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Spontaneous Rupture of the Knee Extensor Apparatus in a Chronic Renal Failure Patient: A Case Report

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Abstract **Case Report**

This summary discusses the rare occurrence of non-traumatic bilateral rupture of the knee extensor apparatus. This pathology involves spontaneous rupture of the quadriceps et patellar tendons in both knees without a history of recent trauma. Non-traumatic tendon ruptures, particularly bilateral cases, are uncommon and may be associated with underlying systemic or metabolic conditions such as diabetes or renal failure, which can contribute to tendon fragility. Management typically involves surgical repair of the ruptured tendons followed by intensive rehabilitation to restore knee function and strength. Close monitoring is essential to identify potential complications and optimize long-term outcomes.

Keywords: Knee Extensor Apparatus, pathology, renal failure.

INTRODUCTION

Spontaneous ruptures of the quadriceps tendon are uncommon. They typically occur through an indirect mechanism, often due to excessive contraction of the extensor apparatus. In cases where there is no history of trauma, it is essential to investigate the possibility of an underlying systemic condition that could weaken the tendons.

Such ruptures are more commonly observed in patients with tendinopathies, systemic diseases such as systemic lupus erythematosus, diabetes, repeated corticosteroid injections, or chronic kidney insufficiency [1].

Here, we describe a patient who experienced a simultaneous rupture of the quadriceps and patellar tendons.

CASE REPORT

This involves a 60-year-old patient previously diagnosed with chronic renal failure of hypertensive origin, currently undergoing chronic hemodialysis. The patient also presents tertiary hyperparathyroidism, evidenced by a significantly elevated parathyroid hormone level (PTH: 2500 pg/ml), associated with parathyroid nodules.

The patient was admitted to our facility due to knee pain persisting for the past two months. Clinical examination revealed excessive mobility of both kneecaps, tenderness upon palpation, and a reduced range of active knee extension. No signs of skin openings or vascular or nerve involvement were observed.

Ultrasound imaging of both thighs and knees revealed a complete rupture of the right quadriceps tendon and a complete rupture of the left patellar tendon. Further assessment through MRI of both knees aimed to establish a more precise evaluation of the injuries.

The additional MRI showed the following:
In the right knee: (Fig 1) A total rupture of the right quadriceps tendon with lowering of the patella and tortuous appearance and tendinopathy of the patellar tendon at its patellar insertion.

In the left knee: (Fig 2) A total rupture and retraction of the left patellar tendon, with ascension of the patella visible at the level of the lower 1/3 of the femoral diaphysis and Linear signal anomaly at the patellar apex suggestive of a fracture.

The patient was referred to the orthopedic surgery department for further management.

