



A Rare Case of Bilateral Patellar Tendon Rupture Associated with Anabolic Androgenic Steroids Use

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Abstract

Bilateral rupture of the patellar tendon is a very rare injury in healthy individuals. Some pathologic conditions or repeated local steroid injections can predispose to the occurrence of this lesion. The effect of oral medication on the tendon remains controversial.

Anabolic androgenic steroids (AAS) have a powerful effect on the musculoskeletal system, despite the risk of some adverse consequences. The use of these drugs has been associated with tendon rupture, however, only few cases of tendon injury associated with AAS have been reported, and specific pathophysiological mechanisms are not well known.

We present a case of a healthy middle-aged male, recreational bodybuilder, who presented to our institution with the diagnosis of bilateral patellar tendon rupture. His single risk factor to this uncommon injury was the use of AAS. The aim of this case report is to raise awareness for the association between the use of AAS and tendon rupture.

Keywords: Patellar tendon rupture; Bilateral; Anabolic androgenic steroids; Bodybuilder; Exercise

Introduction

Patellar tendon ruptures are typically unilateral and occur in athletic individuals under the age of 40. Bilateral simultaneous ruptures are uncommon and rarely described in the literature. These are often associated with systemic diseases, such as rheumatoid arthritis, systemic lupus erythematosus, chronic renal failure, hyperparathyroidism, hyperthyroidism and diabetes mellitus [1]. Local injection of steroids is also associated to an increased risk of tendon rupture [2]. Furthermore, some authors correlated the systemic administration of fluoroquinolones [3], statins [4] and AAS [5,6] with tendon rupture.

The use of AAS has become common among athletes and men desiring a cosmetic muscle makeover in order to increase muscle strength and to induce hypertrophy of muscular fibers, called bodybuilders. According to the literature, AAS use among community weight trainers attending gyms and health clubs ranges from 15% to 30%. Two thirds of AAS users are nonathletes bodybuilders [7].

Case Presentation

A 44-year-old male presented at our institution with bilateral knee pain, swelling and inability to weight bear. He described that the symptoms appeared suddenly while walking during a friendly football match. The patient had no comorbidities or use of chronic medication. He was a daily attender of the gym and he revealed an intermittent consumption of oral AAS. He confirmed the AAS use during the last three months.

The physical examination revealed bilateral anterior knee pain and swelling, as well as, palpable infrapatellar tendinous defect. He was unable to actively perform knee extension bilaterally. There was no neurovascular impairment.

Radiographs showed a bilateral superior patellar displacement (Figure 1).

Bilateral patellar tendon rupture was diagnosed and surgical tendon repair was performed on the day after using the same technique for both knees. After tourniquet inflation, a midline longitudinal incision was made, extending the patella to the tibial tubercle. Complete rupture

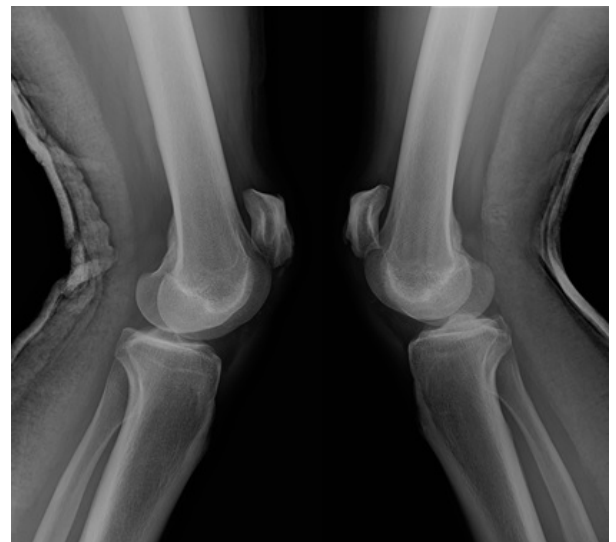


Figure 1: Knees radiography: patellar superior displacement.

of each tendon from the lower pole of the patella and associated partial retinaculum tears were observed (Figure 2A). These findings were very similar bilaterally.

