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CASE REPORT

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Missed Achilles tendon rupture due to oral levofloxacin: surgical treatment and result

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Abstract We describe a case of a 60-year-old male patient who was treated with oral levofloxacin. The patient sustained a total subcutaneous rupture of the left Achilles tendon which was not diagnosed for at least 5 months. Surgical treatment was successful.

Keywords Fluoroquinolones · Achilles tendon rupture

Introduction

Fluoroquinolones have been associated with tendon disorders, such as tendinitis and tendon ruptures. The manifestations persist for several weeks or months [8]. The most frequently affected site is the Achilles tendon (90%), and in 44% of the cases, the injury is bilateral [10]. A rupture is described in almost one-half of the cases [10].

According to a case-control study from the Netherlands, the risk of Achilles tendon disorders due to exposure to fluoroquinolones is relatively rare, with an overall excess risk of 3.2 cases per 1000 patient-years [15].

We describe a patient with an oral levofloxacin-induced total rupture of the left Achilles tendon which was originally missed and the result of the surgical treatment.

Case report

A 60-year-old man required hospital care for bacterial pneumonia in July 2002. The patient was given a combination of cephalosporin and metronidazol intravenously for 10 days. After 10 days, due to the large infiltration, the antibiotics were changed to oral levofloxacin 500 mg twice a day for another 8 days. After 3 days the patient complained of pain in both Achilles tendons, and a bilateral tendinopathy was recognised clinically. Both tendons were painful for several months, and in November 2003 the patient noticed that he could not raise his left heel. His left ankle was weaker than the right one.

The patient visited general practitioners several times and complained of difficulties in walking. However, the rupture of the left Achilles tendon was not diagnosed until March 2003. The Thompson's test [24] was positive in the left calf and negative in the right.

The operation according to Lindholm [17] was performed in April 2003, 5 months after walking difficulties had developed and 9 months after levofloxacin medication. The rupture was located 4 cm proximally to the tendon insertion on the calcaneus.

Because the operation was delayed, the reconstruction of the tendon was difficult due to the large gap and extensive scar formation at the rupture site. Despite the fact that the ankle was in maximal plantar flexion, a 1 cm-wide gap still remained between the cleaned tendon strips. The tendon repair was performed with non-absorbable sutures according to the Krakow locking loop technique. The 1 cm gap was bridged with two turn-down gastrocnemius flaps whose width was 7–8 mm and length 8–9 cm, and each flap

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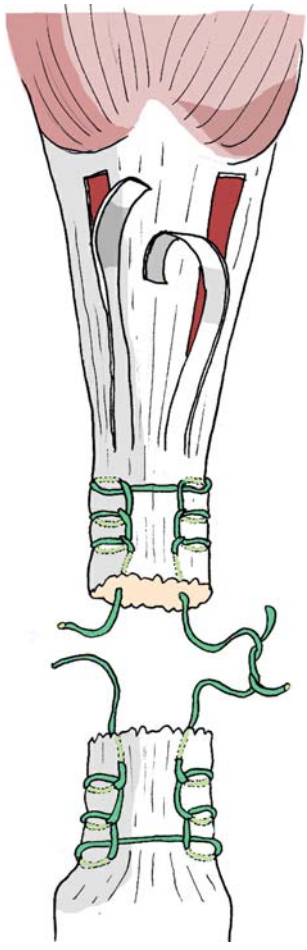

Fig. 1 The surgical procedure

was sutured with absorbable sutures to the distal stump of the tendon and to the other flap (Fig. 1). The ankle was immobilized postoperatively for 3 weeks with a below-knee plaster cast with the ankle in maximal plantar flexion. The plaster cast was changed after 3 weeks to a 10 grade lesser plantar flexion. After 4 weeks the plaster cast was changed to a removable Walker® orthosis with the ankle in neutral position, and the bracing time was 4 weeks. Weight-bearing was allowed gradually. At 7 weeks postoperatively, the patient was allowed to remove the orthosis several times per day and guided to perform active ankle exercises. At 8 weeks postoperatively, strengthening exercises were allowed.