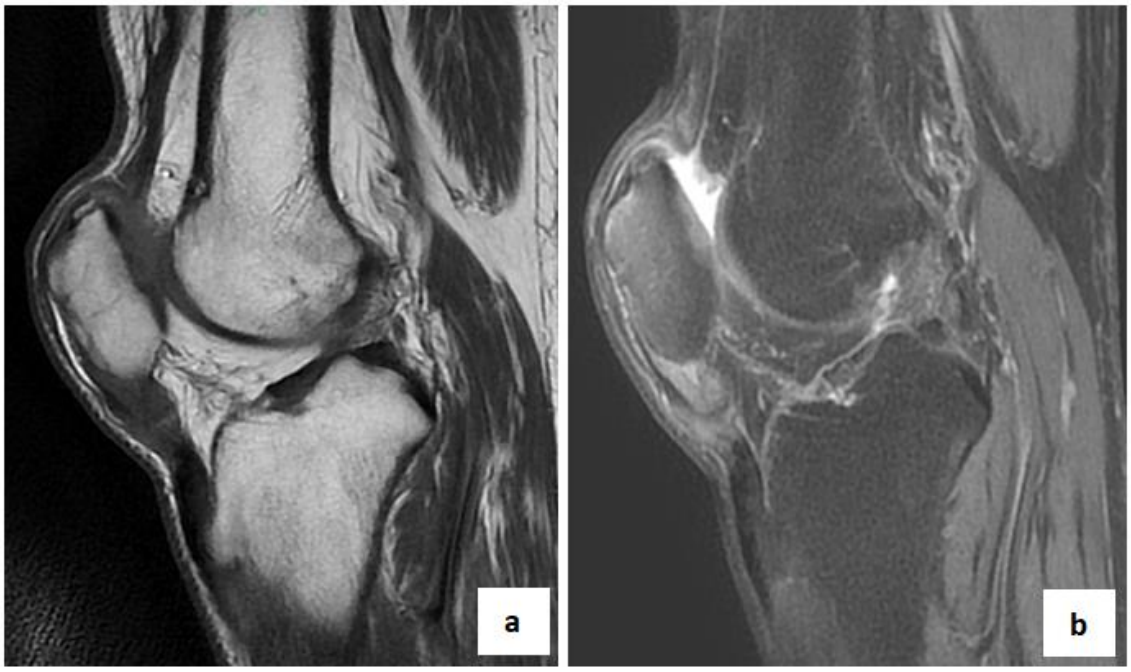


Fig 1

⇒ Patello-femoral and femoro-tibial osteoarthritis (a)
⇒ Joint effusion of minimal abundance (b).
⇒ Rupture of the quadricipital tendon at its patellar insertion, with lowering of the patella and tortuous appearance of the patellar tendon (a, b).
⇒ Infiltration of Hoffa's fat (b).

Fig 2

⇒ Tibio-femoral and patello-femoral osteoarthritis (a).
⇒ Joint effusion of minimal abundance (b).
⇒ Total rupture of the patellar tendon, which is retracted and ascension of the patella, with individualization of a linear signal anomaly at the level of the tip of the patella with solution of continuity of the bone cortex opposite suggestive of a fracture (a, b).
⇒ Infiltration of Hoffa's fat (b).

DISCUSSION

Spontaneous ruptures of the extensor tendons of the knee are extremely rare, often associated with systemic diseases or endocrine disorders such as hyperparathyroidism, rhumatoid arthritis, diabetes, and disseminated lupus erythematosus [1].

Two main hypotheses have been proposed by researchers regarding these spontaneous tendon ruptures. Firstly, the vascular hypothesis suggests that reduced blood flow to the tendon, caused by aging and pathologies predisposing to rupture, leads to tissue degeneration, exacerbated by systemic corticosteroid therapy. Secondly, the mechanical hypothesis proposes that tendon microtraumas cause tissue damage, weakening the tendon and hindering its incomplete regeneration [2].

In some cases, although exceedingly rare, no predisposing factors have been identified, and the rupture may occur in individuals seemingly in good health, without notable pathological history or medication use [3].

Symptoms of knee extensor tendon rupture may include sudden pain, swelling, inability to extend the knee, and sometimes an audible popping or snapping noise at the time of injury.

