Introduction

The spectrum of Achilles tendon overuse injuries is wide ranging from peritendinitis to structural degeneration of the tendon (tendinosis), and partial to complete tendon rupture (1). Various pathological conditions may co-exist (e.g. peritendinitis with tendinosis) (2). Tendinosis has been recently suggested as the correct term to replace tendinitis in most cases. This is due to histopathological studies showing mucoid degeneration with complete absence of inflammatory cells (3). Insertional tendinitis, tendinosis and involvement of musculotendinous junction should be also considered separately (4). The number of patients in previous MRI studies dealing with painful Achilles tendon other than total rupture have been limited to 27 or less. Sensitivity of MR imaging to alterations of tendon pathology can be improved by application of gradient echo sequences with short echo times (5).

Our purpose was to describe and classify MRI findings related to overuse injuries of painful Achilles tendon with special referring to peritendinous tissue and surgical findings.

Materials and methods

100 patients with 118 clinically manifest symptomatic Achilles tendon disorder (pain and tenderness) participated in this prospective study. 28 patients were operated and in thirteen cases histological specimen were taken. Also 62 asymptomatic contralateral Achilles tendons were images. We performed the MR imaging at 1.5 T (Vision, Siemens) and evaluated separately the tendon itself, peritendinous tissues, tendon insertion and musculotendinous junction by two observers. The imaging protocol consisted of sagittal T1-weighted spin-echo (SE) (460/14, TR msec/TE msec) and turbo inversion recovery (STIR) images (4,000/30/160) with 3mm slices and 1 mm gaps. In axial plane we obtained axial high resolution T1-weighted gradient echo (FLASH) images (TR 600/TE 10 msec) and a pixel size of size 0.54 x 0.35mm and conventional STIR-(4700/30/160, TR/TE/TI), PD- and T2-weighted (2100/20/80) pulse sequences.

Results

MRI had abnormal appearance in 111 of 118 painful Achilles tendons and in 12 of 62 asymptomatic tendons. The MRI of Achilles tendon had sensitivity of 94% and specificity of 81%, positive predictive value of 90% and negative predictive value of 88% (κ = .77). In 64% of the painful tendons more than one type of abnormalities were found. 90 (76%) Achilles tendons itself had abnormal appearance and 54 of them had an intratendinous lesion which was best seen on axial FLASH images. 17 of the lesions had a high signal intensity foci on STIR-images. 21 intratendinous lesions were found in surgery and 20 of them were detected with FLASH-images and only 14 with other sequences. All 13 histological specimen of the lesions showed tendon fiber disturbances with light collagen staining and some roundness of tenocyte nuclei. In two cases histological specimen suggested possible rupture and they had larger high signal intensity lesion on STIR-images. Other abnormalities included retrocalcaneal bursitis (19%), tendinomas changes at insertion of the Achilles tendon (15%) and calcaneal bone marrow oedema (9%). The last two were suggestive of insertitis. Peritendinous abnormalities were detected in 81 (67%) of the Achilles tendons. They consisted of anterior peritendinitis (increased signal intensity on STIR-images in Kager's fat pad ), posterior peritendinititis (increased signal intensity of the paratenon on STIR-images) and thickening of the paratenon on FLASH-images.

Conclusion

MR imaging of thin layers like paratenon is possible with high resolution techniques. Gradient echo images with short TE improves the detectability of intratendinous lesions. A radiologist should separately evaluate all different units of the symptomatic Achilles tendon. Based on our result MRI is able to detect accurately both intra- and extratendinous pathological structures of the painful Achilles tendon and in most of the cases they co-exist.

References