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Wound management with negative pressure wound therapy in postoperative infection after open reconstruction of chronic Achilles tendon rupture



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ABSTRACT

INTRODUCTION: Deep infection after reconstruction of chronic Achilles tendon rupture is a major and intractable complication.

CASE REPORT: We report a case of late deep infection following a surgery for chronic Achilles tendon rupture, and its simple and successful treatment with negative pressure wound therapy (NPWT). Six months following the reconstruction of chronic Achilles tendon rupture, a deep infection developed and reconstructed part of the tendon ruptured again. After appropriate debridement.

DISCUSSION: There is no definitive treatment strategy for postoperative infection following open Achilles tendon repair. NPWT was applied to the wound, to promote wound healing and healthy granulation. In our case, NPWT promoted the wound healing and the infected Achilles tendon with tendon loss formed a healthy bridge with granulation tissue spontaneously. The patient resumed her normal activities of daily living, without requiring tendon transfer surgery. NPWT seems to be a simple and successful candidate for this situation.

CONCLUSION: NPWT seems to be effective for the treatment of postoperative infection following Achilles tendon repair, even in cases of tendon loss.

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1. Introduction

Infection is a major complication after open reconstruction of chronic Achilles tendon rupture. There has been an increase in deep infections associated with Achilles tendon surgery [1]. The overall postoperative complication rate is estimated to be 7% to 13%, with a deep infection rate of 2%–4% [2–4]. Although there are several surgical techniques for the treatment of Achilles tendon ruptures, there are no specific guidelines for the management of postoperative infections. Results after a deep infection are often deleterious [1,5].

Negative pressure wound therapy (NPWT) is one of the recommended options to accelerate healing in acute and chronic wounds, including traumatic wounds, diabetic leg ulcers, surgical incision, burns, and wounds following skin grafting [6]. We report a case where NPWT was used for the treatment of postoperative infection, which had developed after open reconstruction of chronic Achilles tendon rupture. NPWT proved to be a simple and successful treat-

ment procedure. This paper has been written in line with the SCARE criteria [7].

2. Presentation of case

A 57-year-old Japanese woman perceived pain in the right heel while walking on the supermarket job, and consulted a local physician, who diagnosed it as a bruise. However, 2 months later, the pain continued, and she was unable to walk up and down the stairs. She consulted another physician, who diagnosed it as a chronic rupture of the right Achilles tendon. She was referred to our hospital and we performed an open reconstruction of the tendon, using free Achilles tendon graft. She had no significant comorbidities or risk factors (diabetes mellitus, history of tobacco consumption, vascular diseases, past history of local steroid injection). Postoperatively, the operated ankle remained in a cast for the first 2 weeks. After removal of the cast, the patient wore an ankle foot orthosis for 3 months without any restriction of weight bearing. Five months after the surgery, the tendon was completely functional and she had resumed her normal activities of daily living. Six months after the surgery, a little skin wound, like a chap, appeared on the surgical scar. Within a week, the wound deepened and formed a fistula, with discharge of pus. Ruptured end of the Achilles tendon was visible through the fistula and she was back to hospital (Fig. 1).

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Fig. 1. Ruptured end of the infected Achilles tendon.

It was diagnosed as a late deep infection and intravenous antibiotic treatment was initiated (Sulbactam and Piperacillin 3 g/day). Staphylococcus aureus was detected on bacterial examination. One week after admission, surgical debridement was performed. Pus formation was seen around the Achilles tendon with infectious necrotic free Achilles tendon graft. Infected and necrotic parts of the tendon and peritendinum were debrided and the wound was cleansed with Ringer solution. After the surgery, NPWT (V.A.C., KCI KK, Tokyo, Japan) was applied, under a continuous negative pressure of 125 mmHg. The patient was allowed to walk without any weight bearing restriction for the operated extremity, on the first day after surgery. NPWT was applied continuously for 11 days after the surgical debridement, by which time the Achilles tendon was completely covered with granulation tissue. NPWT application and systemic antibiotics were discontinued. The granulation tissue was cleaned with tap water shower, and povidone-iodine and sugar ointment were applied on the granulation tissue every day. Three weeks after the surgical debridement, she was discharged and treatment continued in the outpatient unit. Two months after discharge, the wound had healed completely. The patient was able to perform the single heel rise test, and full range of ankle movements without any discomfort in the activities of daily living. The follow-up Magnetic Resonance Image (MRI) demonstrated a well-bridged Achilles tendon, with normal signal intensity (Fig. 2).