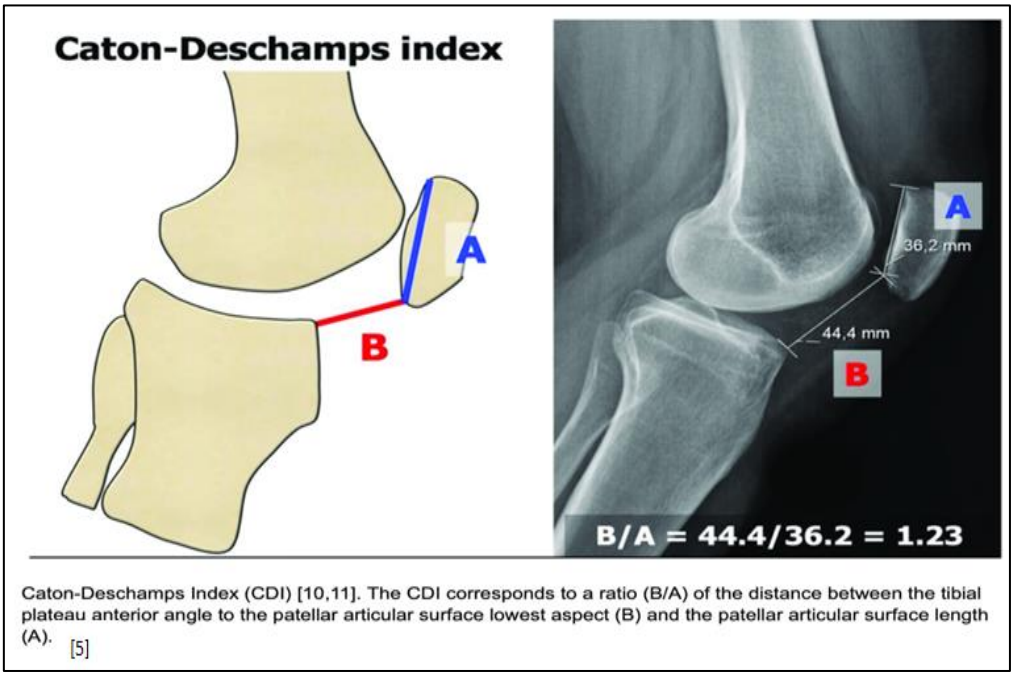
The diagnosis of knee extensor apparatus rupture relies primarily on clinical criteria, with symptoms of knee extensor tendon rupture that include sudden pain, swelling, inability to extend the knee, and sometimes an audible popping or snapping noise at the time of injury.

The differential diagnosis in a patient unable to perform full active knee extension is femoral nerve paralysis [4], which can be either traumatic or iatrogenic. Other signs, sometimes less obvious, may contribute to the diagnosis, such as knee swelling, a painful subpatellar depression upon palpation, and an abnormally ascended patella.

Diagnosis of this condition is typically confirmed through imaging studies such as ultrasound or MRI, which reveal the tendon rupture.

Knee radiographs in anterior-posterior, lateral, and femoro-patellar skyline views help differentiate a quadriceps tendon rupture (manifested by soft tissue swelling above the patella), a patellar fracture, or a patellar tendon rupture.

The patella can be ascended (patellar tendon) or descended (quadriceps tendon) depending on the affected tendon. Several radiological indices exist and allow for the objective assessment of patellar ascent or descent, comparing its position to the contralateral side.



Caton-Deschamps Index (CDI) [10,11]. The CDI corresponds to a ratio (B/A) of the distance between the tibial plateau anterior angle to the patellar articular surface lowest aspect (B) and the patellar articular surface length (A). [5]

Soft tissue ultrasound, a simple and non-invasive technique, reveals a complete interruption of tendon fibers, separated by a hypoechoic area in the case of total tendon rupture.

MRI is the preferred complementary examination, providing not only diagnostic certainty but also assessing the residual tendon stump, indicative of its biomechanical value. It reveals a disruption in the tendon (filled with hematoma), specifies the extent of tendon

retraction, and identifies the presence of intra and extra-articular effusions.

Treatment for non-traumatic knee extensor tendon rupture depends on the severity of the injury and may involve surgical repair of the tendon followed by intensive rehabilitation to restore knee function.

The choice of treatment depends on the type and size of the tear, the patient's age, activity level, and the presence of comorbidities [6]. Surgical treatment is recommended in all cases, regardless of the duration of the lesion, as orthopedic treatment proves ineffective. The surgical goal is to achieve a robust tendon repair, allowing for early initiation of functional rehabilitation.

From a prognostic standpoint, most authors consider the therapeutic timeline as the major prognostic factor [7]. The best outcomes are typically achieved when treatment is administered within 2 to 6 weeks following the rupture. Beyond this timeframe, quadriceps retraction and adhesion formation complicate surgery and impede the restoration of patellar tendon length.

CONCLUSION

Spontaneous ruptures of the knee extensor apparatus lead to significant functional impairment of the lower limb. Non-traumatic ruptures of the quadriceps and patellar ligaments are rare but should be investigated during the clinical examination. An early diagnosis enables prompt management, facilitating optimal functional recovery.

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