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Case Report

Six Recent Cases of Quadricipital Tendon Rupture, Four of Which were Bilateral

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Abstract

Spontaneous ruptures of the extensor apparatus are rare and, among them, ruptures of the quadricipital tendon are even more so, we have been led to observe 6 cases of which 4 are bilateral. This lesion occurs following a banal trauma in the sedentary. Pre-existing tendinopathy is common. The rupture is most often total and sits on the tendon body 60% of cases or quadricipital derailment at the upper edge of the patella (40% of cases). In our patients, this pathology occurred during gestures of everyday life or during banal trauma. The diagnosis is clinical. Additional examinations (ultrasound and magnetic resonance imaging) are useful for diagnosis. The essentially surgical treatment associated with functional rehabilitation gives good results. The response time is a very important prognostic factor. The main thing is not to ignore the diagnosis.

Keywords: Quadricipital; Ruptures

Introduction

The knee extensor apparatus is an anatomical and functional entity consisting of the femoral quadriceps muscle, the quadricipital tendon, the patella integrated in the prepatellar fibrous plane, and the patellar tendon which ends on the tibial tuberosity. The soft tissue structures provide both static and dynamic stability of the patella [1].

The ruptures of the knee extensor apparatus are defined by the existence of a solution of continuity on the tendino-musculo-osseous chain which ensures the extension of the leg on the thigh: in this case, the fractures of the patella are the most frequent lesions, but all the other elements allowing the extension of the leg can be affected: anterior tibial tuberosity, patellar tendon, quadricipital tendon, quadriceps muscle [2].

Rupture of the quadricipital tendon is the most common condition in ruptures of the extensor apparatus after patella fractures [3]. While the unilateral and traumatic form is not uncommon, spontaneous involvement of this tendon is extremely rare, more common in patients over the age of 40. The occurrence of this impairment involves an intervention of predisposing factors [4,5]. The diagnosis of this pathology often goes unnoticed due to the ignorance or frequent underestimation of these lesions. The delay in diagnosis favors the installation of hypertrophy and calcifications, a source of pain. Clinical examination is essential. Imaging plays an important role in diagnosis. Treatment is a relative emergency which is essentially surgical. The aim of our work is to recall this rare pathology, which often goes unnoticed and a source of functional handicap.

Case Presentation

All of the patients have the distinction of having been observed in the IBN SINA orthopedic trauma department - RABAT-, and for 6 years.

In the 6 observations (4 bilateral and two unilateral cases), they were men, between 35 and 72 years old, all corpulent. They had no predisposing factor or disease; one patient was on statins for hypercholesterolemia and two were hypertensive with hypertension and diabetics on oral antidiabetics and one patient with chronic renal failure and one patient was under « xarelto » and on heart rate regulator for heart disease.

The cause of the rupture is always the sudden contraction of the quadriceps to avoid falling forward or receiving a jump. One might associate it with a direct shock. This kind of situation can therefore recur in sports.

The diagnosis was made clinically in front of a total functional impotence of the limb concerned, a cutaneous depression above the left patellar (Figure 1), with a muscular atrophy of the quadriceps associated with bruises on the anterior aspect of the thigh and the left knee, but without any real increase in knee volume. There is also an impossibility of active extension of the left knee, with a movable lower middle patella. There were no signs of meniscoligamentary involvement, the neuromotor sensitization examination of the limb was normal. At the end of the paraclinical explorations, the standard

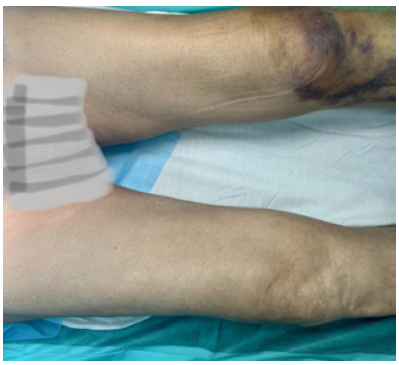

Figure 1: Clinical aspect of quadricipital tendon repture associated with bruising.

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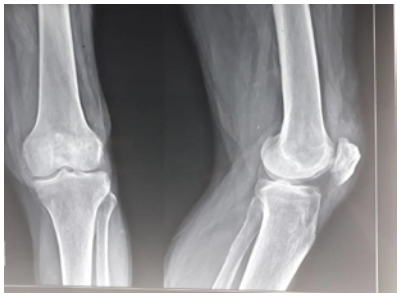

Figure 2: Standard radiography of the knee from the front and in profile objectivize a low patella with indirect signs of quadricipital fracture at the insertion at the upper edge of the patella.

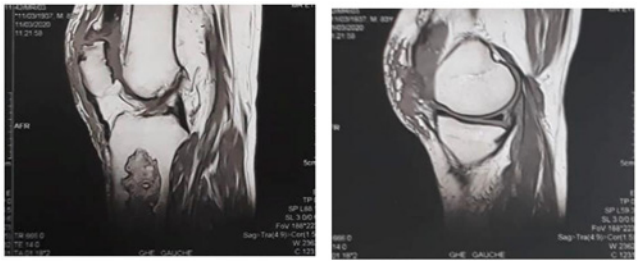

Figure 3: MRI images confirm the rupture of the quadricipital tendon.