A Krackow-type suture using nonabsorbable fiber wires was performed (Figure 2B). Three transosseous tunnels from the inferior pole to the superior pole of each patella were made with a 2.0 mm drill

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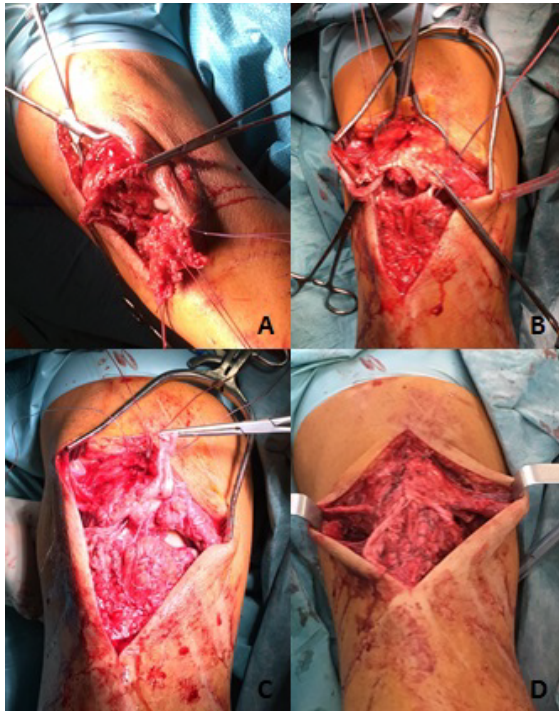


Figure 2: A) Intraoperative images of the surgical procedure: complete rupture of the tendon from the lower pole of the patella; B) Krackow-type suture repair with nonabsorbable fiber wire sutures into each half of the tendon; C) Three transosseous tunnels from the inferior pole to the superior pole of each patella; D) Restoration of the extensor apparatus of the knee.

bit (Figure 2C). The inner limbs of each stitch were passed through the central tunnel and the outer limbs were passed through the outer tunnels. The sutures were tied adjacent to the superior pole of the patella, allowing the restoration of the extensor apparatus of the knee (Figure 2D). Medial and lateral retinaculum tears were repaired using Vicryl-0 suture. Complete extension and flexion of the knees were verified during and after the surgical repair.

Postoperatively above the knee lower limb casts in extension were maintained for 7 days. Pain control and swelling regression were observed. The postoperative radiography showed patellar placement in the normal height.

After this period the casts were removed and hinged knee braces were applied locked at 0° of extension and 30° of flexion and he began physiotherapy. The patient was allowed to mobilize the knees and weight bearing with crutches was permitted. As rehabilitation program progressed, the range of motion allowed increased to 45° of flexion during the third week and 90° of flexion during the fifth week. On the 8th week following surgery, braces were removed, muscle strengthening exercises were intensified and progressive weight bear without crutches was encouraged. At 6 months after the surgery, the patient had no pain, presented a range of motion of 0°-120° and was able to go up and down the stairs with no impairment (Figure 3). At this time he began gym activity and he was advised not to consume AAS.

Discussion

Oral steroids administration has been described as a risk factor for tendon rupture at some anatomical segments of the body. However, the specific association between AAS use and tendon injury was reported



Figure 3: Clinical outcomes six months after the surgery: knees range of motion of 0° - 120°.

only in few cases. The adverse effects of AAS on cardiovascular, hepatic, renal and reproductive systems are well known, but the effect of these pharmacological agents on connective tissue remains unclear.

AAS have showed to increase fat-free mass, muscle size and strength. In fact, few studies advocate the use of AAS to improve muscular strength in patients with muscular dystrophies [8]. However, studies in rats demonstrated that AAS appear to induce changes in biomechanical properties of tendon. These may lead to a dysplasia of collagen fibrils, producing a stiffer and less elastic tendon [5,9]. Moreover, the combination of exercise and steroids potentiate the stiffness, decreasing the capacity of tendon elongation, leading to an increased risk of rupture. In addition, it has been demonstrated that the changes in tendon properties can be reversible after steroid discontinuation [9].

The occurrence of ultrastructural or biochemical changes in tendon is not well established, but authors present some theories: the enzymes of collagen synthesis, the type of collagen produced (increase on collagen type I synthesis), the interaction between fibrils and the collagen remodeling [9]. Also, it is possible that the rapid strength adaptations produced by AAS in muscle are not simultaneously accompanied by slower adaptations in tendons (less vascular structures), making tendons the weakest element of the chain [7].

Conclusion

A link between AAS use and bilateral patellar tendon rupture has not been previously described. We report a case of a healthy individual with a bilateral patellar tendon rupture which occurred without a direct trauma. As a risk factor for this injury, he presented only the use of AAS. As described before, we suppose that combined AAS and exercise can increase tendon stiffness, predisposing to the rupture. Despite being characterized by typical features in clinical and image exams, it is reported that almost one third of patellar tendon ruptures are misdiagnosed initially [10]. Clinical suspicion is important in order to perform a correct diagnosis especially in healthy individuals without an associated high energy mechanism of lesion. AAS use is frequent among bodybuilders and we should be aware of with its potential adverse effects over tendinous structures.

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