



Osteotendinous repair of bilateral spontaneous quadriceps tendon ruptures with the Krackow technique in two patients with chronic renal failure

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Although unilateral traumatic quadriceps tendon rupture is a relatively frequent pathology, bilateral non-traumatic spontaneous ruptures are uncommon and are usually associated with chronic renal failure, hyperparathyroidism, gout, and systemic lupus erythematosus. This paper aimed to discuss two patients with chronic renal failure treated with the Krackow suture technique for spontaneous bilateral quadriceps tendon rupture.

Key words: Bilateral tendon rupture; Krackow technique; quadriceps.

Spontaneous bilateral quadriceps tendon rupture is a rarely seen condition. The majority of patients with spontaneous bilateral quadriceps tendon rupture have systemic disorders such as chronic renal failure, diabetes mellitus, gout, or secondary or tertiary hyperparathyroidism. Cases of patients with obesity or chronic steroid usage have also been reported.^[1,2]

In this paper, we present two patients with spontaneous bilateral quadriceps tendon rupture. The Krackow technique was used for osteotendinous fixation in both patients.^[3]

Case report

Case 1

A 43-year-old male patient with chronic renal failure due to diabetic nephropathy presented to the emergency

department with difficulty in walking after sudden giving way of his knees while descending stairs. He was hemodialysis-dependent for 14 years. In physical examination, the patient was unable to do a straight leg raise and gaps were palpable just superior to both patellas. Bilateral quadriceps tendon ruptures were detected with magnetic resonance imaging (MRI).

Case 2

A 34-year-old woman with chronic renal failure presented to the hospital complaining of experiencing a sudden giving way feeling while getting out of the car and the inability to walk afterwards. She was hemodialysis-dependent for 8 years. Gaps were detected superior to the both patella and straight leg raise tests were negative. MRI showed bilateral quadriceps tendon rupture (Fig. 1).

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Fig. 1. (a, b) Appearance of the ruptured quadriceps tendon (arrow) in MRI sections of the second patient.

Under general anesthesia, pneumatic tourniquets were applied at the level of the thigh. A 15 cm longitudinal incision was made from the inferior pole of the patella and extending upward. Following hematoma drainage and tendon debridement, a groove was made on the upper patellar pole. Three longitudinal tunnels

were opened at 1 cm intervals in the patella. Using the Krackow suture technique, two no. 5 Ethibond (non-absorbable polyester; Ethicon, Johnson & Johnson Medical Ltd., Edinburgh, UK) sutures were used to create double-row locked knots in the medial and lateral sides of the tendon. The tendon was placed into the

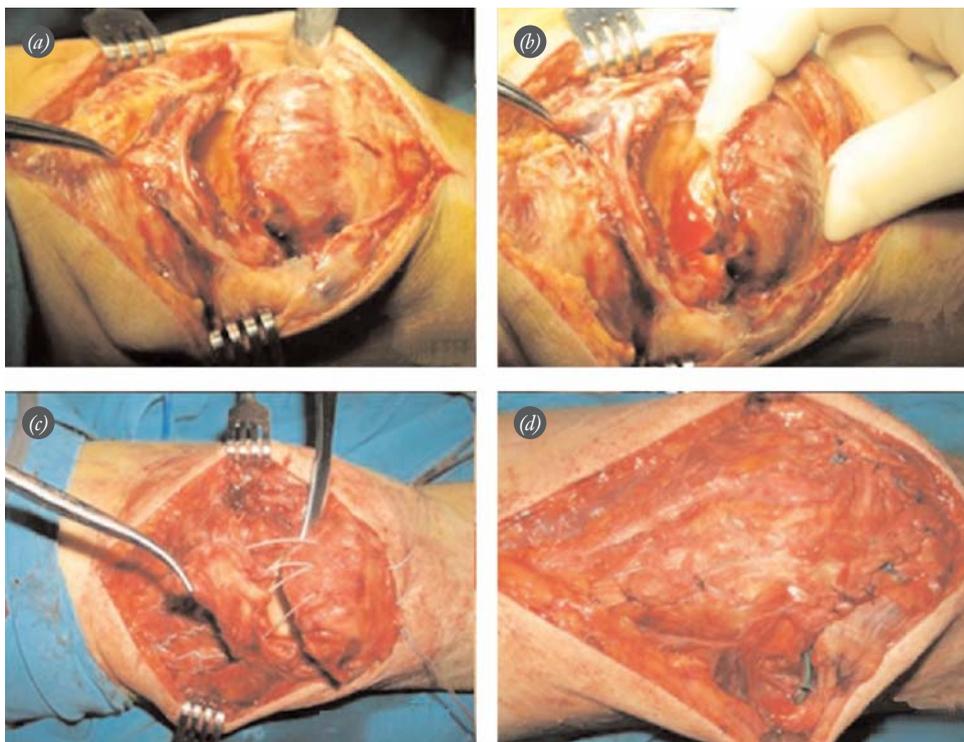


Fig. 2. (a) Intraoperative appearance of the ruptured tendon, (b) the patellar sulcus, (c) sutures passing through tunnels opened in the patella, (d) appearance of the repaired tendon. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

groove in the upper patellar pole by migrating the sutures through the tunnels and fastening in the lower pole (Fig. 2). Incisions were closed after application of suction drainages. Cylinder cast was applied with the knees in full extension for 6 weeks.

Patients were mobilized with double crutches. After cast removal, weight-bearing was allowed and an active-assisted rehabilitation program was started. Follow-up periods were 51 and 24 months, respectively. Both patients gained full range of motion and there were no occurrence of re-rupture (Fig. 3).

