

Incidence and Management of Sural Neuritis Post-Peroneal Tendon Repair – Case Series

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Retrospective Case Series

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Abstract

Background

Sural neuritis is a recognized and common complication resulting from iatrogenic injury, postsurgical or posttraumatic fibrosis, traction injury, or chronic nerve compression. Previously in a case series by Stockton and Brodsky, sural neuritis was reported as a complication in 16.6% of the patients who underwent peroneal tendon repair. Patients with sural neuritis often report pain and tingling in the distribution of the sural nerve along the lateral posterior leg, lateral foot, and the fifth digit. Symptoms of sural neuritis could be intense and debilitating, necessitating prompt recognition and treatment.

Method

Patients who underwent peroneal tendon repair between January 2022 to January 2024 by a single surgeon were included in this retrospective case series. Medical charts of the patients included in the study were reviewed. Demographics for all patients included in the study were recorded. Time to onset of sural neuritis, time to resolution, and management of the condition were recorded for patients who developed sural neuritis.

Results

A total of 39 patients were retrospectively reviewed, of which three patients (7.69%) developed symptoms attributed to sural neuritis post-peroneal tendon repair. Diagnosis of sural neuritis in the three patients ranged from 130 to 191 days post-peroneal tendon repair. Time to resolution of neuritis symptoms in the three patients who developed sural neuritis were 113 to 574 days after the onset. Successful management of sural neuritis were observation, serial injection of a mixture of 1 ml 1% lidocaine, 1 ml 0.5% bupivacaine, and 1 ml dexamethasone (4 mg/mL), and sural neurectomy.

Conclusion

While conservative treatments may be effective to manage sural neuritis, surgical options may be necessary for patients who fail to respond adequately. Patients suffering from sural neuritis often experience intense and debilitating symptoms that significantly impact their quality of life, highlighting the critical importance of early identification and appropriate management to mitigate long-term disability and ensure optimal outcomes.

Introduction

Sural neuritis is a recognized and common complication resulting from iatrogenic injury, postsurgical or posttraumatic fibrosis, traction injury, or chronic nerve compression. [1] Patients with sural neuritis often report pain and tingling in the course or distribution of the sural nerve at the lateral posterior corner of the leg, lateral foot, and fifth digit [2]. As symptoms of sural neuritis can be intense and debilitating, such conditions could have a significant impact on quality of life, necessitating prompt management [1]. According to a case series by Stockton and Brodsky, incidence of sural neuritis as a complication of peroneal tendon repair was found to be up to 16.6%. [3].

The sural nerve holds its clinical significance in its use for biopsy, nerve conduction studies, and nerve graft [4]. The sural nerve is typically formed by a fusion of the medial sural cutaneous nerve, a branch of the tibial nerve, and the peroneal communicating branch of the lateral sural cutaneous nerve, a branch of the common peroneal nerve at the lower third of the leg. [5] Studies have found that the sural nerve is located approximately 12 mm medial to the lateral border of the gastrocnemius-soleus junction and can be traced back to spinal nerve roots S1 and S2. [6]. Although anatomical variations have been noted, a cadaveric study by Webb et al. found that sural nerve courses proximal-medially to distal-laterally at the posterior aspect of the leg, crossing the lateral aspect of Achilles tendon at 9.8cm from the tendon insertion [7].

Diagnosis of sural neuritis is a clinical diagnosis that be suspected in patients with history of trauma or prior surgery to the lateral hindfoot, and made with positive Tinel sign over the course of the sural nerve, tenderness or reproduction of stated symptoms with palpation of the sural nerve, and the anatomic distribution of nerve-related pain or paresthesias along the lateral aspect of the foot [1]. Iatrogenic causes, such as peroneal tendon surgery, gastrocnemius recession, Achilles tendon repair or debridement, calcaneal osteotomy, subtalar arthroscopy, posterolateral ankle ganglion excision, lateral ligament reconstruction through an extensile lateral approach, open reduction and internal fixation of the talus or calcaneus, and excision of the os trigonum, are possible iatrogenic causes of sural neuritis [1, 7]. Traumatic causes of sural neuritis include recurrent sprains, inversion ankle injury with peroneal tendon dislocation, and lawnmower injury [1]. Additionally, a case series by Stockton and Brodsky found that patients who developed sural neuritis post-peroneal tendon repair had a tendency for a diagnosis of high-grade peroneus brevis tear preoperatively [3].

