POSTOPERATIVE INFECTION AFTER ACHILLES TENDON REPAIR: A Case Study of Management and Delayed Reconstruction With Tensor Fascia Lata Autograft

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INTRODUCTION

The authors present this case study of postoperative infection following an Achilles tendon repair. Surgical and medical management is chronicled, which included serial debridements, delayed closure, and later surgical reconstruction with a tensor fascia lata autograft.

CASE HISTORY

A 29-year-old healthy female presented to the office complaining of weakness and pain to her posterior right lower leg after stepping down hard with the right leg during a step aerobics class several days prior. She clinically presented with all the classic signs of an acute Achilles tendon rupture including a palpable dell at the Achilles watershed area, passive dorsiflexory position of the right foot compared with the left foot, lack of foot plantarflexion with the Thompson test, and weakness with attempted active plantarflexion of the foot. Magnetic resonance imaging confirmed the rupture. She was placed in an equinus nonweight-bearing short-leg cast with crutches and conservative and surgical options were discussed. The patient elected for primary repair of the right Achilles tendon rupture, which was performed uneventfully. The only significant patient history included rare social smoking, birth control injections, and a history of fibroids with vaginal bleeding; but otherwise she was a very healthy patient.

The primary repair included a posterior incision along the medial margin of the Achilles tendon. Paratenon and deep fascia were disrupted at the rupture site and complete rupture of tendon with mop-ends noted. The mop-ends were debrided and a Bunnell stitch reapproximated the distal and proximal tendon ends using a #2 Ethibond. This was reinforced with 3-0 fiberwire suture in a modified Krakow-type stitch and 2-0 absorbable suture. Standard layered closure was performed. An equinus non-weightbearing shortleg cast was applied.

Five days postoperative the patient demonstrated no significant edema or pain. Good healing of the incision without erythema, dehiscence, or any signs of infection. The cast was bi-valved and she was to remain nonweightbearing with crutches. The patient was anxious to return to work and was allowed to return provided that she keep her leg elevated on a chair next to her as she did sitting type of work.

Thirteen days postoperative, she presented to the office complaining of increased pain over the last 3 days at the surgical site. She admitted she had been keeping her leg dependant and did not elevate her leg on a chair as prescribed since her first postoperative appointment. She denied any



Figure 1. Clinical view demonstrating dehiscence and wound defect from infection prior to I & D.



Figure 2A. Preoperative clinical view prior to second debridement, marked necrosis seen of the Achilles tendon.

nausea, vomiting, fever, chills, or night sweats and she was afebrile. The cast and dressing were removed revealing a central area of dehiscence approximately 2.5 cm in width with significant serosanguineous drainage without erythema (Figure 1). She was placed NPO and incision, drainage, and debridement of the surgical wound with cultures was planned for that night. After the patient left for the hospital, the case was discussed with Dr. John Ruch and he assisted in the surgery. The overall plan was incision and drainage with wound cultures. If disruption of the deep fascia was present, than the suture repair would be removed. If the Achilles tendon tissue remained clean without infection, than rerepair with unbraided suture would be planned once the wound infection cleared. Serial debridement of the wound would be performed as necessary.

SURGICAL INTERVENTION

Day 0

At the initial incision and drainage, skin, and subcutaneous sutures were removed. Drainage and apparent infection disrupted the deep fascia, therefore all sutures were removed from the tendon repair, which was intact with good end-to-end approximation. Curettage debridement of the Achilles



Figure 2B. Post-debridement, second surgery.

tendon was performed with normal saline lavage. No marked necrosis of the tendon was noted and the wound was packed open after wound cultures.

Postoperatively, internal medicine and infectious disease specialists were consulted. PCA and intravenous antibiotic of Ancef every 8 hours was started. Lovenox 40 mg was begun by internal medicine. On the first postoperative day the initial wound culture grew gram negative rods. Unremarkable laboratory tests of CRP, ESR, and CBC indicated early infection. Wound cultures grew out Enterobacter cloaca and the antibiotics were changed to Cefepime because the bacteria was resistant to Ancef. The patient was further questioned about her postoperative course and she recalled an episode of her toilet overflowing after her first postoperative visit and this may have gotten her surgical leg wet at the knee. This, perhaps, was the cause of the infection.

Day 3

Surgical debridement of the open wound was performed in the operating room and much of the remaining tendon appeared necrotic and nonviable (Figure 2A). The tendon was debrided with a curette, and tissue cultures were taken of the proximal and distal tendon ends (Figure 2B). The wound was again packed open. The tissue cultures



Figure 3A. Pre-debridement at third surgery, necrosis seen in the proximal and distal segments.

of both proximal and distal segments came back later showing light growth of Enterobacter cloacae.

Day 7

Surgical wound debridement was performed with almost full resection of the gastrocnemius aponeurosis and achilles tendon to the calcaneus (Figures 3A, 3B). Tissue pathology of the proximal and distal tendon were taken. Irrigation and curettage of the remaining wound was performed, and it was packed open with an equinus belowknee cast applied. Cefepime was discontinued, and the patient was started on Zosyn 4.5 g intravenously every 6 hours, and Levaquin (750 mg) daily. Tissue pathology showed proximal and distal Achilles with necrosis and marked inflammation.

Day 11.

Open wound irrigation and debridement were performed, wound cultures were taken, and delayed wound closure was performed. The wound appeared free of infection with clean margins and was closed with 3-0 non-absorbable suture and a TLS drain (Figure 4). An equinus nonweight-bearing Jones cast was applied. The cultures from the last surgery showed no growth.



Figure 3B. Post-debridement, almost full excision of the Achilles tendon.



