Isolated Rupture of the Vastus Lateralis Tendon: Case Report

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Abstract

We report a patient with a history of bariatric surgery who have an isolated rupture of the unilateral vastus lateralis tendon from the adhesion site on the patella. The diagnosis was missed in this case and was placed with magnetic resonance (MR) investigation of the patient during follow-up. A 40-year-old male patient felt pain in his knee after an awkward movement. Initially, because of his bariatric surgery, he had some other complaints, the diagnosis was missed, and the patient had conservative treatment and physical therapy applied. When complaints did not improve, MR was taken, and the vastus lateralis tendon was identified to have ruptured from the patella in isolation. Treated surgically, the patient had no new rupture on check-up performed 1 year later. The patient is fully healed. After the bariatric surgery, some metabolic changes and weakness at the osteotendinous junction of muscles may occur. Isolated vastus lateralis rupture is rarely observed, and diagnosis may be missed. In these patients, surgical treatment is required and other accompanying pathologies of the knee should also be treated at the same time.

Keywords: Bariatric surgery, tendon avulsion, vastus lateralis

INTRODUCTION

Extensor mechanism ruptures (EMRs) involve either the quadriceps or patellar tendon and may be partial or complete. EMRs often occur in a pathologic area of the tendon due to degenerative changes.[1,2] Fatty and cystic degeneration of tendons, mixed degeneration, micro angioblastic dysplasia, decrease in collagen, and calcification occur with age. These structural changes weaken the tendon (quadriceps hoca). Rupture of the quadriceps muscle is an extremely uncommon type of injury except following direct major trauma or as a sports-related injury.[3] Quadriceps tendon injuries are rare and generally occur after the fourth decade. These are usually full-thickness injuries. There is a limited number of studies in the literature, reporting isolated rupture of a part of the quadriceps tendon.[4]

Anatomically, rupture of the quadriceps tendon may occur in the musculotendinous or intratendinous regions but is most common at the osteotendinous junction. It usually manifests as a result of rapid eccentric contraction of the quadriceps, with a flexed knee and fixed foot, although the mechanism of injury may be less severe in tendons with a more degenerated preexisting ultrastructure.[5]

The diagnosis is placed mostly by anamnesis and physical examination. Pain, insufficient active knee extension, and suprapatellar fissure are important symptoms for the diagnosis of full-thickness injuries. In the absence of a good anamnesis and physical examination, some partial injuries can be overlooked.

Radiological procedures for diagnosis are direct radiography, arthrography, ultrasound, and magnetic resonance imaging (MRI).[6,7] MRI and ultrasound have replaced arthrography in recent years because of being noninvasive interventions. The sensitivity of ultrasound in determining the localization of the rupture is high. It is also quite sensitive for the differentiation of complete or partial ruptures. MR is the most effective imaging method.[6-8]

CASE HISTORY

A 40-year-old male patient felt pain in his knee after suddenly going down on his knee for a reason. Later, the knee developed swelling. He attended hospital with these complaints, and the diagnosis was missed, and the patient had conservative treatment and physical therapy applied. When complaints did not improve, MR was taken, and the vastus lateralis tendon was identified to have ruptured from the patella in isolation. Treated surgically, the patient had no new rupture on check-up performed 1 year later. The patient is fully healed. After the bariatric surgery, some metabolic changes and weakness at the osteotendinous junction of muscles may occur. Isolated vastus lateralis rupture is rarely observed, and diagnosis may be missed. In these patients, surgical treatment is required and other accompanying pathologies of the knee should also be treated at the same time.
received physical therapy and conservative treatment. However, the patient’s pain did not resolve. He felt pain, especially while walking, going up, and downstairs. The pain lateral of the knee never improved and overtime a hollow formed in the skin in this region. The cavity-forming superolateral of the patient’s knee grew over time. With no resolution of complaints, the patient attended our clinic 5–6 months after the event began, and physical examination found the patient walked with a limp due to the pain. Palpation found a cavity superolateral of the patella, and pain increased with palpation of this cavity. MR investigation observed rupture of the vastus lateralis tendon superolateral of the patella [Figure 1].

The patient’s history included previous gastric sleeve surgery. Weighing nearly 170 kg, the patient lost 60–70 kg in 6 months. When the event occurred, the patient continued to lose weight.