Discussion

Although unilateral traumatic quadriceps tendon rupture is a well-known pathology, bilateral non-traumatic spontaneous ruptures are not common. In such cases, delayed diagnosis and misdiagnosis are frequent. Neubaer et al. reported 32 delayed or incorrect diagnoses in 105 bilateral traumatic or spontaneous quadriceps tendon ruptures.^[1] Bilateral cases are usually related to chronic systemic diseases. In his series, Shah reported 43% renal failure, 16% obesity, 10% diabetes mellitus, 5% primary hyperparathyroidism and 5% gout disease and 12 patients had no risk factors.^[2] In the healthy patients, ruptures were seen more frequently in males and the elderly more.^[1,2]

The mechanism of injury is sudden contraction of the quadriceps tendon of the flexed knee with the foot fixed on the ground. Structural failure of the tendon is the underlying cause.^[1]

Uremia has adverse effect on collagen maturation by disturbing the protein-polysaccharide complex and decreased tendon elasticity caused by amyloid accumulation. In patients with osteodystrophic renal failure and hyperparathyroidism, osteoporosis causes subperiosteal resorption and decreases tendon endurance. Increased parathyroid hormone secretion causes deposition of calcium phosphate in the tendons and decreases elasticity. Fibrinoid necrosis and chronic inflammation in gout disease, long-term steroid treatments and obesity may also cause spontaneous ruptures. Steroids disturb the structure of collagen and obesity increases lipid accumulation in the tendons.^[1,3,4]

In such cases, surgery is the treatment of choice. In the literature, nonsurgical treatment was chosen for three patients with unilateral ruptures and for only one patient with bilateral ruptures and the healing period was longer for these cases.^[5]

There are several surgical treatment options although transosseous suturing through tunnels opened in the patella is more common. Krackow described a transosseous suture technique using a single suture

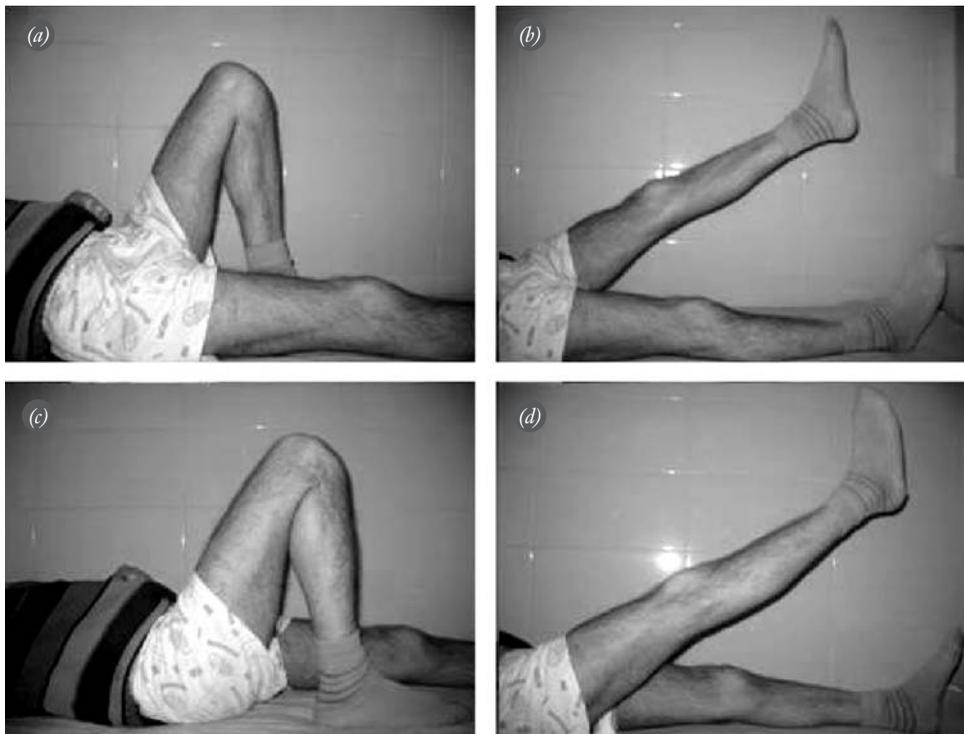


Fig. 3. (a-d) Images from the 51th month follow-up of the first patient. The patient had a full range of motion.

material.^[6] This technique is biomechanically superior to the Kessler and Bunnell techniques. With the help of locking nodes, the elongation of tendon grafts was avoided in long periods.^[7,8] Scuderi advises reinforcement with wires and triangular flaps of the quadriceps muscle after tendon repair.^[9] Kayali et al. repaired the bilaterally ruptured quadriceps tendon of a patient with chronic renal failure with transpatellar sutures augmented with reverse quadriceps tendon and reported satisfactory results.^[10] This treatment modality is similar to our technique although we did not augment after repair. Krackow et al. reported better results with Krackow sutures ended around a screw than with bone-tendon grafts fixed with screws.^[11] Parallel double Krackow sutures were used in our patients and additional reinforcement techniques were not used. There were no complication and complete range of motion was gained at the 3rd postoperative month.

In both cases, complete range of motion was achieved at the end of treatment. No re-rupture occurred during the follow-up. In our opinion, the strength of the repair prevents re-rupture and facilitates healing despite disturbed collagen maturation. Different repair techniques are suitable for such injuries with good results but studies have not provided long-term results.^[1,2,10]

In conclusion, bilateral spontaneous quadriceps tendon rupture is a rare pathology which may be seen in patients with systemic disorders. The Krackow suture technique, especially with double-rows, can produce good results even without reinforcement of the repair.

Conflicts of Interest: No conflicts declared.

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