Flouroquinolones And A Case Of Bilateral Achilles Tendon Rupture
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Citation

Abstract
The incidence of rupture of the Achilles tendon is increasing (1), but bilateral rupture of the Achilles tendon remains a rare event (2, 3). In such cases a careful history and examination is required to elucidate any predisposition. Various hypotheses have been put forward as to why the Achilles tendon ruptures (4, 5, 6). We present a case of bilateral asynchronous Achilles tendon rupture associated with the use of fluoroquinolone antibiotics.

CASE
A sixty year old man was walking up stairs when he felt a painful ‘snap’ in his left heel. He had no history of pain in his Achilles tendon and was generally well. Two days later, the patient was once again walking up stairs when he felt another ‘snap’ in his contralateral heel. Difficulty mobilising caused him to seek medical advice after the second incident. The diagnosis was not immediately apparent and the patient was referred for physiotherapy. Five weeks later, during his first attendance at physiotherapy, bilateral defects in the Achilles tendons were suspected on palpation. Bilateral positive ‘calf-squeeze’ tests confirmed the diagnosis of bilateral Achilles tendon rupture and this was confirmed on ultrasonography. An immediate orthopaedic clinic appointment was made. A detailed drug history revealed that prior to his first rupture, the patient was treated for a lower respiratory tract infection with Levofloxacin (a fluoroquinolone antibiotic). The patient elected to be managed non-operatively after discussing the risks and benefits of surgery and non-operative management. This was carried out using bilateral functional bracing for a period of twelve weeks and on his last clinic review he had reasonable ankle push off strength and range of ankle motion with a clinically intact Achilles tendon.
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Figure 2

Figure 3

Figure 4
DISCUSSION

The majority of people who present with rupture of the Achilles tendon give a history of a sudden, sharp pain in the posterior aspect of the calf of the affected leg. They often describe the feeling that they have been ‘kicked in the heel’ (4, 7). An audible snapping sensation may also be described. The patient may subsequently have difficulty weight-bearing on the affected side and may describe ankle stiffness. On occasion a palpable gap may be present (Fig 1) however, in the absence of sports participation or a specific painful event, the rupture may be misjudged either by the patient or the doctor. Diagnostic difficulties may occur in elderly patients and if the patient consults a doctor some days after the injury. A bilateral injury may make the diagnosis particularly difficult as there is no normal side for comparison. Achilles tendon ruptures are therefore missed in up to 20% of patients (5, 7). In elderly patients with an Achilles tendon rupture, nine (36%) of 25 patients had a delay to definitive management of more than one week (6).

In chronic rupture of the Achilles tendon, the pain and swelling may have subsided and the gap between the proximal and distal ends of the Achilles tendon may have filled with fibrous tissue (5, 7). Therefore, a less apparent or absent gap exists between the tendon ends. Minimal pain and swelling around the proximal and distal stumps of the ruptured tendon may be present (5). Active plantar flexion is also possible by the action tibialis posterior and the long toe flexors, contributing to a delayed diagnosis (5). Active plantar flexion will however be weak and associated with a limp (5). If there is uncertainty or confirmation is required a series of special tests can be undertaken.

The ‘calf squeeze’ test is the most commonly used test. It is often described as Thompson’s (4) or Simmonds test (5), though Simmonds described the test five years before Thompson. The patient lies prone with both feet hanging over the edge of an examination couch. A positive test is one in which the foot fails to plantarflex against gravity when the calf muscles are squeezed (Fig 2). The result of the test should be compared with the other leg (Fig 3), unless the symptoms are bilateral.

Matles’ test (6) is carried out with the patient again lying prone on an examination couch. Both legs are flexed at the knee to approximately 90°. On the side without the rupture, the ankle will remain in plantarflexion. On the side with the rupture, the ankle will dorsiflex or remain in the neutral position (Fig 4, Fig 5). If the plantaris tendon is intact, there is a theoretical risk of false positive. However, in the absence of sports participation or a specific painful event, the rupture may be misjudged either by the patient or the doctor. Diagnostic difficulties may occur in elderly patients and if the patient consults a doctor some days after the injury. A bilateral injury may make the diagnosis particularly difficult as there is no normal side for comparison. Achilles tendon ruptures are therefore missed in up to 20% of patients (5, 7). In elderly patients with an Achilles tendon rupture, nine (36%) of 25 patients had a delay to definitive management of more than one week (6).

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If two of the aforementioned special tests are positive, the diagnosis of Achilles tendon rupture is certain (9).

If there is still clinical doubt imaging is of benefit using either ultrasound or MRI. Ultrasonography of a neglected rupture will reveal an acoustic vacuum with thick irregular edges. Magnetic resonance imaging will reveal generalised high signal intensity on T2 weighted images. On T1 weighted images, the rupture will appear as a disruption of the signal within the tendon substance (10, 11).

Following diagnosis, the reason for rupture of the Achilles tendon should be established. Spontaneous rupture of the Achilles tendon has been associated with many disorders, such as inflammatory and autoimmune conditions, genetically determined collagen abnormalities, infectious diseases, renal failure, neurological conditions and hyperlipidemia. A disease process may predispose the
tendon to rupture from minor trauma. Blood flow into the tendon decreases with increased age and the 'watershed' area of the Achilles tendon may be more prone to rupture as it is relatively avascular compared with the rest of the tendon.

Achilles tendon rupture may also result from a drug adverse event, the most common being corticosteroids. Speed (30), reviewed the literature on corticosteroid injections involving tendinopathies, and concluded that there was no good evidence to support such intervention. The anti-inflammatory and analgesic properties of corticosteroids may mask the symptoms of tendon damage, and individuals will continue to maintain high levels of activity even when the tendon is damaged (5, 31).

Fluoroquinolone antibiotics such as ciprofloxacin have been implicated in the aetiology of rupture of the Achilles tendon (32, 33). In France, between 1985 and 1992, 100 patients treated with fluoroquinolones had tendon disorders, including 31 ruptures (32). Szarfman et al (32) demonstrated disruption of the extracellular matrix of cartilage as well as depletion of collagen in animals which received fluoroquinolones. This may also apply to humans. There are at least two documented reports of Levofloxacin associated Achilles tendon rupture in the literature.

At a molecular level Decorin is a prototype member of the family of the small leucine-rich proteoglycans (SLRP's). It modulates collagen fibrillogenesis, and is vital in maintaining tendon integrity at molecular level (34). The glycosaminoglycans bound to decorin act as bridges between contiguous fibrils. This arrangement suggests a possible role in providing mechanical integrity of the tendon structure. Laboratory evidence suggests that fluoroquinolone antibiotics decrease decorin transcription (35), which may alter the viscoelastic properties of the tendons and induce increased fragility.

CONCLUSION

This case of asynchronous bilateral Achilles tendon rupture demonstrates the importance of taking a careful history and examination in patients with pain in the calves associated with a limp. Knowledge of pre-disposing factors increases the index of suspicion regarding interpretation of the clinical findings. Prompt diagnosis and early treatment yield the best results for patients with Achilles tendon rupture.

References

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