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Concurrent Rupture of the Patellar Tendon with Contralateral Patella Fracture

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Abstract- **Patella fractures and patellar tendon ruptures are mainly due to trauma. Concurrent bilateral patella fracture or concurrent bilateral patellar tendon rupture are even rare. There are case reports that describe concurrent bilateral patella fracture or concurrent bilateral patellar tendon rupture in the literature. This study reports a case of a 23-year-old man who suffered concurrent patella fracture with contralateral patellar tendon rupture due to fall from height by a lift. To our knowledge, this case report describes the first concurrent patellar tendon rupture with contralateral patella fracture.**

I. Introduction

There are case reports that describe bilateral patella fractures or bilateral patellar tendon ruptures in the literature. Patella fractures and patellar tendon ruptures are mainly due to trauma. Both injuries affect the extensor mechanism of the knee because both of anatomical structures contribute knee extension. Other anatomical parts that participating in knee extension are quadriceps muscle, quadriceps tendon, and tibial tubercle. Patellar tendon ruptures are less common than quadriceps tendon ruptures and patella fractures[1].

In this study we present the case of a concurrent patellar tendon rupture with contralateral patella fracture as a result of fall from height by a lift. To our knowledge, this case report describes the first concurrent patellar tendon rupture with contralateral patella fracture.

II. Case Report

A 23-year-old man was transported to our emergency department after falling from height by lift. He complained of pain in both knees, both arms, and both hands. There were no obvious past systemic or local disease in patient's history. On phsical examination, there were swelling and tenderness at both knees, both arms, and both hands. He was unable to actively extend his knees. Bilateral patella alta without any skin wound was noted. There was a palpable gap below the left patella and on the right patella. Knee x-rays demonstrated patella alta at the left knee and patella distal pole fracture at the right knee (Fig. 1a,b). Rupture of the patellar tendon in his left knee was considered. Simultaneously bilateral humerus shaft fracture and bilateral multiple metacarpal fractures were revealed on x-ray examination.

Figure 1a : Left knee patella alta

Figure 1b : Right knee patella distal pole fracture

Rupture of the patellar tendon just below the inferior pole of the left patella was seen during surgery. Patellar tendon was reattached to the patella by two

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titanium bone anchors. Small distal fragment of the right patella was exised and patellar tendon reattached to the patella by two titanium bone anchors. Open reduction and internal fixation was performed for bilateral humerus and bilateral multiple metacarpal fractures. Both knees were immobilized for 6 weeks postoperatively in knee braces, in extension. After removing braces, rehabilitation program was begun. The left patellar tendon was found avulsed from the patella on the examination at the end of the third month. Patellar tendon reconstruction with autogenic hamstring tendons was performed. Knee was immobilized for 6 weeks in knee brace, in extension. Brace was removed after the end of 6 weeks and rehabilitation program was begun. The quadriceps muscle strength and 90º-100º knee flexion on the right side was regained five months after the initial injury. Rehabilitation program was continued on the left side and 40º knee flexion was regained two months after reconstruction surgery (Fig. 2a and b).

Figure 2a : Left knee postoperative lateral view

Figure 2b : Right knee postoperative lateral view

III. Discussion

Quadriceps muscle, quadriceps tendon, patella, patellar tendon, and tibial tubercle constitute the knee extensor mechanism. Injury of any of these structures causes deterioration of knee extension. Patella fracture is the most common ones in these injuries[2]. The second one is quadriceps tendon injury and the third one is patellar tendon injury[3].

The patella is the largest sesamoid bone in the body. It increases the muscle moment arm of the extensor mechanism. Patella fractures may be caused by an excessive tension or a direct trauma. These injuries result insufficiency of the knee extensor mechanism if effective treatment was not applied. Surgical treatment should be applied for displaced patella fractures.

Patellar tendon is one of the strongest structures of the body. Zernicke et al[4] found that a force 17.5 times of the body weight was necessary to rupture a healthy patella tendon in a young individual. Patellar tendon injury is typically unilateral and occurs in individuals younger than 40 years. Overloading the extensor mechanism and to have a history of tendinitis may cause patellar tendon injury[5,6]. A sudden significant eccentric contraction precipitate patellar tendon rupture [7]. Surgical repair is necessary for complete rupture of the patellar tendon.

Patella fractures and patellar tendon ruptures may occur without direct trauma. An eccentric contraction of the quadriceps during a fall may cause a patella fracture [8]. In analogy to this mechanism contraction of the quadriceps in a flexed knee may result in patellar tendon rupture. Strong opposite contractile forces create moment arms in opposite directions.

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Patellar tendon rupture occurs when these forces are strong enough [6].

Concurrent bilateral patella fracture or concurrent bilateral patellar tendon rupture are even rare. There are case reports that describe concurrent bilateral patella fracture or concurrent bilateral patellar tendon rupture in the literature. This study reports a case of a 23-year-old man who suffered concurrent patella fracture with contralateral patellar tendon rupture due to fall from height by a lift. A literature search was performed, however there was no such a case in the literature. To our knowledge, this case report describes the first concurrent patellar tendon rupture with contralateral patella fracture. Moment arms in opposite directions due to strong and sudden contraction of both quadriceps' in his flexed knees while hitting to floor was thought to be the cause of this rare injury.

In summary simultaneous patellar tendon rupture with contralateral patella fracture may occur due to sudden significant eccentric contraction of bilateral quadriceps'. Knee extensor mechanism injury should be considered in a patient who is unable to actively extend one or both knees. An accurate diagnosis must be made by a careful and detailed physical examination with x-rays. MRI and ultrasonography should be performed in suspected cases.

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