3. Discussion

Postoperative infection following open Achilles tendon repair is a deleterious and intractable complication, with poor functional outcome [8]. However, there is no definitive treatment strategy for this condition [8]. Repeated debridement leads to poor functional outcomes; hence, a simple and expeditious treatment is necessary. NPWT is one such option; however, only 2 studies have been published on the use of NPWT with split-thickness skin graft, to treat postoperative infection following surgery for an acute Achilles ten-

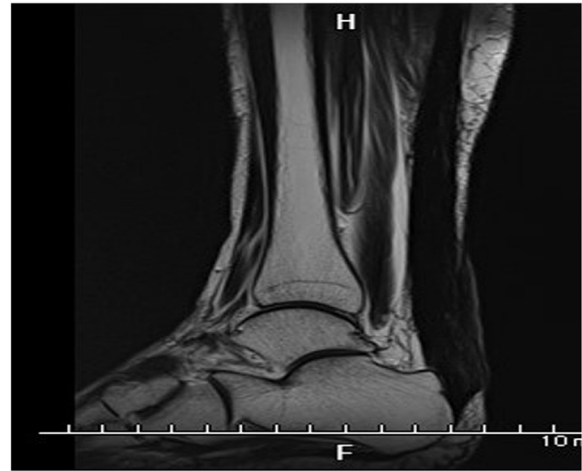


Fig. 2. T2 weighted sagittal Magnetic Resonance Image showing a well-bridged Achilles tendon with normal signal intensity at three months after the surgical debridement.

don rupture [5,8]. There is however, no published report related to the use of NPWT for infection following surgery for chronic Achilles tendon rupture requiring tendon graft. Chronic rupture treatment requires tendon graft at times; hence, this option also needs to be considered for the treatment of postoperative infection following chronic rupture of Achilles tendon. In our case, the patient did not require any skin graft or secondary tendon graft after NPWT.

Heugel et al. [5] were the first to demonstrate the successful use of NPWT for the treatment of an exposed Achilles tendon after a burn injury. Definitive wound closure was achieved by skin grafting. Mosser et al. [8] reported the use of NPWT for the treatment of 6 patients with late deep infections, after open Achilles tendon reconstruction. A continuous negative pressure of 125 mm Hg was applied on each wound. After changing the NPWT dressings thrice on an average, a split-thickness skin graft was performed for definitive wound closure. At a mean follow-up period of 29.9 months, no re-infection or lingering infection was observed in any of their patients, and the functional outcomes were good.

To the best of our knowledge, this is the first report of wound management with NPWT for postoperative infection, after open reconstruction of chronic Achilles tendon rupture.

Mosser et al. debrided all infected, necrotic, and ischemic parts of the tendon and peritendinum; however, there were no case with a tendon loss. In our case, a portion of the Achilles tendon graft was completely lost due to the infection. We used NPWT over the area of tendon loss, and it was bridged by the formation of granulation tissue. It should be noted that the patient achieved not only definitive wound closure, but also good functional result, without the need for a repeat tendon surgery. Postoperatively, the patient resumed her normal activities of daily living. Postoperative MRI also showed formation of granulation tissue, bridging the lost part of the tendon.

Heugel and Mosser reported using a skin graft after NPWT to achieve definitive wound closure. Mosser et al. reported that all their skin grafts had healed within 14 days. They highlighted that the split-thickness skin graft allows for definitive wound closure with a low risk of scar, keloid, or adhesion, which could limit the functional outcome. They also recommend securing the skin graft with NPWT, as the method has been shown to improve graft survival [9].

In our case, we did not use skin graft after NPWT, and definitive wound closure was achieved in 10 weeks. Skin grafting after NPWT could have achieved wound closure in lesser time.

4. Conclusion

In conclusion, we report a technique for the treatment of deep infection after open Achilles tendon reconstruction, in a case of chronic rupture. Tendon loss, which had occurred after debridement, was bridged by the granulation tissue using NPWT. Postoperatively, the patient resumed her normal activities of daily living, and required either local tendon transfer nor flap coverage. NPWT alone, is a good treatment option for the treatment of infected tendon, as well as cases of tendon loss.

Patient perspective

The patient shared her perspective on the treatment when her wound was healed completely.

Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

Sources of funding

Authors declare there is no funding resources for this paper.

Ethical approval

Institutional review board approval was not required because all data were collected from clinical records and imaging systems for routine preoperative planning and follow-up.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

IS wrote this paper. All authors attended the surgery and read this paper.

Guarantor

Toru Akiyama, the corresponding author of this paper.

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