

79244_Auto_Edited.docx

Recurrence of intratendinous ganglion due to incomplete excision of satellite lesion in the extensor digitorum brevis tendon: A case report

Park JJ *et al.* Recurrence of intratendinous ganglion

Jeong Jin Park, Hyun Gyu Seok, Hongfei Yan, Chul Hyun Park

Abstract**BACKGROUND**

Intratendinous ganglions are rare lesions, especially on the foot and ankle. Although several studies have presented the intratendinous ganglion of the foot and ankle, there are only few reported cases, and no cases of recurrence or secondary surgery have been reported.

CASE SUMMARY

We present a case report of a 32-year-old man with an intratendinous ganglion of the second extensor digitorum brevis (EDB) tendon that recurred after ganglion excision. Magnetic resonance imaging (MRI) was performed before the first surgery to analyze the causes of the recurrence. We confirmed that there is a lack of satellite detection. After recurrence, MRI revealed an extra-tendinous lesion, tenosynovitis, and intratendinous ganglion of the second EDB tendon. Since the second EDB tendon can compensate for the extrinsic muscle, en bloc resection was performed alone. In addition, meticulous excision and synovectomy were performed for extra-tendinous lesions and tenosynovitis, respectively. The patient returned to daily life without any functional problems or recurrence.

CONCLUSION

If removal of the affected tendon is not fatal, en bloc resection should first be considered to prevent incomplete excision and intraoperative leakage. When planning surgical excision, it is necessary to evaluate the presence of satellite lesions along the course of the affected tendon.

Key Words: Intratendinous ganglion; Recurrence; Surgical excision; en bloc resection; Case report

Park JJ, Seok HG, Yan H, Park CH. Recurrence of intratendinous ganglion due to incomplete excision of satellite lesion in the extensor digitorum brevis tendon: A case report. *World J Clin Cases* 2022; In press

Core Tip: Intratendinous ganglion is rare, especially foot and ankle lesions. Surgical treatment should be considered for patients with persistent pain, nerve compression, tendon dysfunction, or recurrence after conservative treatments. Surgical methods include excision of the ganglion and en bloc resection. Surgical excision of ganglion has the advantage of preserving tendon function, but the risk of recurrence due to incomplete excision is high. In addition, failure of complete excision can lead to more severe clinical features with extra-tendinous lesions and tenosynovitis. Therefore, if loss of function of the affected tendon does not cause significant functional impairment, en bloc resection may be considered first.

INTRODUCTION

Ganglions are common benign tumor-like lesions caused by mucoid degeneration of connective tissues, including the joint capsule, tendon sheath, and tendon^[1-4]. They were classified according to their sites of origin. Among these, the intratendinous ganglion, which occurs in the tendon substance, is the rarest^[2,4,5]. Most intratendinous ganglions

reported so far have been found in the extensor tendons of the wrist or hand^[2,6-8]. An intratendinous ganglion on the foot or ankle is an even rarer disease, with few reported cases^[9,10]. The etiology of intratendinous ganglions remains unclear. One possibility, based on the fact that tenosynovitis or associated tendon tears are commonly found around ² ganglion cysts, is the recurrent injury to the tendon with subsequent cystic degeneration^[1]. Congenital anomalies may be present in patients with no history of trauma or sprains in the affected areas^[3]. Intratendinous ganglions cause soft tissue swelling as well as symptoms such as pain and neuropathy^[11-14].

An intratendinous ganglion can be treated using one of several methods, including aspiration, surgical excision, and en bloc resection of the entire affected tendon. Aspiration is a straightforward method; however, it has a high recurrence rate of approximately 50%-70%, which makes it less preferred as a treatment option^[12,14]. Surgical treatment should be considered for patients with persistent pain, nerve compression, tendon dysfunction, or recurrence after more conservative treatments^[11,15]. Surgical methods include excision of the ganglion and en bloc resection, with or without an additional procedure^[8-10]. Although surgical excision can preserve tendon function, a risk of recurrence remains due to intraoperative leakage and incomplete resection of the ganglion^[3]. However, en bloc resection of the affected tendon exerts a low risk of recurrence and can result in functional restrictions and deformities^[10]. Therefore, additional procedures such as tenodesis and tendon transfer may be required^[2,9,10]. The distinct advantages and disadvantages of each method make it clinically vital to decide which approach should be used for the primary treatment. In addition, for cases of recurrence, it is important to identify the cause and plan for secondary surgery.

