Case report

Reversed palmaris longus muscle on MRI: report of four cases

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Abstract. Muscle anomalies around the wrist, in particular the palmaris longus muscle, may cause effort-related median nerve compression. A search of the medical records at our university hospital between 1994 and 1999 revealed four patients with an effort-related median nerve compression due to a reversed palmaris longus muscle. Magnetic resonance imaging was used in the patient work-up and showed an anomalous muscle in each case that had been missed initially. All four patients were free of pain after simple excision of the anomalous muscle. Awareness of muscle anomalies at the wrist on MR imaging is essential in evaluating patients with nerve compressions at the wrist. The purpose of this article is to heighten this awareness in radiologists.

Key words: Muscle anomalies – Median nerve compression – Wrist – MRI

Introduction

The use of magnetic resonance imaging in evaluating soft tissue masses has now become common practice. However, the interpretation of the MR images is dependent not only on knowledge of the anatomy but more importantly on the index of suspicion of the presence of anatomical anomalies. Presence of the numerous normal soft tissue structures in the wrist can make interpretation difficult. Carpal tunnel syndrome due to an anomalous muscle (mostly the palmaris longus) is well known to hand surgeons but has not attracted much attention from others [7]. We report four cases in which MR was used to evaluate an effort-related median nerve compression combined with a soft tissue mass in the distal one third of the forearm. Initially, the muscle anomalies remained unnoticed on the MR studies. Magnetic resonance imaging studies provide more detailed information on soft tissue structures and the boundaries between the structures than other investigative studies.

Materials and methods

The medical records at our university hospital between 1994 and 1999 were searched for patients with an effort-related median nerve compression due to a reversed palmaris longus muscle and who had undergone MR examinations of the wrist to determine the nature and extent of a soft tissue swelling on the volar side of the distal forearm. The MR images consisted of T1- and T2-weighted transverse, sagittal, and coronal images obtained with various types of surface coils, spin-echo (SE), and gradient-recalled-echo (GRE) sequences, with varying parameters.

Results

The search of the medical records revealed four patients with an effort-related median nerve compression due to a reversed palmaris longus muscle. Interestingly, three were women (age 18, 24, and 51 years), and there was only one man (age 22 years). All patients were right-handed with symptoms on the dominant side and complained of pain and tingling in the fingers following sport or manual exercises. Clinical examination showed a diffuse, bluish swelling on the volar surface of the distal forearm in all four cases. Lancinating paresthesias in the distribution of the median nerve with percussion of the median nerve at the wrist (Tinel’s sign) and reproduction of symptoms with the wrist flexion test (Phalen’s test) were all negative. EMG investigations were performed in three patients and were all negative. Surgical exploration was performed. The mass was covered by the fascia of the forearm and had clear boundaries. The anomalous muscle was excised. At follow-up all patients were free of symptoms. Unfortunately, the diag-
nosis of reversed or hypertrophied palmaris longus muscle was primarily missed on the MRI studies and all patients were surgically treated on purely clinical grounds. Review of the MR images clearly showed an anomalous soft tissue mass on the volar surface of the distal forearm which had gone undetected in all cases probably due to the radiologist being unfamiliar with the anomaly. There was no invasion into the surrounding tissues. At the level of the distal forearm the mass was directly superficial to the median nerve and MR images clearly demonstrated the flattening of the median nerve due to the compression as is seen in Fig. 2.

**Discussion**

The functionally redundant palmaris longus muscle is one of the most variable muscles of the human body. Normally it arises together with the flexor tendons at the medial epicondyle of the humerus and inserts into the palmaris aponeurosis in the hand. The muscle normally has a short belly proximally and a long tendon distally. However, variations are not infrequent as reported by Reimann [1] in a cadaver study in which he found agenesis of the palmaris longus muscle in 12% with an overall incidence of anomalies of 9%. Variations of the muscle belly consisted of a centrally located, distally lo-

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**Fig. 1.** Transverse T1-weighted MR image of the wrist shows the anomalous muscle belly of a reversed palmaris longus muscle at the level of the distal forearm. The median nerve (arrow) is in direct contact with, and flattened by, the palmaris longus muscle and the finger flexors.

**Fig. 2.** The resected reversed palmaris longus muscle held between two forceps seen next to the median nerve (arrows) at surgery. The wrist is on the left of the figure.

**Fig. 3.** Transverse T2-weighted gradient-recalled-echo image at the level of the wrist joint shows a flattened median nerve (arrow) between the reversed palmaris muscle and the tendons of the finger flexors.

**Fig. 4.** Transverse T1-weighted spin-echo image shows hypertrophied anomalous palmaris longus muscle, superficial to the median nerve (arrow) compressing the nerve.