The patient was invited to re-examination and clinical tests at 6 months postoperatively. He was satisfied with the result. He could walk normally, and there was no difference in the active ROMs between the ankles. The circumference of the left leg was 1.5 cm smaller than that of the right leg. The functional and clinical outcome at 18 months postoperatively was assessed according to the American Orthopaedic Foot and Ankle Society (AOFAS) scale [23]. The overall result in this patient was excellent (95 points).

Discussion

The fluoroquinolone antibiotics were first introduced in the 1980s and are widely used for the treatment of bacterial infections. Overall, these drugs are generally well tolerated. Impaired renal function, reactions of the gastrointestinal tract, skin reactions, CNS toxicity, cardiotoxicity, hepatotoxicity, chondrotoxicity as observed in immature animals, tendonitis and tendon ruptures are rare adverse effects of these drugs [22]. Fluoroquinolone-induced tendinopathy was noticed for the first time in 1983 [1]. The first case of tendon rupture associated with ciprofloxacin was reported in 1987 [18].

The mechanism by which fluoroquinolones are thought to cause tendon injury has not been established, although a number of suggestions have been made [26]. A change in proteoglycan synthesis, oxidative damage or a toxic effect in the Achilles tendon has been found in animal studies [9, 21]. In clinical practice, degenerative lesions, fissures, interstitial oedema without infiltration, necrosis and neovascularization have been found [7]. Other studies demonstrated necrosis due to an ischaemic vascular process [2] or direct toxicity to the collagen of the tendon [12].

According to the review of Khalig and Zhanel [10], the mean age of the patients with tendon disorders when receiving fluoroquinolones was 59 years with a slight male predominance. Tendon injury was reported to occur as early as 2 hours after receipt of the first dose of the drug [6] to as late as 6 months after treatment had been started [4]. Tendon injuries were most frequently reported in association with the use of pefloxacin and ciprofloxacin, but tendon disorders have been reported also with most other fluoroquinolones [10]. In a population-based case-control study from the UK during the period from 1988 to 1998, the highest risk of Achilles tendon rupture was found for users of ofloxacin [16]. Little is known about the risk factors of the tendon injury. It seems that the risk increases with increasing age (over 60 years) and in patients who are taking long-term glucocorticoid treatment and in patients with chronic renal disease [22]. According to van der Linden and coworkers, the adjusted odds ratio of Achilles rupture was 6.4 (95%CI 3.0–13.7) in patients aged 60–79 years and 20.4 (95%CI 4.6–90.1) in patients aged 80 years or older [16]. In that study, oral corticosteroid use with current exposure to quinolones strongly increased the risk of Achilles tendon rupture in patients older than 60 years. The incidence of fluoroquinolone-induced tendon injury in an otherwise healthy population is not well established, but earlier studies suggest the rate as low, ranging from 0.14% to 0.4% [11, 14, 25].

With the increasing use of these drugs due to their excellent gastrointestinal absorption, good tissue penetration and broad-spectrum activity, we can expect a growing number of patients with tendon disorders. Nevertheless, prescribers should be aware of this risk and try to avoid the use of fluoroquinolone for

patients with risk factors for tendinopathy such as oral corticosteroid medication or renal dysfunction [16]. The early diagnosis of an Achilles tendon rupture is extremely important for successful treatment. The Thompson's test is a very easy means to diagnose whether there is an Achilles tendon rupture or not. It is important to recognise the early typical symptoms of Achilles tendonitis and stop the associated medication.

Of all acute Achilles tendon ruptures, some are primarily misdiagnosed. According to earlier studies, about 20% of ruptures (12–28%) were missed, leading to treatment delay [3, 5, 19]. In two Finnish studies (98 and 101 patients), 5–7% of the ruptures were missed, and the surgical treatment was performed more than 2 weeks after the rupture [13, 20].

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