Case Report | Journal of Orthopaedic Case Reports 2025 March:15(3):Page 156-159

Simultaneous Bilateral Knee Extensor Mechanism Injury in a Young Male: A Clinical Diagnosis and Literature Review

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Learning Point of the Article:

This case report confirms the theory that tendon rupture is caused by systemic disease. In this case, chronic kidney disease causes inflammatory changes that alter the structure of the tendon. Early surgical treatment offers promising outcomes.

Abstract

Introduction: Simultaneous quadriceps tendons with contralateral patellar tendon ruptures are extremely uncommon. We present a rare case of a male with bilateral simultaneous knee extensor mechanism injuries following a fall who is known to have a systemic end-stage medical disease.

Case Report: A 36-year-old African male is known to have end-stage renal disease following bilateral congenital kidney disease. He receives hemodialysis 3 times a week at our academic hospital renal unit. He presented at our casualty with bilateral knee pains, knee swelling, and an inability to mobilize both legs. He had an inability to extend his knee, a palpable gap along the patella tendon on the left, and a palpable gap in the right quadriceps tendon. We performed plain radiographs to confirm the clinical diagnosis.

Conclusion: We experienced a simultaneous rupture of the quadriceps tendon with the contralateral patellar tendon in a 36-year-old with chronic renal failure on hemodialysis. Surgical repair was performed earlier, and he achieved good functional outcomes.

Keywords: Chronic kidney disease, tendons, patella, quadriceps, orthopaedics.

Introduction

Simultaneous quadriceps tendons with contralateral patellar tendon ruptures (PTR) are extremely uncommon [1]. According to Emre et al., there is a gradual rise in cases with chronic renal failure experiencing simultaneous rupture of the patellar and contralateral quadriceps tendons [2]. Patients over 40 years old are more likely to experience isolated quadriceps tendon ruptures (QTR), whereas patients of younger ages get isolated PTRs [3]. It usually occurs spontaneously in patients with chronic medical conditions due to the poor tendon blood supply and degeneration of collagen fibrils [1]. The chronic medical treatment for this ailment includes gout, rheumatoid arthritis, systemic lupus erythematosus, hyperparathyroidism, chronic kidney failure, connective tissue disorders that are inherited, prolonged corticosteroid treatment, and fluoroquinolone medications [1,2,4].

We present a 36-year-old male with bilateral simultaneous knee extensor mechanism injuries following a fall who is known to have a systemic end-stage medical disease.

Case Report

A 36-year-old African male is known to have end-stage renal disease following bilateral congenital kidney disease. He receives hemodialysis 3 times a week at the Academic Hospital renal unit. He presented at our casualty with bilateral knee pains, knee swelling, and an inability to mobilize both legs. It happened while he was walking; he tripped over a stone and fell onto both knees.

Access this article online

Website: www.jocr.co.in

DOI: https://doi.org/10.13107/jocr.2025.v15.i03.5370

Author's Photo Gallery

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Submitted: 05/12/2024; Review: 12/01/2025; Accepted: February 2025; Published: March 2025

DOI: https://doi.org/10.13107/jocr.2025.v15.i03.5370

Figure 1: Left knee radiograph shows patella alta.

Figure 2: Right knee radiograph shows patella baja.

He has been receiving hemodialysis for his chronic renal disease since 2017, as well as Erythropoietin D 4000s/c weekly and 1α Vitamin D 0.25 mg PO daily.

He was a young male, well-kept, presented in a wheelchair, and had normal vital signs. He had a perm catheter going into the right subclavian vein. On knee examination, he had no wounds, bilateral knee swelling, or anterior knee tenderness with palpable right suprapatellar and left infrapatellar gaps. His knees were in 90° flexion with an inability to extend the knees actively; he was unable to hold the knees in extension when passively moved. He was neurovascular intact on both legs.

On plain radiographs of the bilateral knees, the left knee showed a patella alta both on anteroposterior and lateral views, and the right knee showed a patella baja on anteroposterior and lateral views (Fig. 1 and 2).

He was then planned for open surgical repair. The left patella tendon rupture was at the insertion site of the inferior pole; it was debrided and fixed with suture anchors from Stryker.