To the best of our knowledge, there have been no reports on assessing the recurrence of intratendinous ganglions of the foot and ankle after excision and the results of secondary surgeries. We report a case of an intratendinous ganglion in the second extensor digitorum brevis (EDB) tendon that recurred after excision of the ganglion alone, with successful secondary treatment by en bloc resection of the entire tendon.

CASE PRESENTATION

Chief complaints

A 32-year-old Korean man presented to the orthopaedic clinic with a complaint of a painful mass on the dorsum of the right foot for 3 wk.

History of present illness

Symptoms started 3 wk prior to presentation and gradually worsened.

History of past illness

The patient with a painful mass on the dorsum of the right foot was diagnosed with intratendinous ganglion in the second EDB tendon at a local hospital. Open excision of the ganglion with tendon repair was subsequently performed. Histological examination of the tissue confirmed the diagnosis of intratendinous ganglion. Approximately 3 mo after surgery, the mass lesion recurred, and the patient was admitted to our hospital.

1

Personal and family history

The patient had no relevant family medical history.

Physical examination

The patient had no history of trauma to the affected area. Physical examination revealed a surgical scar on the dorsum of the right forefoot between the second and third ray. A palpable mass approximately 5 cm × 4 cm in size was found around the scar and was accompanied by slight tenderness. The range of motion of his toes was unrestricted.

1

Laboratory examinations

The results of the routine blood and urine tests, blood biochemistry, and immune and infection indices were normal.

Imaging examinations

Plain radiographs showed a slight enlargement of the soft tissue and no bony abnormalities. Magnetic resonance imaging (MRI) revealed multiple lobulated cystic lesions within and above the second EDB tendon, identified by regions of high signal intensity on a fat-saturated T2-weighted image (Figure 1A) and low signal intensity on a T1-weighted image (Figure 1B). Extensive tenosynovitis was observed around the ganglion cyst (Figure 2).

FURTHER DIAGNOSTIC WORK-UP

We diagnosed this as recurrence after open excision of the intratendinous ganglion. MRI scans taken before the first surgery were reviewed to understand the cause of recurrence. A previous MRI scan showed no lesions, except for a cystic lesion inside the second EDB tendon, with no indications of tenosynovitis in fat-saturated T2-weighted sagittal (Figure 3A) and axial (Figure 3B) images. However, a lesion with high signal intensity was observed at the proximal portion of the second EDB tendon before attachment to the calcaneus (Figure 4).

FINAL DIAGNOSIS

We concluded that incomplete resection was performed, mainly because of the failure to detect the satellite lesion located in the proximal portion of the second EDB tendon. In addition, contamination was thought to have occurred following intraoperative leakage during open excision, which in turn caused extra-tendinous lesions and tenosynovitis.

TREATMENT

Considering the presence of multiple ganglion cysts in the entire tendon from the proximal to the distal end, en bloc resection was planned to prevent a recurrence. As the EDB tendon can be compensated for by an extrinsic muscle, tendon transfer was not planned. Additionally, meticulous excision of the extra-tendinous ganglion and synovectomy were planned.

5
Under epidural anesthesia, the patient was placed in the prone position with a tourniquet applied to the ipsilateral thigh. The procedure was performed by extending a previous longitudinal incision. Extratendinous ganglions and tenosynovitis were observed in the extensor tendons (Figure 5). After the excision of the extra-tendinous ganglions, the second EDB tendon was found to have an enlarged spindle shape (Figure 6). Bulbous satellite lesions were observed in the proximal portion of the tendon (Figure 7A), and a colorless jelly-like content was found inside the cysts when incised (Figure 7B). Following the extension of the incision to the anterior process of the calcaneus, remnant tendon removal and electrocauterization were performed. (Figure 8). The second metatarsophalangeal joint capsule was then removed to prevent a recurrence.

OUTCOME AND FOLLOW-UP

Histological examination confirmed the diagnosis of intratendinous ganglion. The patient returned to his daily life without functional problems after surgery, and no recurrence of the lesions was found 18 mo after surgery.

