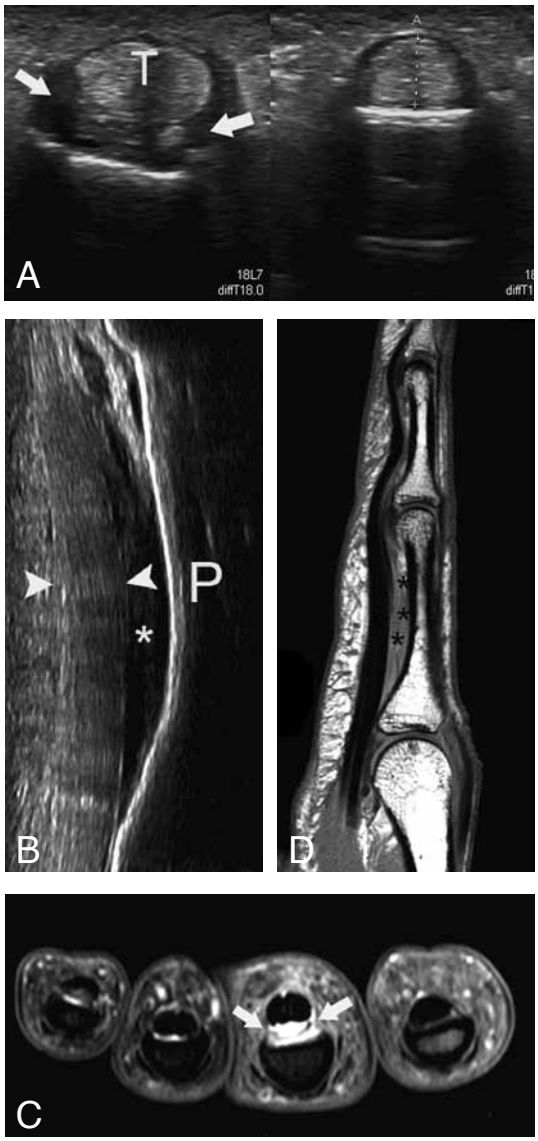
JBR–BTR, 2013, 96: 47.

# IMAGES IN CLINICAL RADIOLOGY




## *An unusual cause of A2 pulley rupture in a 49-year-old man*

M. De Maeseneer, C. Boulet, M. Kichouh, F. De Ridder, M. Shahabpour[1]

A 49-year-old man presented to his family physician with pain in the third finger that occurred after he tried to grasp a falling heavy object. His finger was forcefully extended from a semi-flexed position. On clinical examination extension was normal. However, flexion was slightly limited and extremely painful at the end point of flexion.

Ultrasound of the finger was performed and showed that the flexor tendons at the level of the proximal phalanx were at an abnormally increased distance from the bone (Fig. A, B). Both the superficial and deep flexor were also markedly thickened. The normal slips at the side of the tendon representing the A2 pulley were replaced by a heterogeneous mainly hypoechoic area. Fluid was seen deep to the tendons in between the latter and the bone.

MR imaging was performed using a dedicated wrist coil on 3 T (Fig. C-D). On transverse and sagittal proton density weighted images the flexor tendons were seen to be located at some distance from the bone at the midlevel of the proximal phalanx. The ulnar attachment of the A2 pulley could not be visualized, and the radial attachment was thickened, elongated and exhibited high signal intensity on the transverse images. Fluid sensitive sequences showed fluid in the synovial sheath and also in between the tendons and the bone.

*Comment*

Injuries of the flexor pulleys have been typically described in rock climbers. In our experience, the injury may also occur in less athletic contexts such as holding on to or trying to grab a falling object. Also situations with deformities of the fingers may lead to bowstring-like abnormalities of the fingers.

Anatomically there are different pulleys including A and C pulleys. It is essentially the A pulleys that are mechanically important and they are named A1 to A5 from proximal to distal. Bowstringing especially occurs with ruptures of the A2 and A4 pulleys, located respectively at the level of the proximal and middle phalanx. The A1 (and A0) pulley are typically thickened in trigger finger.

The diagnosis of pulley ruptures can usually be made with ultrasound showing the increased distance of the tendon to the bone, designated bowstring injury. A disadvantage of ultrasound is that the finger can not be imaged in flexion, and it is in this position that the distance becomes more prominent. This imaging in forced flexed position is actually most easily done with CT, but is possible with MR also.

Our patient had some associated findings that were better appreciated on 3T MR and that have not been emphasized in the literature. These included marked thickening of the tendons, synovial sheath fluid, and fluid between the tendons and the bone, likely related to avulsion of the synovial sheath from the bone in this location.

Different surgical proecedures have been described to reconstruct the pulleys some using palmaris longus grafts.

In conclusion, we describe a patient with an unusual mechanism of injury leading to an A2 pulley rupture of the finger. This abnormality was diagnosed by ultrasound, but more details of the injury could be appreciated on 3T MR images.

*Reference*

1. Hauger O., Chung C.B., Lektrakul N., et al.: Pulley system in the fingers: normal anatomy and simulated lesions in cadavers at MR imaging, CT, and US with and without contrast material distention of the tendon sheath. *Radiology*, 2000, 217: 201-212.

1. Department of Radiology, UZ Brussel, Brussels, Belgium.