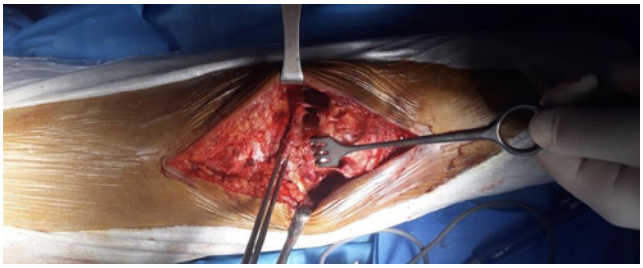

Figure 4: The image shows an anterior approach, had confirmed the rupture at the tendon insertion and not an offset at the base of the patella.

radiographs of the knee from the front and in profile show a low patella (Figure 2), with indirect signs of quadricipital rupture at the insertion at the upper edge of the patella with a de-clogging aspect. Magnetic resonance imaging confirmed the diagnosis (Figure 3). We did not see fit to ask for an ultrasound or an MRI each time, the diagnosis was so obvious.

Surgical exploration under general anesthesia was decided quickly. In 4 bilateral cases there was no hemarthrosis and no opening of the joint. an anterior approach, had confirmed the rupture at the insertion of the tendon and not a shift in the base of the patella (Figure 4), The ruptures always extended far laterally and sometimes downwards.

The surgical gesture had consisted, After joint washing and trimming of the lesions, in the realization of a transosseous patellar reinsertion by absorbable wire, of good gauge, of the quadricipital extensor which was completely torn off from the patellar base (Figure 5A), with a plasty by reinforcement framing using a semi-tendon graft [10,16] (Figure 5B). There was no histopathological sampling except

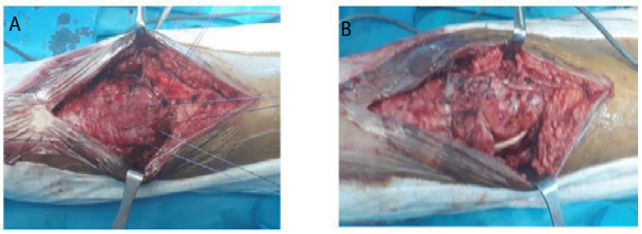

Figure 5: Final appearance after surgical repair of the quadricipital tendon with:
A: Realization of a transosseous patellar reinsertion by absorbable wire, of good gauge, of the quadricipital extensor which was completely torn off from the patellar base; B: Plasty by reinforcement framing using.

in 2 cases in which the histological study had revealed the existence of signs of necrosis tendon on the banks with pigment deposits in the intratendinous.

Postoperatively, patients were immobilized in extension in a posterior splint for a period of 6 weeks followed by passive rehabilitation for 6 weeks before active rehabilitation was authorized at 3 months. And the march was authorized with support, from the start.

The next activities were particularly simple with, a possible walk, an extension at 0° and a flexion exceeding 110° at 5 month intervals.

Discussion

Anatomically, the quadricipital tendon is formed a few centimeters above the patella by the terminations of the quadriceps tendons. Its rupture interests the 4 components and is located approximately 1 to 2 cm above the upper edge of the patella. The vascularization of the anterior tendon fibers extends from the musculo-tendon junction to the patellar insertion. At the level of the deep layer, there is an avascular range. This zone could therefore explain the occurrence of degenerative lesions, which are more frequent on the hypovascularized middle and posterior bundles, all the more so as the stresses on the posterior side of the tendon are increased during hyper-flexion of the knee which fixes these posterior elements against the trochlea [6].

There are predisposing factors, such as a state of general fatigue with no muscle recovery, after sustained efforts. Particular conditions, such as cold weather or dehydration in overweight, if not obese, patients can have a harmful role. Direct trauma is also recognized as a triggering agent [7].

Pathologies are to be sought, such as system diseases such as rheumatoid arthritis, diabetes, lupus erythematosus, hyperparathryroidism, whether primary or secondary. A special place must be reserved for renal failure [8] which, like autoimmune diseases, causes structural changes and growth disorders affecting the maturation process of collagen fibers. The rupture has been observed in kidney transplant patients; it would not be linked solely to long-term corticosteroid treatment, since such a lesion should have been observed regularly in asthmatics. The increase in sub-periosteal bone resorption in hyperparathyroidism induced in kidney transplant patients can weaken the tendon-bone junction and thus promote rupture. In addition, we know that kidney failure patients with renal

osteodystrophy often develop muscular atrophy and weakening of the extensor apparatus.

Taking certain drugs would predispose to rupture.

