

Patella fractures (surgical treatment) retrospective, epidemiological, clinical and therapeutic studies

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Abstract

Fractures of the patella are functionally serious and relatively frequent, representing 1% of all skeletal fractures. They compromise the functional prognosis of the knee and consequently the socio-professional future of the patient.

The purpose of our study was to evaluate the epidemiological, clinical and therapeutic results as well as the evolution of 90 cases of patella fractures treated in the orthopedic trauma service at IbnoTofail Hospital in Marrakech over a period of 5 years from January 2016 to December 2020.

The average age was 40 years with a male predominance (85.55%). Public road accidents were the most common etiology (60%). For the anatomopathological study we adopted the SOFCOT classification. We found 47.78% of type II fractures, 30% of type III fractures, 8.89% of type IV fractures, and 13.33% of type VI fractures, while no case of type I and V fractures. The skin opening was found in 34 patients (37.78%). The most commonly used osteosynthesis technique in our series was splinting strapping, performed in 51 patients (56.67%), followed by cerclage, which was indicated in 20 patients (22.22%). The analysis of the functional results was based on the BOSMAN grading scale, with excellent results in 46.67%, good results in 44.45% and poor results in 8.89%. The complications found in our series were infection in 10 cases, 1 case of dislocation of the material, 1 case of vascular damage, 7 cases of malunion, 5 cases of pseudoarthrosis, 6 cases of knee stiffness and 5 cases of arthrosis.

Keywords: Patella; Fractures; SOFCOT Classification Surgery; Complications

1. Introduction

The patella is one of the three bones that make up the knee. It is a round structure that is part of the knee extender apparatus His intermediate subcutaneous position exposes him to trauma (1, 2). Patella fractures account for 1% of skeletal fractions(3), they are not only joint fractions but they are also fractions that can disrupt the knee extension system, which compromises the functional prognosis of the knees and consequently the socio-professional future of the injured person. The prognosis depends on the anatomical injury and the quality of care (4). The treatment of these fractures, which is often surgical, involves different techniques to restore the continuity of the knee extender and to initiate early rehabilitation (5).

2. Material and methods

This is a descriptive retrospective study, involving 90 patients with patella fractures connected within the Department of Traumatology-Orthopaedics of the IBN TOFAIL Hospital in Marrakech over a period of 05 years from January 2016

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to December 2020. In our study, we included adult patients with surgically treated patella fractures, whether open or closed, complete records. And we excluded patients under the age of 16, patients with pathological patella fractures and patients who received orthopedic treatment. The data was collected using an operating sheet filled out from the medical records of the patients.

3. Results

During the period of our study, 90 cases of patella fracture were linked. The average age of our patients was 40.14 years, with extremes ranging from 17 to 80 years. The age distribution shows that patella fractures affect all age groups with a peak frequency between 20 and 29 years. Relative to gender: 85.55% of the cases were males with male predominance. Public road accidents and falling height were the two most common causes, accounting for 60% and 28.89% respectively. With regard to the achieved side, there is a predominance of the left side in 50 cases or 55.56% of our patients. The direct mechanism is the most common, it has been found in 68 cases, or 75.56%, and most often occurs as a direct shock to the front of the knee, in a flexed position following a fall from its own height or as a result of the edge board syndrome.

In the course of the history, pain is the main sign, it was present in all of our patients associated with functional impotence which was total in 76 cases and partial in 14 cases. Clinically all of our patients were admitted in general good condition except for one patient who was admitted in a state of vital distress for which he was initially taken care in resuscitation.

