CASE REPORT

Endoscopic adhesiolysis for extensive tibialis posterior tendon and Achilles tendon adhesions following compound tendon rupture

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SUMMARY

Tendon adhesion is one of the most common causes of disability following tendon surgery. A case of extensive peritendinous adhesions of the Achilles tendon and tibialis posterior tendon after compound rupture of the tendons was reported. This was managed by endoscopic adhesiolysis of both tendons. The endoscopic approach allows early postoperative mobilisation which can relieve the tendon adhesion.

BACKGROUND

Repair of acute Achilles tendon rupture usually gives favourable results. However, peritendinous adhesion can occur with the prevalence between 1.0% and 18.6%¹ and this can impair functional outcome.² Tendon adhesions will occur whenever the surface of a tendon is damaged either through the injury itself, be it laceration or crush, or by surgical manipulation. At any point on the surface of a tendon where violation occurs, an adhesion will form in the healing period. When these adhesions cannot be mobilised by an adequate course of physiotherapy, the non-gliding adhesions forming along the surface of a tendon will prevent gliding of the tendon in the performance of its intended function.³ Adhesiolysis should be considered if conservative treatment fails to relieve symptomatic tendon adhesions.³ The classic open procedure requires extensive exposure, which represents another surgical incursion into an area of previous trauma and surgery.³ This may increase the possibility of recurrence of peritendinous adhesion, wound breakdown and infections.² We describe a case of extensive peritendinous adhesions of the Achilles tendon and the tibialis posterior tendon after repair of compound rupture of the tendons. This was successfully managed by endoscopic adhesiolysis which have the advantage of preservation of the soft tissue envelop and early vigorous mobilisation.

CASE PRESENTATION

A 59-year-old man had his right leg crushed by a falling rock resulting in a deep laceration over the posteromedial side of his right leg. Examination of the wound showed complete rupture of the Achilles tendon. The posterior tibial artery was exposed and pulsatile. Toe flexion was intact. The patient noted numbness over the tips of the toes. Radiographs showed no fracture of the injured site. Emergency operation of wound exploration and toileting was performed on the date of injury.

There was complete rupture of the tibialis posterior tendon and the Achilles tendon. The posterior tibial artery and vein and the tibial nerve were intact. The flexor digitorum longus tendon was also intact. The wound was debrided and irrigated with hydrogen peroxide, aqueous hibitane and normal saline. The tibialis posterior tendon was repair with Ethibond 2 using the 2 cores Krackow technique and peritendinous repair with 5/0 Ethilon. The Achilles tendon was repaired with Ethibond 5 using the 4 cores Krackow technique. The skin flap was loosely apposed with 3/0 vicryl and 4/0 ethilon sutures (figure 1). A dorsal splint was applied to keep the ankle plantarflexed. The wound healed up with daily dressing. The splint was kept for 3 weeks and the patient was allowed supervised ankle mobilisation exercise and gradual weight bearing walking. However, the patient presented with symptoms of persistent pain and stiffness discomfort at the calf and posterior ankle region. He could tolerate walking for 1 h with a crutch. Clinically the Achilles tendon was intact with positive Thompson sign. The tendon was thickened and tethered to the surrounding tissue. The ankle could only be dorsiflexed to 5° with reproduction of the symptoms. There was mild tenderness over the thickened part of the Achilles tendon and posterior to the distal tibia. There was no evidence of flexor hallucis longus or flexor digitorum longus adhesions as the toes could be fully dorsiflexed easily with the ankle dorsiflexed without increase in pain.

INVESTIGATIONS

An ultrasound study of his right Achilles tendon and posterior tibial tendon was performed 7 months after the injury. The tendons were found to be intact and there was no abnormal fluid collection in the surrounding soft tissue.

DIFFERENTIAL DIAGNOSIS

The clinical diagnosis was symptomatic adhesions of the Achilles tendon and tibialis posterior tendon. Endoscopic adhesiolysis of the tendons was performed 10 months after the injury. The patient was put in a prone position and a thigh tourniquet was applied to provide a bloodless surgical field. Achilles tendoscopy^{4 5} was performed with dorsomedial and dorsolateral portals at the sides of the Achilles tendon close to its insertion (figure 2) and 4.0 mm 30° arthroscope was used for this procedure. The non-scarred distal part of the tendon was

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Figure 1 Clinical photos. (A and B) The laceration of the calf with the exposure of the underlying neurovascular bundles and tendons. (C) After suturing of the laceration.

identified and then traced proximally to the scarred part of the tendon. Marked circumferential fibrous adhesions were found surrounding the Achilles tendon especially at the previous repair site. There was extensive adhesion of the flexor hallucis longus (FHL) muscle to the deep surface of the Achilles tendon. The surrounding scar tissue and the FHL muscle were released from the tendon by means of an arthroscopic shaver (figure 3). Proximal dorsomedial and dorsolateral portals were made at the proximal limit of reach of the shaver and the adhesiolysis can be continued proximally till the tendon was completely freed from surrounding scar tissue.

The knee was then flexed and the leg was supported by towels. Posterior tibial tendoscopy^{6–8} was performed with a portal distal to the medial malleolus and away from the zone of previous injury. The normal distal part of the posterior tibial tendon was identified and then traced proximally to the scarred zone. A proximal portal was made at the junction point between the normal and scarred zone and 2.7 mm 30° arthroscope was used for this procedure. The tendon was freed from the surrounding

scar tissue with an arthroscopic shaver. Another proximal portal was then made at the proximal reach of the shaver. The arthroscope and the shaver were shifted proximally and the adhesiolysis was continued proximally till the tendon was completely freed from the surrounding scar tissue (figure 4). The patient was allowed full weight bearing walking and vigorous stretching exercise to the Achilles tendon since postoperative day 1.