Figure 4. Delayed wound closure of clean wound with drain placement.

Day 12

A cast change was performed and the TLS drain removed. The incision was intact without evidence of dehiscence or drainage. The patient was discharged with pain medicine, Levaquin 750 mg and Zosyn 4.5 g intravenously for 3 weeks. The patient would ambulate with an equinus nonweightbearing cast and crutches.

Day 16

The patient was afebrile, 5 days after debridement and closure of the right leg. Mild residual drainage was noted over the central aspect of the incision with peeling of some epidermis, but there was no erythema or calor, and no signs of abscess or infection. The plan was close observation of the wound with dressing and cast changes.

Weeks 3-9

The patient was followed on a weekly basis to closely monitor the wound. The incision remained stable except a 1-2 cm area centrally with mild residual hemorrhagic drainage, but no signs of deep infection. This area healed with local wound care over the following weeks. Sutures were removed sequentially each week. A Jones compression dressing with a below knee equinus nonweight-bearing cast was reapplied at each visit. Future surgical intervention of possible tendon transfers to provide an attachment to the calcaneus and tensor fascia lata autograft for Achilles reconstruction were discussed.

Week 9-11

The incision line was entirely intact with no dehiscence, drainage, or infection. The patient was fitted with a tubigrip and fracture walker. She was allowed to bathe and do ankle range of motion exercises. Good resolution of the infection was noted, and the wound now appeared suitable for reconstruction. The plan was for transfer of the flexor hallucis longus and/or peroneus brevis tendon and augmentation with a fascia lata autograft.

Week 12

The patient was brought to surgery for reconstruction of the Achilles tendon (Figure 5A). The tensor fascia lata autograft harvest was performed first with the patient supine (Figures 5B, 5C). An approximately 3 inches by 8 inches strip of fascia was removed and wrapped in a sterile bloody sponge until it was used posteriorly. The patient was turned prone and a thigh tourniquet at 300 mmHg was inflated. A posteromedial right leg incision was created along the previous incision and extended proximally with significant scarring at the distal 10 cm of the incision. The proximal medial and lateral heads of the gastrocnemius muscle, deep fascia, and aponeurosis were identified as known layers and used to help define the distal layers. Deep fascia and aponeurosis proximally were reflected. Delamination of the layers was performed of the remaining scarred wound (Figures 5D-5F). Fortunately, the distal Achilles tendon had regenerated 5 cm arising from the calcaneus insertion. The defect was now prepared for reconstruction with the fascia graft. Tendon transfers had been planned to provide a scaffold for the tensor fascia lata and to create an insertion into the calcaneus. Because of the regenerated tendon distally, the tendon transfers were not deemed to be necessary.

The tensor fascia lata graft was prepared by removing any attached muscle, subcutaneous, and non-fascial tissue. The graft was than placed over the wound and contoured to match the geometry of the defect (Figure 5G). A 2-0 Mersilene and 2-0 Vicryl were utilized in a pulley-type stitch to attach the graft proximally to the superior remaining aponeurosis fibers just below the gastrocnemius muscle heads (Figure 5H) and distally into the regenerated Achilles tendon. Additionally, tack down sutures were utilized to tag the graft to the deeper soleal fibers (Figures 5I, 5J). Wound closure was performed in layers with 3-0 and 4-0 absorbable suture for the subcutaneous tissue and skin. A #10 TLS drain was placed prior to skin closure (Figure 5L). The wound was dressed and equinus Jones compression cast applied. The patient was admitted and placed on a PCA. Intraoperative wound cultures were negative.

Weeks 13-18

The incision healed uneventfully and the patient remained in a nonweight-bearing gravity equinus cast. She did get her cast wet twice requiring cast changes and the second time she was placed nonweightbearing in a CAM walker.



Figure 5A. Preoperative clinical view prior to Achilles reconstruction, note right calf atrophy.



Figures 5B-5C. Fascia lata graft harvest.





Figure 5D. Delamination of the wound in preparation for reconstruction.



Figure 5E. Identification of the gastrocnemius heads and proximal aponeurosis.



Figure 5F. The wound is prepared for graft placement.



Figure 5G. The full harvested fascia lata graft placed in the wound.



Figures 5H. Attaching the fascia lata graft proximally.



Figure 5I.



Figure 5J. Attachment of remodeled graft to reconstituted Achilles tendon distally.



Figure 5K. Reconstructed Achilles tendon. Note the tack-down sutures.

Week 19

The patient began ambulating with crutches and the walker boot. She was started on home strengthening exercises and a stationary bike. Formal physical therapy was ordered for rehabilitation of the gastrocnemius-soleus complex 3 times a week for 1 month.

Week 21

At 10 weeks postoperative the patient was ambulating in regular shoes. She did not begin formal physical therapy as prescribed. The Achilles tendon was noted to be strong and intact with definite connection to the gastrocnemious muscle although significant atrophy of the calf muscle was visible. She was strongly encouraged to initiate the prescribed physical therapy.



Figure 5L. Final closure with drain.

Week 24

Mild hypertropy of the scar was noted distally and was managed with a Compro support for compression of the scar. The patient started the formal physical therapy soon after her last visit and will be on an aggressive strengthening program for 1 year. Currently, she is walking without pain or a limp and without a need for a brace or other device. Full strength and integrity to the Gastrocnemius-soleal complex was noted clinically with definite reconstruction of the gastrocnemius size and tone.

CONCLUSION

The authors have presented a case study of the management of a postoperative infection after Achilles tendon repair and details the later surgical reconstruction. While each individual case is different, basic principles of infection management and delayed reconstruction were fundamental to the successful treatment and outcome.

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