Among the clinical signs revealed in our patients are knee tumefaction in 46 cases or 51.11%, knee deformation in 4 people or 4.44%, and skin lesions caused by ecchymoses and scratches in 28 patients or 31.11%. With regard to the skin opening, it was noted in 34 patients, including: 11 cases were type 1; 19 were type 2 and 4 were type 3 according to the classification of Couchoix and Duparc. We also noted, exquisite pain caused in the fractured area in the total of patients is 100%, one edema in 9 patients is 10%, a hemarthrosis spreading to the nearby soft parts in 19 cases is 21.11%, and a transversal depression signalling a displaced fracture with diastasis (space) inter fragmentary in 55 cases is 61.11%. At mobilization: 76 cases have a deficit of the active extension of the knee, which means the rupture of the extender apparatus is 84.44%. With regard to the locoregional examination, it was noted that fractures of the lower end of the femur were most frequently associated with patella fractions, they were noted in 8 cases, only one case of knee luxation with total rupture of the anterior cross ligament (LCA), and no vasculo-nerve injury was objectivated. At admission all our patients have benefited from standard patella facial and profile X-rays, Additional incidences were requested based on associated injuries. Subsequently, based on the results of the radios performed, fractures were classified according to the classification of SOFCOT which allowed to objectivize a predominance of type II fractions, followed by type III fractions representing 47.78% and 30% respectively. (figure 1).



Figure 1 Face and profile X-rays for type II patella fracture according to SOFCOT classification

Surgical treatment was recommended for all patients in our study, with an estimated average care time of 5 days with extremes ranging from 1 day to 30 days, depending on the delay in hospitalization, adverse skin condition, the presence of associated lesions, and transfer to another department. Several therapeutic methods have been used to treat patella fractures. The most widely used method was hooping, it was performed in 51 patients or 56.67% and the 2nd plan circling, carried out in 20 cases or 22.22% (figure 2).



Figure 1 Osteosynthesis by embroidery

For post-operative complications, they were classified as early and late: For the early complications there are 10 cases of post-operative infections of which 6 were superficial and 4 were deep, only one case that showed vascular impairment at postoperative j7, he benefited from an angio-scanner objectivizing the total occlusion of the superficial femoral artery. He was transferred to the cardiovascular surgery department, And one case of dismantling the uipment. For late complications: 5 cases of pseudoarthrosis, 7 cases of vicious calcium were found. 6 cases of knee stiffness, 5 cases of femoro-patellar arthrosis, And no case of low rotule Based on functional and clinical criteria during our review, we were able to classify the results of treatment by our different therapies into 3 categories, based on the Bosman score and the results are noted in table1.

Table 1 Distribution of overall results in our series

Results	Number of cases	Percentage %
Excellent	42	46.67%
Bon	40	44.45%
Mauvais	8	8.89%
Total	90	100%

Regarding the results by type of osteosynthesis: The patella fractures treated by embrochage-haubanage produced satisfactory results in 49 cases, or 96.08%, of which 62.74% were excellent and 33.34% were good. The results by type of fracture classified by SOFCOT were as follows: Type II fractures are the most common and generally have better results compared to other types with a percentage of 95.35%.

4. Discussion

The most represented age group in our study is 20-29 years with an average age of 40,14 years, and this is also observed in the other series with at least closer average age(6,7,8, 9, 10,). we noted a clear male predominance. which is consistent with the data by the various studies, this particularity would be due to the nature of the activity of the male population. The majority of studies confirm the predominance of PAHs over other etiologies, and in the background are the drops. The left side is the most achieved side, which is consistent with the study by Haklar (9) and Wilkinson (11). However, in the literature we have found no data or links between the patella fracture and the affected side. The direct shock, flattened knee and contracted quadriceps is the most observed mechanism, this shock can occur at low energy as during the simple drop of height with reception on the front side of the knee, or on the contrary at high energy realizing the classic dashboard syndrome. High-energy-supported direct trauma is the cause of comminutive fractures with a possibility of osteochondral clogging. (3, 4, 12). After an interrogation in patients who are stable, a local examination starting with the inspection is primary, looking for swelling; skin lesions as well as to clarify the skin opening. It was noted in 34 cases, 37.78% in our series, 19% in MbaMba series and 8% in the Orengo study (3,13). Then the palpation, which can reveal an exquisite pain in the front of the knee, or the existence of a depression that is found in the classical horizontally displaced fracture of the patella. Subsequently, a locoregional examination, which allows to search for the immediate vascular nerve or ligamentary complications and to specify the associated lesions

