

Tactics of Treatment of A Patellar Fracture with Repair of the Patellar Ligament: A Clinical Case

Mirzaakhmedov F.M., Ismailov N.U., Qobilov N.R., Mamajonov Sh.T.

Tashkent Medical Academy

Annotation: Patellar fractures account for approximately 1% of all fractures [1], are most common in the 20 to 50-year age group [1,2], and affect men twice as often as women [2]. Patellar tendon ruptures are devastating injuries that can cause significant functional impairment due to disruption of the knee joint extension mechanism. [7,8] Surgical treatment is indicated for open fractures, fractures that disrupt the function of the extensor apparatus, in the presence of a joint space >5 mm and/or joint incongruity >3 mm, which accounts for approximately 30% of the total number of fractures. A case of a patient who required reposition and osteosynthesis of an open patellar fracture associated with damage to the extensor apparatus is presented. The clinical and radiographic characteristics of the patient, as well as the resolution of the case, are described.

Keywords: Patella fracture. Patellar ligament. Ethibond..

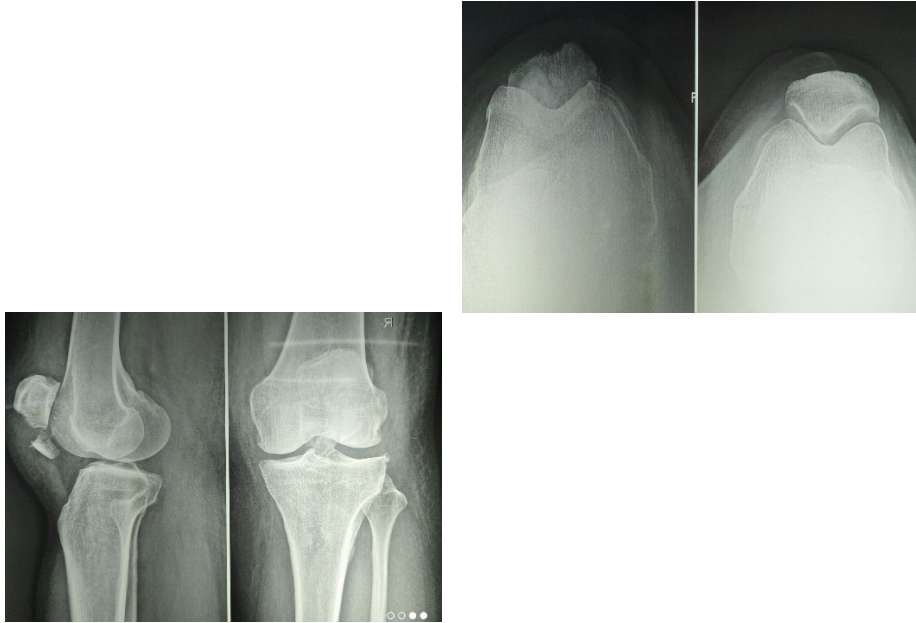
Introduction

Fractures of the largest sesamoid bone account for approximately 1% of all fractures [1], are most common in the age group from 20 to 50 years [1,2], and men are affected twice as often as women [2]. Such fractures occur mainly as a result of a direct mechanism of injury: a fall on a bent knee joint, a direct blow to the patella area. Rarely, a patellar fracture can occur from an indirect impact - from a sharp contraction of the quadriceps femoris. The patella is part of the extensor apparatus of the knee. Being a sesamoid bone, it is in continuity with the quadriceps tendon proximally and the patellar ligament distally. Despite the low incidence of patellar fractures, the consequences of inadequate treatment or very complex fractures are potentially disabling, with the possible development of contracture, loss of extension, or patellofemoral osteoarthritis. The patella is integrated into the extensor apparatus of the knee joint. It has various functions [4], including transmitting the forces of the quadriceps, creating a connection between the quadriceps tendon and the patellar ligament, and distributing forces on the trochlea through a thick cartilaginous surface consisting of two facets separated by a ridge and present on the upper three-quarters of the articular side. The thickness of the patellar cartilage can reach 5 mm in its central part [3]. The contact area of the patella and the femur varies depending on the degree of knee flexion: it is maximum at 90° flexion (about 4 cm²) and almost zero at full knee extension [4]. The constraints on the patella therefore also vary greatly depending on the degree of knee flexion. Indeed, the position of the patella varies in the sagittal plane depending on the degree of flexion. At 60° the force reaches 4 times the body weight, while at full flexion it is 7.65 times the body weight [5]. Another role of the patella is to increase the lever arm. The patellar tendon has a strength of up to 614 kg/cm² at 5° and 1039 kg/cm² at 90° of flexion. A decrease in its length causes an increase in forces due to a decrease in the lever arm. The last role is to center the extensor apparatus. Transverse stability is provided by the medial and lateral retinacula. Medially, there are the medial patellofemoral ligament, which is attached to the upper two-thirds of the inner edge of the patella, and the meniscopatellar ligament, which is attached to its lower third. Laterally, the lateral retinaculum of the patella is attached to the upper half of the outer edge of the patella, and the meniscopatellar ligament is attached to the lower half [3].

