

Spontaneous Bilateral Quadriceps Tendon Rupture in a Patient with Hyperparathyroidism: A Case Report

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Abstract

We report a clinical case of a 31-year-old patient with bilateral rupture of the quadriceps tendon secondary to hyperparathyroidism following minimal trauma. The objective of this case report is to present this clinical and radiological variety of bilateral quadriceps tendon rupture in a patient with hyperparathyroidism, as well and to discuss its therapeutic treatment. We opted for surgical treatment. The results at our last follow up at six months were satisfactory.

Introduction

Quadriceps tendon rupture is defined as a solution of continuity in the transmission chain of the extensor system on quadriceps tendon. Bilateral rupture of the quadriceps tendon in a patient with hyperparathyroidism is a rare clinical situation. In 1949, Steiner and Palmer reported the first case of bilateral simultaneous rupture of the quadriceps tendon in a patient with chronic renal failure [1]. Although the exact mechanism of the quadriceps tendon rupture in a patient with hyperparathyroidism is unknown, most authors agree that it is secondary to hyperparathyroidism. Repeated hemodialysis is a major factor in the pathogenesis of tendon rupture [2]. We report a clinical case of a 31-year-old patient with bilateral rupture of the quadriceps tendon secondary to hyperparathyroidism following minimal trauma. We opted for surgical treatment. The results at our last follow up at six months were satisfactory.

Clinical Case

BH 31 years-old, with hyperparathyroidism, chronic renal failure and undergoing hemodialysis, was admitted for a minimal pain on both knees associated with functional impairment of his two lower limbs that began 10 days before his admission after a minor trauma. Clinical examination revealed oedematous swelling and hematoma in the suprapatellar region, and a palpable soft tissue depression above the patellae, which was exaggerated with active contraction of the quadriceps muscles (Figure 1). The rest of the physical examination was unremarkable. X-ray radiography objectified an anterior and downward displacement of both patellae with no calcification or obvious fracture (Figure 2). Ultrasonography showed a complete rupture of two quadriceps tendons attached to the patellar. Surgery was performed under general anesthesia. A tourniquet was inflated on the limbs followed by a 10 cm median longitudinal incision over the quadriceps tendon, and the proximal end of the patella on both knees. Surgical exploration found an opened space in between the quadriceps tendon and its proximal patellar insertion (Figure 3). The upper pole of patella was roughened through medial approach and by drilling two tunnels on patella. We made a transosseous suture using non-absorbable sutures which were placed through the quadriceps tendon according to Bunnell's technique (Figure 4,5). Splint immobilization of both knees was realized followed by early rehabilitation. The functional results were very satisfactory. In six months, the range of movement in right knee was 0/0/120 and 05/05/135 in the left knee. The quadriceps force was evaluated at 5 on the right side and 4 on left side.

Discussion

Bilateral rupture of the quadriceps tendon is a very rare injury [1]. They are frequently associated with systemic diseases or endocrine disorders such as rheumatoid arthritis, diabetes, systemic lupus erythematosus, hyperparathyroidism [3-6] and secondary hyperparathyroidism in chronic renal failure (90% of patients with chronic renal failure will develop hyperparathyroidism). The treatment of secondary hyperparathyroidism before complications is mainly medical.

Two main hypothesis have been proposed by authors for spontaneous tendon rupture. The first is vascular; decreased blood flow in the tendon (caused by age and pathological predisposing to rupture), leads to tissue degeneration, aggravated by corticosteroids, through fibrillary necrosis and



Figure 1: Clinical aspect of a bilateral quadriceps tendon rupture.

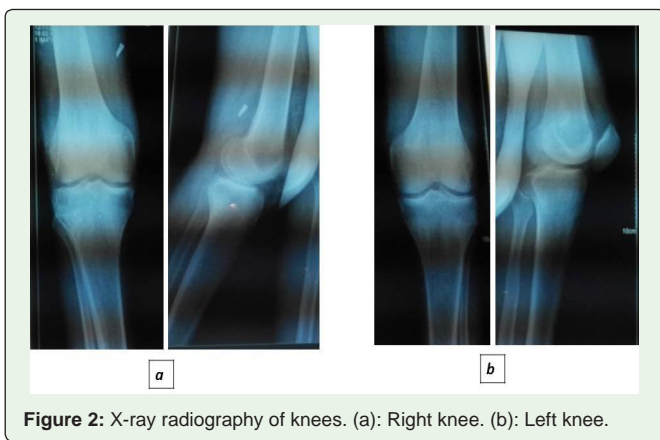


Figure 2: X-ray radiography of knees. (a): Right knee. (b): Left knee.