Sural neuralgia often responds to conservative treatments such as rest, physical therapy, massage therapy, anti-inflammatory medications, tricyclic antidepressants, serotonin and norepinephrine inhibitors, gabapentin, and calcium channel blockers [2]. In patients who fail to respond adequately to these conservative approaches, various surgical options have been proposed, such as simple neurectomy, neurectomy with implantation into muscle, adipose tissue, vein, or bone, nerve wrap placement, regenerative peripheral nerve interfaces, resection with use of interpositional allograft, and targeted muscle reinnervation. Pulsed radiofrequency ablation has also been discussed in the literature for sural neuralgia management with successful outcomes [2].

As there is a lack of literature regarding the outcomes of sural neuritis management associated with peroneal tendon repair, the purpose of this study is to report the incidence, management, and time to development and resolution of sural neuritis post-peroneal tendon. This case series examined the incidence and management of sural neuritis in three patients following peroneal tendon repair from January 2022 to January 2024.

Materials And Methods

Patient Selection and Diagnosis

Medical records review for patients who underwent peroneal tendon repair (peroneus longus, brevis, or both) operated on by a single surgeon from January 2022 to January 2024 were retrospectively reviewed. The patients were diagnosed with sural neuritis based on examination by the same surgeon. Inclusion criteria were composed of a diagnosis of sural neuritis after peroneal tendon repair with a history of surgery to the lateral hindfoot, positive Tinel sign or reproduction of stated symptoms from palpation of the sural nerve and its anatomic distribution, or paresthesia along the lateral aspect of the foot.

Data Collection

Demographics of all patients who underwent peroneal tendon repair were collected. Any report of neurologic complications and indication of sural neuritis were carefully assessed. Detailed timeline of the operation date, time to diagnosis of sural neuritis after peroneal tendon repair, management, and resolution of symptoms were collected from the patients’ medical charts.

Results

A total of 39 patients’ medical charts were retrospectively reviewed, and three patients developed sural neuritis post-peroneal tendon repair (7.69%). Remainder of the patients did not develop symptoms attributed to sural neuritis in their follow-up period which lasted for a minimum of six months. The average age of the patients who developed sural neuritis post-peroneal tendon repair was 46.3 and 46.7 in patients who did not develop sural neuritis. Two males and a female developed sural neuritis post peroneal tendon repair while 16 males and 20 females did not develop symptoms attributed to sural neuritis. Onset of sural neuritis in the three patients ranged from 130 to 191 days post-peroneal tendon repair, and symptoms of sural neuritis resolved 113 to 574 days after the onset. Successful management

Table 1. Demographic, Onset of Sural Neuritis, Treatment, and Time to Resolution of Symptoms in 39 Patients Post-Peroneal Tendon Repair.

	Developed Sural Neuritis	Did Not Develop Sural Neuritis
# of Patients	3	36
Age	32 – 62 (Avg. 46.3)	25 – 63 (Avg. 46.7)
Sex	2 M / 1 F	16 M / 20 F
Onset of Sural Neuritis (days)	130 - 191	N/A
Time to Resolution of Symptoms (days)	113 - 574	N/A
Treatments	1. Observation 2. Injection of a mixture of 1 ml 1% lidocaine, 1 ml 0.5% bupivacaine, and 1 ml dexamethasone (4 mg/mL) to the sural nerve under ultrasound guidance 3. Sural neurectomy	N/A

of sural neuritis were observation, serial injection of a mixture of 1 ml 1% lidocaine, 1 ml 0.5% bupivacaine, and 1 ml dexamethasone (4 mg/mL) to the sural nerve under ultrasound guidance, and sural neurectomy.