The right knee QTR was at the insertion site of the superior pole; it was debrided and fixed with suture anchors from Stryker. The patient was placed on an above-knee back slab and applied an extension in the theatre.

For the left knee with patella tendon injury at 2 weeks, sutures were removed, and range of motion was started as tolerated by the physiotherapist on a brace. For the right knee with quadriceps tendon injury at 2 weeks, sutures were removed, and the back slab was kept for another 2 weeks as per our hospital protocol.

At 6 months, his range of motion was 0–95° on the right knee and 0–100° on the left knee.

Discussion

In 1983, Loehr and Welsh reported a case of simultaneous ruptures of the right patellar tendon with contralateral left quadriceps tendon in a 27-year-old patient suffering from chronic renal failure brought on by lifting, and it appears that this was the first case in English literature of this nature, based on our review of the literature [5]. The knee extensor tendons are infrequently injured, and QTR is more common than PTR, with an incidence of more than 1.37/100,000 people per year for QTRs and <1/100,000 people per year for PTRs [1].

We managed to identify 17 previously reported cases in the English literature review of simultaneous rupture of the quadriceps tendon with contralateral patellar tendon from 1983 to December 2023. Males were impacted at a higher rate than females, with 88.2% (15 cases) compared to 11.8% (two cases). These simultaneous PTR with contralateral QTR affect patients aged 42.3 (21–67 years). Of the 17 cases, seven injuries occurred to the left QTR, seven to the right PTR, 10 to the right QTR, and 10 to the left PTR. Unfortunately, hand dominance was not documented in these cases [1-17]. Our case had a right QTR with a contralateral left PTR.

The concurrent rupture of the knee extensor mechanism is primarily caused by systemic chronic medical disorders, primarily chronic renal failure. We identified 12 cases with chronic renal failure, four healthy patients, and one case with systemic lupus erythematous [1-17]. The mechanism of injury was spontaneous in seven cases with CRF followed by a fall, and in healthy cases, the mechanism of injury was mainly trauma [1-17].

The exact mechanism responsible for the simultaneous rupture of the quadriceps tendon with the contralateral patellar tendon is still unknown. The increased number of cases could be associated with the increased use of hemodialysis, which has increased the lifespan and quality of life in patients with chronic renal failure. Although it is still debatable, bilateral QTR is now thought to be a complex disorder predominantly caused by secondary hyperparathyroidism from prolonged hemodialysis treatment rather than just connective tissue elastosis [18]. Bilateral PTR has three reported theories in the literature. The first theory has to do with systemic disease, which causes inflammatory changes that alter the structure of the tendon; the second theory is an injectable steroid that affects collagen

production and comprises vascular supply, thereby weakening the tendon; and the third theory is that chronic repetitive microtrauma leads to rupture [19].

The diagnosis of simultaneous rupture of the quadriceps tendon with the contralateral patellar tendon is based mainly on history, physical examination, and imaging. Plain radiographs were used to confirm our diagnosis in this study. To mitigate the possibility of misdiagnosis of partial tears, the literature suggests utilizing ultrasound and magnetic resonance imaging [10, 12].

The management of the simultaneous rupture of the quadriceps tendon with the contralateral patellar tendon has progressed over the past decades through multiple surgical procedures techniques such as end-to-end repair, transosseous tendon repair, suture anchor tendon repair, and additional augmentation [1-17]. Regarding outcomes, these patients do have a good range of motion, as seen by the 17 case reports and our case [1-17].

Conclusion

We experienced a simultaneous rupture of the quadriceps tendon with the contralateral patellar tendon in a 36-year-old male with chronic renal failure on hemodialysis. Surgical repair was performed earlier, and he achieved good functional outcomes.

Clinical Message

Simultaneous rupture of the quadriceps tendon and contralateral patellar tendon is extremely rare and requires swift surgical procedures, followed by rehabilitation to enhance the patient's functional results.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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Conflict of Interest: Nil
Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article

Klaas BA, Nkosi CS. Simultaneous Bilateral Knee Extensor Mechanism Injury in a Young Male: A Clinical Diagnosis and Literature Review. Journal of Orthopaedic Case Reports 2025 March;15(3):156-159.