**Surgical intervention**
The patient first had knee arthroscopy performed. During arthroscopy, a longitudinal tear at the capsule adhesion site posteromedial of the medial meniscus was present. At the same time, the anterior cruciate ligament had ruptured. The vastus lateralis had ruptured from the adhesion site on the patella. The meniscus tear was repaired arthroscopically. Anterior cruciate ligament reconstruction was performed using hamstring tendons. Later, the ruptured tendon had skin incision performed. During surgery, we observed that the vastus lateralis tendon ruptured from the patellar adhesion site [Figure 2]. The remaining quadriceps tendon was macroscopically normal, and no tear was observed. The patella rupture site was cleaned of soft tissue with the aid of a curette and prepared for the tendon. One suture was applied to the patella. The ruptured tendon was tightly attached to the patella with the aid of this anchor. Primary repair was strengthened with soft-tissue repair. The sliding of the patella in the groove and the tension of the quadriceps tendon was compared with the other knee during surgery. MR investigation in the 2nd week postoperative observed the repair was sturdy.

The extremity had no loading for 6 weeks after surgery. In the 1st week, only 0°–45° arc movements were permitted. Later, the joint movement opening was progressively increased. At the end of the 6th week, full joint movement opening was obtained. At the end of the 1st year, joint movement opening was full and pain-free. The quadriceps muscle power was equal to the other extremity in the patient.

**Discussion**
Rupture of the quadriceps tendon occurs by a direct or indirect mechanism. Most cases are related to underlying medical conditions or older age. Although our patient had no clear disorder, he had rapid weight loss in a short period. In the English literature, we did not find any such complication developing in the period after the gastric sleeve surgery. Forces arising from the muscle group of quadriceps during active knee extension are transmitted to the tibial tubercle through the tendon and patella retinaculum. The patella is the supporting point at the anterior. On the other hand, isolated quadriceps muscle rupture is usually associated with a sports-related injury or occupational trauma, especially from direct contusion. Phadnis et al. presented a case of isolated vastus lateralis tendon avulsion, who was a 32 years old national powerlifter with no medical problem. They speculated that by attempting to lift such a heavy load in a rapid, eccentric manner, their patient-generated sufficient force to avulse a completely healthy tendon. Cetinkaya et al. presented a vastus intermedius rupture case in a 22 years old healthy rugby player with knee pain that started by overloading his hyperflexed knee during a rugby match. They said that similar to the literature, and their case had eccentric overloading of the extensor mechanism when the knee was flexed with plantar flexion of the foot. Our patient felt pain after sudden flexion and rotation of the knee. The pain increased over time. This sudden problem occurred by stepping into empty space when coming downstairs. Unlike the literature, our patient had no major trauma history. We thought that because he had
a bariatric surgery and fastly weight loss, some metabolic changes that cause weakness at osteotendinous junction of muscles occurred. By the way, it prepared the ground for injury. In this weight loss process, the patient did not apply any exercise program.

In complete rupture cases, surgery is widely recommended to prevent long-term functional impairment.[10,11] However, in partial rupture cases, there is no consensus for treatment. Aydemir et al. presented a case of partial rupture of the quadriceps tendon in a child treated with a cast successfully.[12] Weber et al. reported a case of isolated rectus femoris rupture diagnosed 3 months after an injury with no pain and weakness.[13] Cetinkaya et al. used a hinged brace in their case of a 22 years old rugby player with vastus intermedius tendon rupture. They found the muscle straightened proximate with that of the contralateral limb according to isokinetic test evaluation in the 5th month.[14] However, there is a role for surgery in high demand patients and with failed conservative treatments. Phadnis et al. used two preloaded anchors in their weightlifter patient case. One year later, the patient returned to full training without pain but was only able to lift 70%-80% of the previous weight he was pressing.[15] We planned surgery for our patients due to the lack of resolution of complaints with conservative methods. Contrary to cases in the literature, our patient had both medial meniscus tear and anterior cruciate ligament rupture in addition to vastus lateralis tendon rupture. Before open repair, we planned arthroscopic intervention to assess and treat pathologies in the knee. We think knee arthroscopy is necessary before the planned intervention to avoid missing any additional pathology in these patients.

As in our patient, the diagnosis of vastus lateralis tendon rupture may be delayed. As a result, partial tear of the quadriceps tendon should be remembered and researched in patients with persistent pain. Our surgical treatment results were very satisfactory. As in the literature, full healing was ensured after surgery in our case. For patients with delayed treatment, the cavity formed after rupture may increase over time, as in our case. We think that progressive situations with this defect may make treatment challenging.

**Conclusion**

This is the first reported case of isolated avulsion of the vastus lateralis tendon after bariatric surgery. This case shows us that in the persistent pain of these kinds of patients, osteotendinous pathologies must keep in mind.

**Informed consent**

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 review by the Editor-in-Chief of this journal.

**Declaration of patient consent**

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

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

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