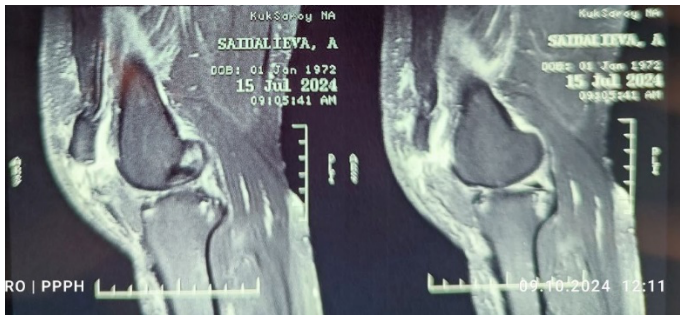
Surgical treatment is indicated for open fractures, fractures that disrupt the function of the extensor mechanism, in the presence of a joint space >5 mm and/or joint incongruity >3 mm, which accounts for about 30% of the total number of fractures. Comminuted and displaced patellar fractures require surgical treatment to achieve the best clinical and functional results [6]. Patellar tendon ruptures are devastating injuries that can cause significant functional impairment associated with disruption of the knee joint

extension mechanism. [7,8]. Extensor mechanism tendon rupture is rare, accounting for 3% of all tendon injuries. It occurs due to trauma associated with daily activities, sports, or associated with systemic diseases. [9]. Below is a case report from practice, a patient required repositioning and osteosynthesis of a patellar fracture associated with damage to the extensor mechanism.

Case report. A 52-year-old woman with TORCH infection was referred to our hospital from the region after a fall. X-ray, CT and MRI of the right knee joint, duplex scanning of the veins of the lower extremities were performed to avoid thromboembolic complications. (Fig. 1).



(Fig. 1). A. X-ray of the right knee joint B. The *knee skyline Merchant view*



C. MRI scan of the right knee joint

The diagnosis was: comminuted fracture of the right patella with damage to the patellar ligament. Concomitant diagnosis: coronary heart disease, angina pectoris. IDA grade II. TORCH infection. Examined by a cardiologist and anesthesiologist. Intravenous antibacterial treatment was started with levofloxacin 500 mg intravenously every 12 hours for 7 days. Three days after admission, taking into account the TORCH infection, osteosynthesis of the patella was performed to avoid purulent complications, without conjugated screws and anchors. Osteosynthesis of the patella was performed with Ethibond 3-0 (ethicon, USA), and the patellar tendon was restored and strengthened through the distal fragment of the patella using the continuation of the suture material according to the Krakow type, then transosseously fixed under the anterior tuberosity of the tibia. The patient shows satisfactory healing without suppuration and inflammation. In the immediate postoperative period, there was a limitation in the range of motion during flexion, which gradually increased after a month. Six months after the operation, motion was restored in the range from 0° to 120° without concomitant effusion or a feeling of instability.



(Fig. 2). After 1 month

After 3 months

Conclusion

A comminuted fracture of the patella with damage to the patellar tendon, if not properly assessed, studied and treated, is a difficult to treat condition associated with significant functional consequences. The development of posttraumatic osteoarthritis in fractures involving joints is a common complication that can determine functional changes. A history of TORCH infection adversely affects wound healing. In the context of recent available literature on this topic, we believe that this treatment was adequate and allowed the patient to demonstrate good functional results.

References:

1. Eric EJ. Fraturas do joelho. In: Rockwood CAJ, Green DP, Bucholz RW. Fraturas em adultos. 3rd ed. Philadelphia: Lippincott; 1991. p.1729–44.
2. Nummi J. Fracture of the patella: a clinical study of 707 patellar fractures. *Ann. Chir Gynaecol. Fenn.* 1971; 60(Suppl):179-87.
3. 3 Boström A . Fracture of the patella. A study of 422 patellar fractures. *Acta Orthop Scand Suppl.* 1972;43(sup143):1–80. doi:<https://doi.org/10.3109/ort.1972.43.suppl-143.01>
4. Melvin JS , Mehta S . Patellar fractures in adults. *J Am Acad Orthop Surg.* 2011;19(4):198–207. doi:<https://doi.org/10.5435/00124635-201104000-00004>
5. Teitz CC , Harrington RM . Patellar stress fracture. *Am J Sports Med.* 1992;20(6):761–5. doi:<https://doi.org/10.1177/036354659202000621>
6. X. Carredano, J. Valderrama, I. Valderrama, M. Hube, N. Bernal, C. Mellado, G. Espinoza, Tratamiento de la fractura conminuta de patela: ¿existen diferencias entre realizar o no una eversión? *Rev Chil Ortop Traumatol* 62 (3) (2021) e193–e200.
7. M.J. Matava, Patellar tendon ruptures, *J Am Acad Orthop Surg* 4 (6) (1996) 287–296.
8. C.W. Siwek, J.P. Rao, Ruptures of the extensor mechanism of the knee joint, *J Bone Joint Surg Am* 63 (6) (1981) 932–937.
9. M.R. Alzate Munera, S. Pereira, F. Bidolegui, Lesiones tendinosas del aparato extensor de la rodilla: Protocolo de tratamiento y rehabilitación, *Rev Asoc Argent Ortop Traumatol* 86 (3) (2021) 291–298.