CASE REPORT

Recurrent bilateral rupture of the patellar tendons: Tendon replacement using polyester connective tissue prosthesis

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Case report

A 27-year-old woman with 7 years history of systemic lupus erythematosus was referred to the senior author for management. Shortly after being diagnosed with the disease she experienced bilateral spontaneous rupture of patellar tendons. Treatment was an end-to-end tendon repair with a heavy non-absorbable suture according to the technique described by Krackow.11

Intra-operatively, both tendons were noted to be ruptured in their midsubstance. Cylindrical casts with the knees in full extension were used for 8 weeks to protect the repair; this was followed by physiotherapy. The overall post-operative progress was described by the patient as good and the patient was able to resume normal mobility.

Four years later, while the lady was going upstairs she felt sudden pain in the right knee and she fell down and was unable to stand. The patient was diagnosed as having bilateral rupture of patellar tendons. She underwent bilateral tendon exploration 3 weeks after injury. Repair and augmentation was performed on both knees. A synthetic material which has not been specified in her medical report was used for augmentation. She spent 6 weeks in plaster following surgery and then underwent extensive physiotherapy. After an year of treatment, the lady continued to have severe weakness of active extension. She was unable to walk without her knees supported in extension braces. The extension lag on both knees gradually became worse and she needed to use two elbow crutches.

At presentation to our unit, physical examination showed diffuse swelling of both knees. Both the patellae were proximally displaced. There was very little discomfort during the examination and there was no tenderness around the knee. Full active extension was not possible, but full passive extension was possible.

She had an extension lag of 80° on the right knee and 70° on the left knee.

Radiographs showed bilateral patella alta. MRI scan showed that parts of the patellar tendon were replaced by cysts filled with fluid. Smaller cysts were also present in the peri patellar region. The remaining tendon was very thin and attenuated. Findings were similar in both knees (Fig. 1).

Two days after presentation, the patient underwent exploratory surgery of the right knee. The knee was explored through a mid-line longitudinal incision with excision of the previous scar.
The patellar tendon was ruptured at the lower pole of patella and replaced with a cyst filled with green thick paste-like substance. Smaller cysts filled with the same substance were present in both the medial and lateral retinaculae. The articular cartilage of the knee and patella looked healthy. All cysts, scar tissue and the degenerated remnants of the tendon were excised as part of the debridement procedure. This left no patellar tendon tissue between the lower pole of the patella and the tibial tuberosity (Fig. 2) 80 mm × 10 mm Leeds Keio polyester connective tissue prosthesis (CTP) (Neoligaments, Leeds, UK) was used for reconstruction of the patellar tendon according to the technique described by the same authors.20

Histopathology and microbiological examination of the specimen confirmed giant cell foreign body reaction with no evidence of infection.

Two weeks post-operatively, a regimen of quadriceps setting exercises was begun under the supervision of a physiotherapist. After 6 weeks of immobilisation, the cast was removed, and active range-of-motion and quadriceps strengthening exercises were started.

At 3 months post-operatively, range of motion of the knee was 90° of active flexion with no extension lag.

At 6 months post-operatively, the patient was admitted for surgery on the left knee. Range of motion of the right knee at that time was 0–120°.

The left knee was approached in the same manner. Findings were similar to the right side. Reconstruction was performed using the same technique. The post-operative management and rehabilitation were also similar. At 2 years post-operatively both knees had full extension with no extension lag and range of flexion of 120° on both sides. The patient was able to walk normally with no aid.

Discussion

Simultaneous bilateral patella tendon ruptures are very rare injuries. No predisposing cause was identified in some cases; however, most reported cases have been associated with systemic diseases such as rheumatoid arthritis, systemic lupus erythematosus, and chronic renal failure.7,9,14,17,22 A few additional reports describe rupture in endocrine disorders such as hyperparathyroidism and diabetes mellitus.5,15

Pritchard and Berney18 investigated the frequency of patellar tendon rupture in patients with systemic lupus erythematosus. They found that tendon rupture appears to be associated with extended disease duration, minimal disease activity, the presence of deforming hand arthropathy and, chronic corticosteroid therapy.

Renal dysfunction and long-term use of corticosteroids were suggested as the aetiological factors for tendon rupture in patients with lupus erythematosus.

The effect of steroids remains controversial. Glucocorticoids may inhibit collagen synthesis or
compromise the blood supply, thus weakening the tendons; however, no cases of patellar tendon rupture have been reported in patients taking steroids for conditions such as asthma or skin diseases.\(^9\)

In this report, the patient suffered bilateral rupture twice in 4 years and to our knowledge this is the first report of recurrent rupture in association with systemic lupus erythematosus. In all the reported cases including this report, it remains difficult to explain the bilateral and simultaneous nature of this injury.

Early diagnosis of patellar tendon rupture can be difficult. In a review of 36 patellar tendon ruptures, Siwek and Rao\(^21\) reported that 10 ruptures were misdiagnosed on initial examination and that diagnosis was made more than 2 weeks after injury in seven patients. In one case, diagnosis was delayed 6 months while the loss of strength in the legs was attributed to steroid myopathy.

Patients with bilateral spontaneous rupture may have minimal or even no history of trauma. The symmetrical abnormal findings on clinical examination in addition to the rarity of the condition add to the difficulty in making an early diagnosis.

In a delayed diagnosis of more than 6 weeks, quadriceps contracture, fibrous adhesions and the poor quality of the remaining tendon make surgical repair and restoration of patellar tendon length more complicated.

Different methods of treatment have been described for this challenging problem. Allograft using extensor apparatus or Achilles tendon has been used with satisfactory results.\(^4,5,13\)

Chagar et al.\(^2\) described augmentation using free autograft from the semitendinous tendon or inversion of the quadriceps tendon. Peyser and Makley\(^16\) described the use of biceps tendon attached to the fibular head for reconstruction in a case of neglected rupture.

In another series of four neglected ruptures, Casey and Tietjens' performed end-to-end anastomosis of the tendon stumps in addition to multiple strands of strong cerclage wire, in a figure of 8 pattern, from the quadriceps tendon to the tibial tubercle. They reported good results without the need for autograft or allograft.

Synthetic materials like Dacron, PDS or poly-p-dioxannone cords have been used to reinforce the repair.\(^5,10,12\)

The use of polyester CTP in augmentation of patellar tendon repair was first described by Fujikawa et al.\(^6\) The CTP was inserted as a loop or in a figure of 8 fashion passing it in the soft tissues on the anterior surface of the patella and through a drill hole in the tibial tubercle. The ligament was secured to the tibia using stables or screw and washer. Despite the satisfactory results with this technique, post-operative elongation and failure of the CTP due to abrasion remained a big concern.

We believe that passing the CTP through bone tunnels in the patella improves the purchase and allows safe application of traction on the patella to bring it down to its anatomical position. It also reduces the risk of elongation and abrasion of the CTP.

Although more studies are needed to evaluate the long-term results, we believe that this technique does offer a good option in the treatment of this difficult-to-manage problem.

References