Discussion

The incidence of sural neuritis following peroneal tendon repair appears to be variable. A case series by Stockton and Brodsky previously reported sural neuritis as a complication in 2 out of 12 patients (16.6%) who underwent peroneal tendon repair. [3] In contrast, our study showed a lower incidence, with only 3 out of 39 patients (7.69%) developing sural neuritis after peroneal tendon repair. In addition, one of these patients' sural neuritis was most likely attributed to the concomitant Evans calcaneal osteotomy, which was performed to address a transverse plane dominant progressive collapsing foot deformity. These findings suggest that the incidence of sural neuritis following peroneal tendon repair may be influenced by surgical techniques and additional surgical procedures performed concurrently.

The operating surgeon in this study posits that an incision hugging the posterior distal fibula with minimal posterior dissection, may have contributed to a lower incidence of sural nerve damage secondary to peroneal tendon repair. The incision for the lateral approach used in this study is depicted in **Figure 1**. According to a cadaveric study by Lawrence, the sural nerve in the hind foot courses 14mm posterior and 14mm inferior to the lateral malleolus. [8] Therefore, a lateral incision along the distal posterior fibula would be expected to avoid complications involving the sural nerve.

The time to develop neuritis attributing to a surgical procedure has also not been widely reported in the literature. In our case series, the three patients who developed sural neuritis experienced symptom onset ranging from 130 to 191 days after the initial surgery. A study by Staff et al. have reported the time to onset of post-surgical inflammatory neuropathy to be up to 30 days after the procedure, with most patients experiencing symptoms within the first 24 hours [9]. In the current case series, the diagnosis of sural neuritis was made well beyond the typical post-surgical inflammatory state, avoiding misdiagnosis of post-surgical inflammatory neuropathy for sural neuritis.

Sural neuralgia often responds to conservative treatments but for patients who fail to respond adequately to these conservative approaches, various surgical options are available (Cychosz). However, despite surgical interventions, a significant proportion of patients, up to a third, are found to continue experiencing persistent neuropathic pain, highlighting the challenges in managing this complex condition (Cychosz). In the current study, the three cases of sural neuritis post-peroneal tendon repair were resolved with observation, anesthetic-steroid injection, and neurectomy in the time frame of 113 to 574 days after the onset of the neurologic symptoms.

The sural nerve is purely sensory, making it a common choice for nerve biopsy and donor procedures [5]. However, this perception of the sural nerve's relative insignificance can be misleading, as patients suffering from sural neuritis often experience intense and debilitating symptoms that can significantly impact their quality of life [1]. Early identification and appropriate management of sural neuropathy are essential to mitigate the potential for long-term disability and ensure the best possible outcomes for affected individuals.

There are some limitations to consider when interpreting the results of this study. The patients involved in this study did not solely receive peroneal tendon repair. All three of the patients received ankle arthroscopy in addition to the peroneal tendon repair. One of the three patients also had adjunct gastrocnemius recession and Evans calcaneal osteotomy which are reasonable causes of sural neuritis.

Confounding factors should be considered when interpreting the data and correlation of sural neuritis and peroneal tendon repair. Furthermore, the small sample size would impact the generalizability of the findings of the data.

Conclusion

In conclusion, the reported incidence of sural neuritis post-peroneal tendon repair was 7.69%. This incidence, which is lower than previously reported, could be attributed to differences in surgical techniques while performing open peroneal tendon repair. In our patient samples, the symptoms of sural neuritis developed 130 to 191 days after peroneal tendon repair and resolved 113 to 574 days after the onset of symptoms. Self-resolution of the symptoms was seen in one of the patients, 2 other patients underwent series of injections with symptom relief in one patient and resolution of neurologic pain with sural neurectomy in the other.

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