

Massive Quadriceps Tendon Repair Using Suture Anchors: A Case Report and Literature Review

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ABSTRACT

The quadriceps tendon is the largest tendon and a fulcrum for function of the most powerful muscles in the human body and has great influence on knee function and independent walking ability. A complete rupture of quadriceps tendon is rarely reported in patients without known co morbidities. In the present case was a 65-year-old male presented with severe pain and inability to extend his right knee after missing a step while walking in his compound. His physical examination revealed the presence of a suprapatellar gap and inability to extending his right knee. Knee X rays revealed a small avulsion fracture of the medial femoral condyle. The magnetic resonance imaging (MRI) also confirmed a diagnosis of complete rupture of his right quadriceps tendon at the insertion point. He denied having systemic disease or being on chronic steroid use. The patient underwent a successful operative repair of the tendon using

two arthrex suture anchors. Intraoperatively we found that the right quadriceps had ruptured transversely at the tendon insertion. During the two-month follow-up after the surgery, the patient received a full rehabilitation with a satisfactorily outcome.

Key words: Quadriceps tendon; Massive rupture; MRI; Reconstruction; Rehabilitation

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INTRODUCTION

Quadriceps is one of the largest and most powerful muscles in the human body^[1]. The rupture of Quadriceps tendons is often associated with systemic disease such as chronic renal failure, hyperparathyroidism, rheumatoid arthritis, systemic lupus erythematosus, and connective tissue diseases^[2-7]. Complete quadriceps tendon ruptures are uncommon and occur typically in male patients older than 50 years old^[8]. This report describes a 65 year-old male patient with quadriceps tendon rupture because of missing his step during his daily walk at his farm. The initial assessment at the casualty missed the quadriceps rupture and he was discharged home on analgesics. He didn't improve and was seen again 4 days later and this time both physical examination and MRI revealed the presence of quadriceps tendon rupture. He was managed by surgical repair of the tendon and protected range of motion in a locking knee brace. After a 6-week period of immobilization in a knee brace at 30 degrees of flexion, the patient was started on a progressive rehabilitation program. The passive flexion could reach 90° by the 8th week and full range of motion at 10 weeks. After that, he was started on strengthening exercises of the extrinsic mechanism.

CASE REPORT

A 65-year-old male presented to the casualty Department of The Nairobi Hospital on 31/12/2017 with right knee pain and the inability to

extend his right knee. The injury had occurred to him 4 days prior to admission at his home. He had severe pain and inability to ambulate on the right lower limb and zero extension at the right knee joint. He had initially been seen and managed as an outpatient with presumed soft tissue injuries without improvement. He attributed his injury to missing a step while walking in his compound. The physical examination revealed the presence of a suprapatellar gap and massive swelling of the right knee joint. Palpation revealed massive knee joint effusion and suprapatellar joint effusion. The patient however denied having any neither comorbidities, systemic diseases or chronic steroid use.

He underwent X ray of the knee and hip joint, which revealed an avulsion fracture of the medial femoral condyle. MRI (Figures 1 and 2) and Ultrasound of the knee revealed a complete rupture of the quadriceps tendon at the insertion point.

He was admitted and operated on the first January 2019 under spinal anaesthesia. He was placed in the supine position and a tourniquet was inflated to 350 mmhg. First a diagnostic arthroscopy done revealed a massive haemarthrosis and complete detachment of the tendon. A longitudinal incision of approximately 10 cm length overlying the quadriceps tendon and proximal superior pole of right patella I found a complete tendon rupture with extension to the Vastus Medialis muscle (Figure 3).

After debridement, I made two parallel bone tunnels from the superior pole to the inferior pole of the patella. Two parallel arthrex sutures anchors fixed into the patella, two anchoring sutures stitched directly into the quadriceps proximal stump in order to reduce the tendon and fix it onto the upper pole of the patella. The knee could be flexed up to 120° and didn't cause the tendon rupture.

After a 6-week immobilization period for knee in a locked knee brace, the patient received passive knee joint movement at 0°-30°, the passive flexion movement achieved 60° until 8th week and 90° by tenth week.

DISCUSSION

The quadriceps tendon is one of the largest and most powerful muscles in the human body. Complete quadriceps tendon rupture is a rare injury that conspicuously affect male patients older than 50-year-old^[1,2]. The overall incidence of quadriceps tendon injuries is 1.37/100,000. Quadriceps tendon rupture generally results from contraction of the extensor mechanism against a sudden load of body weight with the knee flexed^[3].

In a typical acute and complete rupture of quadriceps tendon, surgical repair should be done as soon as possible to avoid the consequences of long term knee disability. Our patient was hospitalized 4 days after the injury. To prevent the tendon re-rupture and reduce the tension of ruptured tendon the use of sutures through drilled holes on the superior border of patella and insertion of sutures into the proximal stump of quadriceps muscle, is known to produce good results. Meanwhile, the use suture anchor fixation is becoming popular in tendon repairs in orthopaedic surgery due to the excellent results of its use in arthroscopic rotator cuff repairs. For this current case, two anchors were implanted into the superior pole of patella and the two pairs of sutures used to stitch the tendon onto the superior pole of the patella.

Most reported ruptures of the knee extensor mechanism are usually associated with systemic disease such as chronic renal failure, hyperparathyroidism, rheumatoid arthritis, systemic lupus erythematosus, and connective tissue diseases. In these cases with systemic diseases a spontaneous disruption of the tendon is reported. In addition, sys-



Figure 1 MRI Scan showing complete quadriceps rupture.



Figure 2 MRI Scan showing quadriceps tendon rupture and suprapatellar effusion.

temic intake steroid and fluoroquinolone or repeated microtrauma to the tendon contributes to tendon ruptures^[1,7].

However, massive rupture of quadriceps tendon is a rare injury in an otherwise normal and healthy person. In the present case, the diagnosis was made mainly based on physical examination, which revealed the presence of a suprapatellar gap and large knee effusion. In addition the ultrasound and MRI scans confirmed the diagnosis. However, cases reported in the literature up to 50% of quadriceps tendon rupture cases had been misdiagnosed initially, which might affect the outcome. Thus, it is important to assess the possibility of a quadriceps tendon rupture in patients with complaints of acute knee joint pain, disability of knee extension.

The quadriceps tendon usually ruptures at the osteotendinous junction in older patients and at the mid tendon area in younger patients.



Figure 3 Intraoperative picture showing a complete tendon rupture.



Figure 4 Intraoperative picture of the ruptured tendon.



Figure 5 Knee flexion 90 degrees at 8 weeks.



Figure 6 Knee extension upto 180 degrees at 8 weeks.

A hypovascular zone is found in the quadriceps tendon 1 to 2 cm from the superior border of the patella, corresponding to the area of spontaneous ruptures reported in the literature^[4].

CONCLUSION

Overall, quadriceps tendon ruptures are rare injuries that require early surgical repair and subsequent physiotherapy. Clinicians, especially emergency physicians, need to pay attention to the physical examination of the quadriceps tendon rupture to prevent misdiagnosis.

ETHICAL STANDARDS

The patient gave the informed consent to the publication of the case study. There is no conflict of interest.

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