27±0.93	2.78	<0.00001

AOFAS: American Orthopaedics Foot and Ankle Society; VAS: visual analog scale

With regard to surgical findings, there were 8 cases of posterior tibial tenosynovitis (73%), 4 cases (36.4%) of fibrous bands, especially in contact with the medial malleolus, 3 cases (28%) of partial tear affecting less than 25% of tendon thickness, and 2 cases (18%) of osteophyte on the medial malleolus (Figure 3, Table 3). Of the 6 cases of PTTD, 4 (66.7) were classified as stage I, and 2 as stage IIa. In the latter case, tendoscopy was combined with subtalar arthroereisis.

As for personal satisfaction, 72.72% of patients reported to be very satisfied with the procedure, and 27.28% reported to be satisfied, according to a Likert scale for personal satisfaction.

No complications were observed in 90.91% of cases. One patient (9%) presented with residual pain that disappeared after 3 months.

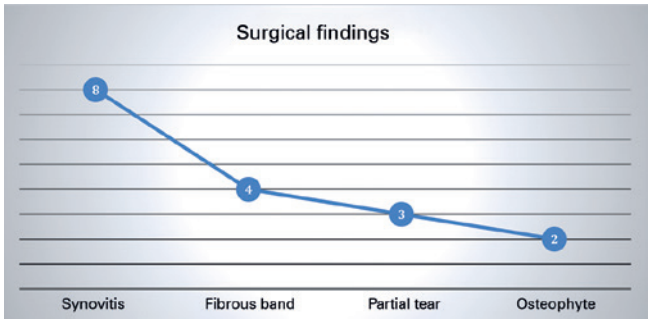

Figure 3. Surgical findings during tendoscopy.

Table 3. Surgical findings during tendoscopy

Number of Cases	Synovitis	Fibrotic band	Partial tear	Osteophyte
1	-	+	+	-
1	-	+	-	-
1	-	-	+	+
1	+	-	-	+
1	+	-	+	-
2	+	+	-	-
4	+	-	-	-

Discussion

McCormack et al.[15] reported good outcomes in 7 out of 8 high-performance athletes, with a mean age of 22 years, treated with debridement; in the same study, cases refractory to conservative treatment were treated with surgical debridement of tenosynovitis. In our case series, 7 (66.6%) of 11 patients were physically active, of which 3 (27%) were high-performance athletes. All these patients returned to the same sports activity level after a mean of 5.12 months (4 to 7 months).

Van Dyck et al.[16] reported 31 successful posterior tibial tendoscopies and found as complications 3 cases of hyposensitivity limited to the posterior portion of the hindfoot; the authors also reported that, in cases involving partial ruptures, tendoscopy was combined with an open technique. Conversely, our study observed only cases of partial tears affecting less than 25% of tendon thickness, which allowed treatment with endoscopic debridement. One of these cases developed residual pain that disappeared after 3 months.

Our case series reported an improvement in VAS scores for pain from 7 points at baseline (preoperative) to 1.27 points at 24 months. This notable difference is consistent with the findings of Bernasconi et al.[17], who reported an improvement in VAS mean scores from 7.9 to 3.5 points and found low complication rates after the procedure.

Bulstra et al.[18] reported a symptomatic improvement with early mobilization of the joint in a series of 17 patients, of whom 2 required a second endoscopic intervention due to symptom relapse caused by adhesions that did not lead to progression of tibial dysfunction. Gianakos et al.[19] also reported relapse of symptoms, but with no evidence of progression of tendon dysfunction. In our series, only one patient complained of persistent pain that lasted for 3 months and was resolved after physical therapy. No reinterventions were required in our series.

Surgical management of stage I PTTD consisted of synovectomy and open tendon debridement. Teasdall and Johnson[20] reported good outcomes for 14 out of 19 patients (74%) and treatment failure for 2 patients (10%), who required subtalar arthroereisis. The following complications were also reported: 2 cases of superficial infection and 1 case of wound dehiscence 3 weeks after surgery.

Chow et al.[21], in a series of 6 cases of stage I PTTD treated with tendoscopy and partial synovectomy, found no complications and observed functional outcomes similar to those obtained with open procedures; the authors also reported the following advantages of tendoscopy: smaller skin wounds, less postoperative pain, and shorter hospital stay. Khazen and Khazen and Khazen[22] performed tendoscopy in 9 patients with stage I PTTD. Improvement of pain was

reported in 8 patients, although no scales for pain assessment were described. Gianakos et al.[19], in a study assessing 12 patients (8 with stage I PTTD and 4 with stage II PTTD), showed that 75% of patients had good outcomes. Similarly, Bernasconi et al.[17] reported 75% of positive outcomes among 16 patients with stage II PTTD. Positive outcomes were achieved in 90% of our series; moreover, of the 6 cases of PTTD, 4 were classified as stage I and two as stage IIa. In the latter case, tendoscopy was combined with subtalar arthroereisis. Results found in our sample were consistent with those reported in the global literature.

The weaknesses and limitations of this study include its retrospective design, the lack of a control group, and its small sample size. Conversely, a strength is the fact that patients were assessed after a minimum of 24-month follow-up, which enabled us to show that favorable changes both in AOFAS and VAS scores observed at 12 months persisted at 24 months.

Conclusion

Posterior tibial tendinitis has a good outcome with conservative treatment (immobilization and rehabilitation) in most cases. However, for recurrent cases or those refractory to non-surgical treatment, endoscopic or tendoscopic treatment is a simple reproducible technique that provides excellent functional and cosmetic outcomes. In the early stages of PTTD, tendoscopy offers symptomatic improvement and good short-term and mid-term outcomes in assessment scales. Studies with a larger sample size and a control group are required to assess the long-term outcomes of tendoscopy for the treatment of posterior tibial tendinitis in our population.

Authors' contributions: Each author contributed individually and significantly to the development of this article: ACA *(https://orcid.org/0000-0002-6129-954X) Conceived the study and performed the surgeries, wrote the article and approved the final version; ACKM *(https://orcid.org/0000-0003-2457-9654) wrote the article and participated in the review process. *ORCID (Open Researcher and Contributor ID).

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