The mechanism most often is indirect, generally resulting from a sudden contraction of the quadriceps. It is a rare condition among lesions of the knee extensor system. It comes after fractures of the patella and rupture of the patellar ligament. Maybe during a rough reception after a jump [9]; we could speak of sudden braking constraints imposed on the quadriceps on this occasion [10]. There is also brutal knee hyperflexion during a fall. It can also be an upset extension of one or both knees, subjects bending their knees and carrying themselves back so as not to fall forward on the stairs or from a high place, when they have loaded arms (logically, weightlifters must be exposed people).

The pathogenesis of such spontaneous ruptures of the quadricipital tendon is unclear. To produce them requires considerable force. Experimentally, the extensor indeed resists stresses greater than 15 kg / mm^2 [8].

From the clinical point of view, careful questioning leads to diagnosis. It manifests as a sharp and intense pain. Impotence may not be complete or replaced by simple walking discomfort. On palpation, we note the existence of sub-patellar depression, and we have seen that hemarthrosis may be absent. In any case, there is a bulky suprapellular impasto, which should raise the diagnosis and look for the extension deficit.

In front of this clinical picture, we must think about this type of lesion. 40% of cases of quadricipital tendon rupture are initially undiagnosed according to Bianchi [11]. Imaging should be requested as soon as one thinks of it in order to confirm or eliminate this pathology if there is any doubt.

Conventional radiography is carried out systematically and inconstantly shows a low kneecap tilted in the sagittal plane, and also makes it possible to rule out the diagnosis of fracture of the patella.

Ultrasound, a fast and reliable examination that must be considered, can objectify a hypoechoic zone crossing the entire thickness of the tendon, and an intra-tendon thickening. It performs better than MRI in the acute and subacute stages. MRI is a determining examination especially in the old forms [7], the rupture results in disappearance of the tendon fibers and the presence of edemato-hemorrhagic changes [12].

The progression in the absence of treatment is towards healing in retraction, leaving persistent depression, and contractile swelling in the lower part of the thigh.

In acute total ruptures, early surgical treatment gives the best results and should be the rule. Neglected or secondarily discovered lesions should also be able to benefit from surgical repair.

In the operating room, The patient under general or locoregional anesthesia is installed in supine position with a pneumatic tourniquet at the root of the lower limb. the anterior vertical mid-supra-patellar approach and we come across the hematoma, the incision is extended by about 8 cm above the upper edge of the patella upwards, and up to the lower edge of the patella towards the bottom .. We find ourselves directly in the knee if there has been a joint break. We evacuate hemarthrosis and joint washing. The tear extends far laterally. It is recommended to take a sample for the histological study in search of a favorable pathology [13].

The lesion is repaired by an edge-to-edge suture of the 2 ends of the tendon by solid U-shaped points in opposite directions with a large diameter wire. If the distal stump is insufficient, the proximal stump is reinserted at the upper edge of the patella, which has been previously revived, by transosseous points resting on the patella [14]. But it can be reinforced by a framing carried out using a half-tendon graft, a strip of fascia lata [16,17] or even by the use of a strip of patellar tendon and especially fibrous returned to the top, according to Ait Si Selmi et al [11], in the last update of the Orthopedic Surgery Techniques of the EMC. Protected by a pull-out [16].

Post-operative immobilization, in a cruropedious splint, is necessary for a period of 6 weeks, time of healing [15,16]. It is performed in slight flexion in order to avoid the appearance of a low kneecap [15]. The crutch is carried out without support for 6 weeks [18] or in partial support under cover of an immobilization in extension [15,16], and is replaced by a wandering in a chair in the event of bilateral rupture.

Rehabilitation is undertaken early and combines an early awakening of the quadriceps by isometric contractions and by locking work without load, maintenance of passive joint mobility in the mobility sector defined by the operator (0-90°) [15,19]. Anticoagulation is used as a preventive dose. At the 6th week, resumption of full support is authorized with the possibility of progressive knee flexion. Proprioceptive rehabilitation and muscle building have started. And at the 8^{th} - 12^{th} week, maximum flexion is allowed under load and work on a bicycle is started. From the 4th month, closed chain exercises and the resumption of running on flat ground are authorized.

The series in the literature conclude on the frequency of good and very good functional results after surgical treatment of a rupture of the quadricipital tendon associated with immobilization and early functional rehabilitation [18,20].

Conclusion

Although ruptures of the quadricipital tendon are rare, the bilateral aspect is, moreover, exceptional. They occurred incidentally in healthy people over the age of 40, and there was no medicated catch. They are easy to diagnose in front, the master sign, the active extension of the knee but there are often unrecognized and untreated ruptures. Ultrasound remains the basic examination if the diagnosis is mentioned early. Additional MRI is essential if the ultrasound is insufficient, especially in the old forms. The surgical strategy must be gradual and "à la carte" depending on the lesions observed. The use of reinforcement plastics should be reserved for cases involving a loss of tendon substance. Surgical repair should allow early passive knee mobilization to begin in order to hope for a good end result in terms of knee mobility.

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