OUTCOME AND FOLLOW-UP

Intraoperatively, the ankle can be dorsiflexed to 30°. The patient noticed relief of the posterior ankle and heel cord stiffness discomfort during ankle dorsiflexion immediately after the operation. However, he presented with symptoms of paraesthesia over the lateral heel with positive tinea sign close to the proximal lateral Achilles tendoscopy portal. The paraesthesia subsided 5 months after the operation. Upon the latest follow-up 17 months after the endoscopic adhesiolysis, the preoperative symptoms improved by 80% subjectively. The ankle can be dorsiflexed to 20°.

DISCUSSION

Tendon adhesion is one of the most common causes of disability following tendon surgery. The peritendinous adhesions in this case is expected to be more extensive and severe than the counterpart closed tendon rupture because of the initial severe crush injury.^{9–11} Prolonged air exposure as in this case of compound tendon rupture can also increase fibrosis and adherence formation.^{12–13} Moreover, the use of multiple cores of Krackow stitches left the bulk of the stitch on the surface of the tendon as a possible nidus for adhesion.¹⁴ The postrepair immobilisation can also promote fibrous peritendinous adhesions. The adhesions after repair of closed rupture of Achilles tendon are usually so mild that they did not require any more operative treatment, especially in the case of tendocutaneous adhesion.¹ However, our case had severe and extensive adhesion surrounding the Achilles tendon especially at its deep surface which was due to the crush injury of the FHL muscle and rupture of the fascia covering the muscle. Although FHL transfer has been proposed to stimulate regeneration of a degenerated Achilles

Figure 2 (A–D) Endoscopic Achilles adhesiolysis through the posterolateral, posteromedial, proximal posterolateral and proximal posteromedial portals.

Figure 3 Endoscopic views showed the circumferential release of peritendinous adhesion of the Achilles tendon. Note the fibrotic flexor hallucis longus muscle adhered to the deep surface of the Achilles tendon. A, anterior; P, posterior; M, medial; L, lateral.

tendon,¹⁵ muscle adhesion to the tendon in this case is believed to be part of the cause of the symptoms as the muscle was fibrotic and not elastic.

Achilles tendoscopy has been developed with the main indication of denervation of the painful area of the tendinopathic tendon by releasing the paratenon from the Achilles tendon.^{4 5 16–18}

Endoscopic adhesiolysis has been described for adhesion following the repair of a closed Achilles tendon rupture using the postomedial and posterolateral portals at the sides of the Achilles tendon insertion.¹⁹ However, more extensive release was needed in this case and two proximal portals were required. Tendoscopic approach can provide extensive release through small portal wounds under magnified arthroscopic visualisation, which can assure correct plane of lysis at the tendon surface.

Moreover, the endoscopic approach allows early postoperative mobilisation which can relieve the tendon adhesion.^{9 11} It was difficult to differentiate the contribution of Achilles and posterior tibial tendons adhesion to the overall symptoms, and endoscopic adhesiolysis of the tibialis posterior tendon was performed as well.

Concerning the technical details, the procedure should be started by identification of the normal non-scarred part of the tendons. The distal end of the scarred tendon together with interface between the tendon and the scar tissue can then be identified. This can assure the correct plane of lysis and prevent iatrogenic damage to the tendon. Stepwise advancement of the release is recommended. Antegrade exploration (arthroscopic instrument pointing proximally) was usually more favourable than retrograde exploration (arthroscopic instrument pointing

Figure 4 Antegrade exploration of the tibialis posterior tendon sheath with stepwise advancement of the release. (A and B) With the arthroscope through the distal portal, the interval between the scarred and non-scarred parts of the tendon sheath (arrow) was identified and a proximal portal was made at this point. Antegrade exploration and adhesiolysis of the tendon sheath was performed with an arthroscopic shaver through this proximal portal. (C and D) After clear up of the adhesion to the length of the shaver, a more proximal portal was made and the arthroscope and shaver were then shifted proximally and stepwise advancement of the release was performed.

distally), in case of tibialis posterior tendon endoscopic lysis. A cadaveric study of an accessory proximal portal of posterior tibial tendoscopy has concluded complete tibialis posterior tendon exploration with the portal.⁸ However, in vivo, the mobility freedom of the shaver through the proximal portal will be hindered by the calf muscle and the tibia during retrograde exploration and the medial and posterior part of the tibialis posterior tendon sheath is difficult to be reached.

The release should be completed both circumferentially and along the whole span of adhesion. Therefore, the normal non-scarred part of the tendon proximal to the scarred zone should be reached before completion of the procedure. The sural nerve is at risk during an Achilles tendon lysis since the nerve may be embedded in the scar tissue and it may adhere to the tendon. The patient should be informed about this potential risk.

Learning points

- Extensive peritendinous adhesions after compound rupture of the Achilles tendon can be quite disturbing.
- Endoscopic adhesiolysis is a feasible surgical option with the advantage of minimal soft tissue dissection and early postoperative mobilisation is allowed.
- Complete adhesiolysis both circumferentially and along the whole span of adhesion is needed for success.
- The sural nerve is at risk during the operation and the patient should be informed about this potential risk.

Contributors THL conceived the idea, was involved in patient assessment and wrote the manuscript.

Competing interests None.

Patient consent Obtained.

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