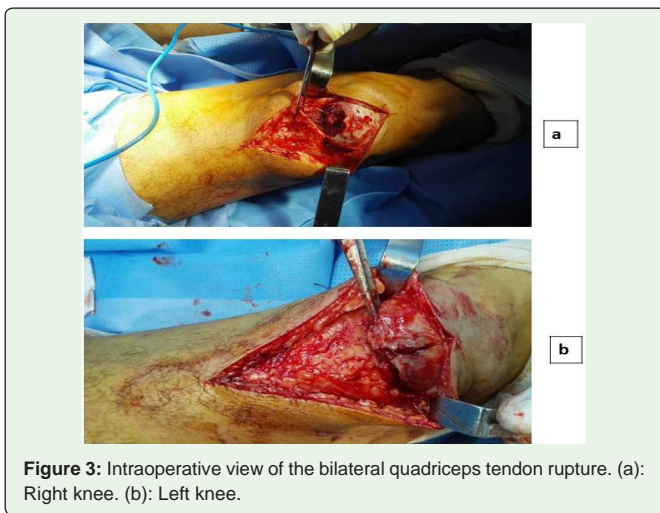


Figure 3: Intraoperative view of the bilateral quadriceps tendon rupture. (a): Right knee. (b): Left knee.

disorganization of collagen ultra-structure. The second hypothesis is mechanical; tissue damage by repeated microtrauma leading to necrosis of the tendon and incomplete regeneration [7,8]. In extremely rare cases, no factor is identified. In our case, we think a combination of many mechanisms: traumatic (over knee-bending) and various systemic conditions may cause damage to the tendon vascular.

The rupture of the quadriceps tendon is a common injury. Simultaneous bilateral quadriceps tendon rupture is very rare.

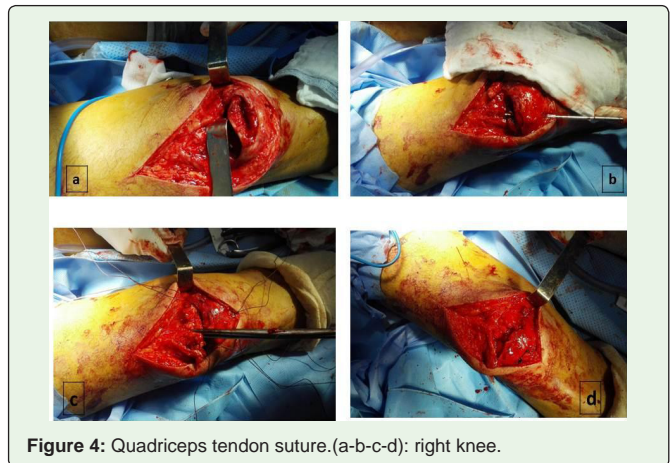


Figure 4: Quadriceps tendon suture.(a-b-c-d): right knee.



Figure 5: Final aspect after surgical procedure. (a): Right knee. (b): Left knee.

The first case was described by Steiner and Palmer [1], only a few publications have been reported in the English literature (little more than 100 cases) [9].

Diagnosis of quadriceps tendon rupture is primarily clinical. The main symptom is the inability to actively extend the knee, this sign is present in partial ruptures especially and other signs can contribute to its diagnosis such as swelling of the knee, patellar depression, instability of patella.

Radiological diagnosis involves a lateral X-ray radiography of the knee flexed at 30° that will show a downward displacement of patella called “patella baja”, which can be measured by Blumensaat method, described in 1933. Ultrasonography of soft tissue can be an efficient way to confirm the diagnosis of rupture. This simple imaging modality shows a complete disruption of tendon fibers separated by a hypoechoic image (hematoma). In other situations such as partial rupture or in difficult diagnosis, the Magnetic Resonance Imaging (MRI) is the examination of choice for appreciation of residual tendon stump and guiding the therapeutic management.

Once the diagnosis of quadriceps tendon rupture is made, the treatment should be only surgical repair, because orthopedic treatment is ineffective. The aim of surgery is to obtain a solid tendon repair to allow early functional rehabilitation. The authors propose to intervene in the first two weeks of tendon rupture, due to the risk

of retraction of the tendon quadriceps that may complicate surgical repair. Many surgical procedures are described, due to injury variety of this tendon, but no technic has been proven to be superior to others and three main types of repair continue to be the most popular: direct repair of the tendon to the patella, Scuderi technique for acute tears, Codivilla tendon-lengthening and repair technique for chronic ruptures. A new fixation is proposed by authors [10]; this technic is similar to Bunnell's method using intra-osseous patella suture. The type of repair, the location of the tear, the patient's age and sex, and the mechanism of injury do not appear to affect the results. Good ROM usually can be regained, but some persistent quadriceps weakness is fairly common. Most patients can return to their previous occupation, but many cannot return to their pre-injury activity level. The knee joints were immobilized in a cast for an average of 4 weeks by the majority of authors [1-8]. Thereafter, the patient underwent physiotherapy to improve his range of movement.

Although the prognosis of this injury is subject to scientific discussions, most authors consider the therapeutic period as the major prognostic factor. The best results are obtained if surgical treatment was realized between 2 to 6 weeks after ruptured quadriceps tendon, after this delay surgical repair is very difficult [10].

Conclusion

Quadriceps tendon rupture is a common injury, but bilateral and simultaneous rupture is a rare. The diagnosis is primarily clinical and the treatment is exclusively surgical. The diagnosis and therapeutic management should be early to prevent complications.

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