that are not rare, they account for 42.22% of cases in our series, and as a comparison the Ricard series (14) has revealed 12% and the El-Sayed(15) and Sanjeev(16) 10%. The positive diagnosis of patella fractures is most often obvious. The aim of the imaging is to confirm the diagnosis and to study the importance of fracture displacement. The kneeclips of the face and especially the profile are sufficient to confirm the diagnosis. DMT is especially useful in complex fractures, as it enables coronal and sagittal and sometimes three-dimensional reconstructions to enable surgeons to better plan surgical treatment. MRI: has no indication in the diagnosis of patella fractures. Its interest lies in the balance sheet of associated ligament injuries. With regard to the anatomopathological classification, several have been used in the literature: Ricard and Moulay (14) are based on whether or not the extender device is interrupted, The OTA classification (Orthopaedic Trauma Association), along with the AO classification (17,18) described extra-articular, partial and complete joint fractures. and the Sofcot(19) was based on the anatomical description of the fracture. Our study was based on the morphological study of SOFCOT. And the predominance of transversal fractures compared to comminutive fractures is observed, with a percentage of 47.78%, which is consistent with the MbaMba study(3) with a proportion of 48.40%. The purpose of the treatment of patella fractures is to restore joint congruence, restore the knee extension system, and avoid the onset of complications, whether in the short, medium or long term. Most authors agree to surgically treat patella fractures, especially those that result in a rupture of the knee extender.

The delay of intervention in our work was estimated at 5 days, which is consistent with the Wilkinson and Boukhani study whose intervention time was also 5 days, while it was 8j in the MbaMba series. Several methods of osteosynthesis are possible, and they are currently used for all fractures not congruent or unstable to two or more fragments, whether open or closed, with the aim of ensuring a solid and fixed mounting that allows for rapid mobilization of the knee without the risk of secondary displacement. The results published in the literature are discordant and sometimes incomparable because the techniques used are very mixed. The most widely used technique in a number of studies, as is ours with a percentage of 56.67%, and as a comparison 63% in the Moukhtar series(22), and 80.6% in the Gnandi-Piou series. The latter considered this technique as a method of osteosynthesis that is indicated in transversal fractures displaced. When the fracture is comminutive, the alternative is to obtain the consolidation of the fragments by means of a circling, whereas the screw fixation is reserved for fractures with a single cross or vertical thread and when the bone is not porotic.

The external fixer is a therapeutic method is exceptional, recommended in case of neglected fractures or open fractions with a high septic risk. If osteosynthesis is not possible, partial or exceptionally complete patellectomy may be discussed.

Other therapeutic methods have been implemented in the literature and have yielded good results. The percutaneous treatment of a transversal patella fracture, which depends on the percutaneous installation of the cannulated screws and arthroscopy-controlled hammering, is indicated in type I patella fractures according to Duparc. This method has allowed a comparative analysis of conventional surgical treatment and finds that Osteosynthesis of patella fractures of type I by screw and hose has the advantage of greater stability than that of hose-hose.

Then we have the method of fixing by trans-osseous sutures using a thread based on polyester without removal of the implant, with a reinforcement by an eight-ring. This technique can be defined as feasible because it offers advantages over other techniques that require the removal of the implant.

The overall functional results are ranked according to the BOSMAN(20) rating scale, as well as in the MbaMba(3) and Gnandi. Piou(5) series, while Mehdi(6) has evaluated its results according to Casting et coll criteria, while bayar(21) has chosen Cybex scoring: it is noted that the percentage of excellent results is the majority in the literature and in our series, this is due to the correct and appropriate support.

5. Conclusion

The analysis of our findings shows that patella affects mainly young adult males; and road accidents are the main cause. The diagnosis of these fractures is relatively simple, assisted by the X-rays of the face and especially the profile of the knee. These fractures are most often transversal, interrupting the knee extender and thus requiring surgical treatment. Early and carefully monitored rehabilitation is one of the pillars of treatment to guarantee better functional and morphological results and avoid complications.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest regarding the publication of this article.

Statement of informed consent

Informed consent was obtained from the patient included in the study. The patient information was be kept confidential during and after study period.

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