Letter to the Editor

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Ultrasound Imaging and Guidance for Tamoxifen-Associated Achilles Tendinopathy

Berkay Yalçınkaya, Ahmet Furkan Çolak, Murat Kara, Levent Özçakar
Department of Physical and Rehabilitation Medicine, Hacettepe University Faculty of Medicine, Ankara, Türkiye

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Dear Editor,

A 62-year-old woman with a body mass index of 22 kg/m^2 was seen for intermittent right ankle pain persisting for the last two years. She identified the pain mainly over the Achilles tendon and this was worse during walking. Her medical history was notable for breast cancer, treated with modified radical mastectomy five years earlier. She had been receiving tamoxifen since then, but it was stopped six months prior to presentation due to severe ankle pain. Cessation of tamoxifen led to moderate symptom relief. Her medical history was otherwise unremarkable. On physical examination, the right Achilles tendon was painful to palpation. Ultrasound examination revealed significant tendinosis (particularly at the myotendinous junction) and partial rupture in the right Achilles tendon (Figure 1). Ultrasound-guided platelet-rich plasma injection was performed in the ruptured area as well as the myotendinous junction (Video 1). Three weeks after the intervention, her complaints were reported to have improved by 50% and the tendon thickness at the level of the lateral malleolus (1) decreased from 6.0 mm to 4.6 mm. Her bone mineral density measurement revealed osteopenic values (T-scores ranged from -1.3 to -2.2) in both lumbar vertebrae and femur. Following a follow-up visit, cold therapy, and exercises (range of motion, stretching, and strengthening of ankle muscles) were started. During this conservative treatment, her symptoms gradually decreased further. The patient is still under uneventful follow-up two months later.

Discussion

Drug-induced tendinopathy can be caused by a variety of medications, including statins, fluoroquinolones, steroids, and aromatase inhibitors. Increased metalloproteinase and collagenase activity and decreased collagen synthesis may be contributory in the pathogenesis. Tendinopathy can ensue and resolve in a widely variable period (two weeks - four years) after the drug initiation/discontinuation (2).

Tamoxifen is a selective estrogen receptor modulator (SERM) which is commonly used for the treatment of breast cancer - particularly in premenopausal women with estrogen receptor positive breast cancer (3). It has both estrogenic and anti-estrogenic effects on various tissues through regulation of the expression level and/or activity of the estrogen receptors. Although its effects on tendons are less well-documented, estrogen is known to enhance collagen synthesis in tendons and reduce tendon stiffness (4). Regarding SERMs, tamoxifen may adversely affect tendons/ligaments, potentially leading to rupture, through mechanisms such as increased metalloproteinase 13 activity, decreased tensile strength, and reduced maximum load at failure (5-7).

Since the presented patient did not have potential risk factors for Achilles tendinopathy/rupture, as she was non-obese, sedentary, had no trauma and got better after drug discontinuation, tamoxifen appears to be the most likely reason for Achilles tendon injury. Needless to say, further studies are needed to explore the possible causal relationship

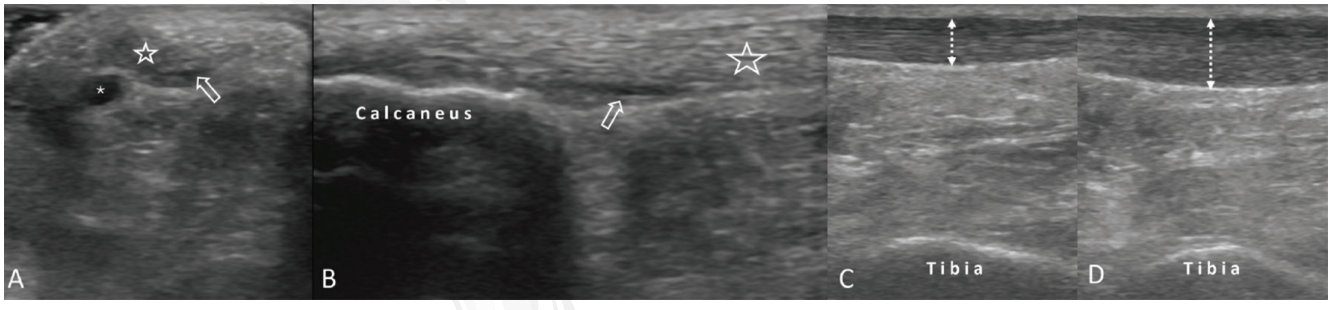

Figure 1. Axial **(A)** and longitudinal **(B)** ultrasound images demonstrate Achilles tendon *(stars)*, ruptured area *(arrows)* and a small ganglion cyst *(asterisk)*. Comparative longitudinal ultrasound images **(C, D)** show the swollen Achilles tendon on the symptomatic side **(D)**

Corresponding Author:
Berkay Yalçınkaya MD; berkay0lka@gmail.com

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between tamoxifen use and tendinopathy whereby ultrasound imaging and guidance would be contributory.

Video 1. Real time ultrasound guidance during platelet-rich plasma injection for ruptured area *(arrow)* of the Achilles tendon *(star)*. The needle *(arrowhead)* is inserted using the direct in-plane technique. Asterisk, injection material; curved arrow, small anechoic ganglion cyst.

Footnotes

Authorship Contributions

Concept: M.K., L.Ö.; Design: M.K., L.Ö.; Literature Search: B.Y., A.F.Ç.; Writing: B.Y., A.F.Ç., M.K., L.Ö.

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