DISCUSSION

2
An intratendinous ganglion is a rare lesion that originates within the tendon substance and causes soft tissue swelling^[13,16]. It can cause persistent pain, functional restriction, and neurovascular compression^[12,14]. Spontaneous tendon rupture is reportedly, a high-risk factor^[4,9,16]. Surgical treatment is considered only in patients with these symptoms^[11,15]. Surgical treatments for intratendinous ganglions may involve only excision of the ganglion or en bloc resection. En bloc resection is superior in preventing recurrence^[10]; however, removal of the whole tendon results in functional loss of the affected tendon and may require additional procedures^[10,15]. Therefore, when deciding on the optimal surgical approach, it is important to assess whether functional loss of the affected tendon may be fatal.

We reviewed previous cases of intratendinous ganglions that occurred in the lower extremities. Shimozono *et al*^[15] and Endo *et al*^[17] only performed excisions of the

ganglions because none of the cases had any soft tissue to compensate for the muscle strength of the FHL tendon; good clinical results were obtained without recurrence. Kim *et al*^[3] also performed an excision of the ganglion to preserve semimembranosus tendon function; however, they noted a recurrence that was thought to be due to incomplete excision. Kono *et al*^[10] performed en bloc resection without additional procedures on the intratendinous ganglion of the second EDB tendon because the extrinsic muscle compensates for functional loss. The patient showed good progress, without functional loss or ganglion recurrence.

In our case, the patient underwent ganglion excision as the first surgery in a local hospital. The medical professionals treating him seemed to have thought that complete excision of the ganglion was possible because of the absence of a satellite lesion. However, when the previous MRI scan was reviewed, small cystic lesions with a high signal intensity on fat-saturated T2-weighted images were observed near the proximal end of the second EDB tendon. We believe that inability to detect satellite lesions is an important cause of recurrence. When clinical examination was conducted at our hospital after recurrence, the symptoms and lump size were more aggravated than those before, and MRI confirmed that these were accompanied by extra-tendinous ganglion cysts and tenosynovitis.

The recurrence rate after excision of the ganglion of the lower extremities has been reported to be approximately 10%^[18,19]. Studies have not been conducted on the recurrence rate following surgical excision of intratendinous ganglions; however, it is expected to be much higher than 10% owing to the difficulty of complete removal of the ganglion^[7,20,21]. In addition, considering the current case of extra-tendinous lesions and severe tenosynovitis after recurrence, repeated surgery requires not only expansion of the skin incision range but also removal of the massive soft tissue, which can lead to poor clinical results. If the removal of the affected tendon does not cause a functional deficit, en bloc resection could be an ideal treatment method to avoid intraoperative leakage and incomplete resections that lead to recurrence. However, excision of only the ganglion should be considered first in cases of fatal functional deficiency and difficulty in

performing additional procedures. To prevent incomplete excision, careful evaluation of MRI scans is essential to detect the presence of satellite lesions along the course of the affected tendon. Removal of all satellite lesions should be carefully planned to avoid the risk of another surgery. When complete removal is difficult, surgical treatment should be planned after evaluating the advantages and disadvantages of each approach.

CONCLUSION

To the best of our knowledge, no other case of an intratendinous ganglion recurrence despite open excision of the foot and ankle has been reported in the literature. Complete excision failure was accompanied by the recurrence of the intratendinous ganglion, extra-tendinous lesions, and tenosynovitis. If removal of the affected tendon is not accompanied by fatal functional restrictions, en bloc resection should first be considered to prevent incomplete excision and intraoperative leakage. Finally, when planning a surgical excision, it is necessary to carefully evaluate the presence of satellite lesions along the course of the tendon.

ORIGINALITY REPORT

6%

SIMILARITY INDEX

PRIMARY SOURCES

1	www.wjgnet.com Internet	38 words — 2%
2	bjr.birjournals.org Internet	28 words — 1%
3	f6publishing.blob.core.windows.net Internet	28 words — 1%
4	www.koreascience.or.kr Internet	16 words — 1%
5	Jun Endo, Satoshi Yamaguchi, Takahisa Sasho. "Tendoscopic Excision of an Intratendinous Ganglion in the Flexor Hallucis Longus Tendon: A Case Report", The Journal of Foot and Ankle Surgery, 2016 Crossref	14 words — 1%

EXCLUDE QUOTES ON

EXCLUDE BIBLIOGRAPHY ON

EXCLUDE SOURCES

EXCLUDE MATCHES

< 12 WORDS

< 12 WORDS