Enthesitis of the direct tendon of the rectus femoris muscle in a professional volleyball player: A case report

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KEYWORDS

Direct tendon;
Quadriceps muscle;
Enthesitis;
Ultrasound;
Volleyball.

Abstract Enthesitis of the direct tendon of the rectus femoris muscle is a rare pathology which mainly affects professional athletes, and it is caused by overuse and repetitive micro-trauma. Athletic jumping and kicking exert a great stress on the direct tendon of the rectus femoris muscle, and volleyball and football players are therefore most frequently affected. Enthesitis may occur suddenly causing pain and functional impairment possibly associated with partial or complete tendon injuries, or it may be a chronic condition causing non-specific clinical symptoms.

We present the case of a professional volleyball player who felt a sudden pain in the left side of the groin area during a training session although she had suffered no accidental injury. The pain was associated with impaired ipsilateral limb function. Tendon rupture was suspected, and magnetic resonance imaging (MRI) was performed. MRI showed a lesion at the myotendinous junction associated with marked inhomogeneity of the direct tendon. Ultrasound (US) examination confirmed the presence of both lesions and allowed a more detailed study of the pathology.

This is a typical case of enthesitis which confirms that MRI should be considered the examination of choice in hip pain, particularly when the patient is a professional athlete, thanks to its panoramic visualization. However, also US is an ideal imaging technique for evaluating tendon injuries thanks to its high spatial resolution, and it can therefore be used effectively as a second line of investigation.

Sommario Le entesiti del tendine diretto del muscolo retto femorale sono rare e pressoché esclusive degli atleti professionisti, legate a sovraccarico funzionale e microtraumi ripetuti. Il gesto atletico del salto e del calcio sono quelli che maggiormente sollecitano il tendine diretto del retto femorale e quindi calciatori e pallavolisti rappresentano gli atleti più frequentemente colpiti. Le entesiti possono presentarsi in maniera acuta, con dolore e impotenza funzionale, eventualmente associati a lesioni parziali o complete del tendine, o cronica con quadri clinici più sfumati.

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Presentiamo il caso di una pallavolista professionista che, nel corso di un allenamento (in assenza di traumi), manifestava una sintomatologia dolorosa inguinale sinistra e impotenza funzionale dell'arto omolaterale. Nel sospetto di rottura tendinea, veniva effettuata una risonanza magnetica che mostrava una lesione a livello della giunzione mio-tendinea, associata a marcata disomogeneità del tendine diretto. L'ecografia permetteva di confermare la presenza di entrambe le lesioni e di meglio definire le caratteristiche dell'entesite.

Il caso in esame è tipico e conferma come la risonanza magnetica, per la sua panoramicità, sia da considerare l'esame di scelta nel dolore dell'anca, in particolare negli atleti professionisti; tuttavia, l'ecografia, per l'elevata risoluzione spaziale, si presenta come la tecnica di imaging ideale per la valutazione delle lesioni tendinee e può pertanto essere utilmente impiegata come esame di seconda istanza.

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Introduction

Overload syndromes are caused by repetitive microtrauma and involve tendons, muscles, cartilage, bones and bursae. Microtrauma causes a series of micro-lesions of the tendons which, despite subsequent tissue repair, lead to tendon degeneration [1]. This results in a structural weakening of the tendons which become subject to partial or complete rupture. The most frequently affected joints are the shoulder, elbow and knee [2], whereas the hip joint is only rarely affected, and in the general population the rectus femoris muscle is hardly ever involved. However, the hip and the rectus femoris are commonly affected in professional athletes, particularly those practising sports which require repetitive kicking and/or jumping [3]. This occurs because the quadriceps muscle is involved in two joints (hip and knee) and it is over-stretched in the landing phase of the jump when the hip is extended and the knee is bent. The quadriceps muscle is therefore contracted (when exercising its anti-gravitary function) and extended, and this increases the risk both of acute injury and of microtraumas leading to degenerative changes [4].

Volleyball players, particularly when playing center of the court acting as a defensive wall by jumping are therefore prone to the development of enthesitis of the direct tendon of the rectus femoris muscle [5,6]. We therefore considered that this case should be reported as the findings were pathognomonic of the disease.

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for inspection by the Editor-in-Chief of this journal.

Description of the case

The patient was a 32-year-old professional female volleyball player who was playing center of the court for the national team. During a training session, in the landing phase after a jump, she felt a sudden pain in the left inguinal fold area spreading downwards to the front of the thigh associated with functional impairment and consequent antalgic attitude during flexion of the left thigh towards the abdomen.

At clinical examination, involvement of the rectus femoris was suspected.

Being an elite athlete, the patient immediately underwent magnetic resonance imaging (MRI) of the hip and ultrasound (US) examination.

MRI examination (Siemens Symphony, Erlangen, Germany) was performed, using spin echo (SE) T1, turbo spin echo (TSE) proton density (PD) and turbo inversion recovery magnitude (TIRM) weighted sequences on the three orthogonal planes which showed marked inhomogeneity of the direct tendon of the rectus femoris muscle (Fig. 1) and a lesion at the myotendinous junction. The examination showed no evidence of indirect tendon injury. Subsequent US examination carried out on Simens ACUSON S2000 with a high frequency multifrequency linear probe, but using a low frequency (7 MHz), allowed a more detailed study of this case of direct tendon enthesitis (Fig. 2).

Conclusions

The quadriceps muscle is located in the anterior compartment of the thigh. It is composed of four muscle bellies: the rectus femoris situated in the anterior portion of the thigh, the vastus medialis and vastus lateralis situated on the inner and outer portions, respectively, and the vastus intermedius situated behind the rectus femoris. The rectus femoris has three proximal tendons: the straight or direct tendon arising from the anteroinferior iliac spine, the indirect tendon inserting into the superolateral rim of the acetabulum, and a reflected tendon, the smallest of the three, inserting into the anterior capsule of the hip joint. The direct and indirect tendons continue in two aponeurotic laminae extending to the lower third of the muscle. The direct tendon continues as the superficial lamina and the indirect tendon as the central sagittal lamina [7].

The quadriceps muscle is involved in knee flexion and hip extension and it exerts maximum contraction when kicking and landing after a jump. Its proximal tendons are therefore only lightly stressed during daily activities, and in the general population the direct tendon of the rectus femoris muscle is rarely injured [6]. The quadriceps muscle is more commonly affected in professional athletes, particularly those practising sports which require repetitive kicking and/or jumping [5].

Fig. 1 A and B. Enthesitis of the direct tendon of the rectus femoris muscle: MRI PD-weighted sagittal scan with fat suppression shows the direct tendon (arrows) which appears increased in volume and of a heterogeneous structure.

MRI is often preferred in the study of hip pathologies due to the deep location, the difficulty in making a clinical diagnosis, the possibility of concomitant pathologies and in order to obtain a more panoramic visualization. However, in addition to MRI, US examination using a lower frequency than the one used in more superficial structures (5 and 12 MHz) is useful thanks to its high spatial resolution and may thus complete the MRI examination by providing a more detailed study of the injury.

Fig. 2 A and B. Enthesitis of the direct tendon of the rectus femoris muscle: US image shows the direct tendon which appears increased in volume and of a heterogeneous echo-texture due to the presence of areas of myxoid degeneration and calcification.

Conflict of interest statement

The authors have no conflict of interest.

Appendix. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.jus.2011.01.007](https://doi.org/10.1016/j.jus.2011.01.007).

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