

Evaluation of the Results of Surgical Treatment of Recent Patellar Fractures

Bah ML^{1*}, Bah AT¹, Sidibe M¹, Ndiaye AT¹, Camara A² and Doukoure M¹

¹Orthopedics and Traumatology Department, Ignace Deen University Hospital, Conakry, Guinea.

²Orthopedics and Traumatology Department, Donka University Hospital, Conakry, Guinea.

***Correspondence:**

Prof. BAH Mohamed Lamine, Ignace Deen National Hospital, Conakry, Guinea, Tel: (+224)622428643.

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ABSTRACT

Our study aimed to evaluate the results of surgical treatment of recent patellar fractures. This was a single-center, prospective, descriptive study conducted in the Orthopedics-Traumatology Department of the Ignace Deen National Hospital over four years (from March 1, 2014, to March 31, 2018, inclusive). It included 72 patients undergoing surgery for a recent patellar fracture. The Bosman functional score enabled us to assess our patients clinically. Assessment of the condition of the osteosynthesis material and bone callus served as radiological criteria. At a mean follow-up of 24 ± 3 months [14-36 months], we were able to review 72 patients. We noted 14 cases of complications (36% knee stiffness, 29% residual pain, 21% malunion, and 14% infections). The mean time to consolidation was 10 ± 4 weeks [8-12 weeks]. The consolidation rate was 100%. The mean Bosman functional score was 23 ± 7 . It was excellent in 36 patients, good in 22, and poor in 14. Treatment of patellar fractures should be exclusively surgical. Prepatellar tension bracing is the osteosynthesis technique of choice. The primary concern remains knee stiffness, which can be managed through early rehabilitation—one of the pillars of treatment that requires good patient cooperation.

Keywords

Patellar fracture, Knee injury, Surgical treatment, Open reduction and internal fixation (ORIF), Fracture management.

Introduction

The patella is the most prominent sesamoid bone in the body. It articulates with the femoral trochlea and is part of the knee extensor apparatus. Its intermediate subcutaneous position makes it particularly susceptible to trauma. Its integrity is essential for both eccentric and concentric quadriceps movement and for stabilization in the rotational components of the knee [1].

Patellar fractures are rare, accounting for less than 1% of all fractures. They occur most frequently in young, active adults [2]. The classification of these fractures allows for a precise description of the fracture type, which determines the therapeutic indication. Treatment of these fractures is most often surgical, and the prognosis depends on the anatomical lesion and the quality of care [3]. Our study aimed to evaluate the results of surgical treatment of recent patellar fractures.

Patients and Methods**Patients**

This was a single-center, prospective, descriptive study conducted in the Orthopedics-Traumatology Department of the Ignace Deen National Hospital over four years (from March 1, 2014, to March 31, 2018, inclusive). All patients with a recent surgically treated patellar fracture were included in the study. Patients with non-recent fractures and those presenting with a complication were omitted.

Our data were collected from a pre-established survey form, the surgical protocol book, and patient admission, hospitalization, and discharge records. Data entry and analysis were performed using SPSS (Statistical Package for the Social Sciences) version 23. Figures were generated using Word and Excel 2013. Results for quantitative variables are presented as mean (\pm standard deviation), minimum, and maximum; results for qualitative variables are expressed as absolute values and percentages.

Our series included 72 patients: 56 men (77.78%) and 16

women (22.22%), with a mean age of 39 ± 6 years (range, 20-67 years). Road traffic accidents were the predominant etiology. Closed fractures were the most common, accounting for 61 cases (84.72%). The Duparc I anatomico-radiological form was the most common (Figures a and b).



Figure 1: (a-b): Duparc type II patella fracture; (c-d): reduction + guy wire; (e-f): functional result in knee extension-flexion.

Methods

Operative Approach

All patients were positioned supine on a conventional knee table under regional anesthesia. Antibiotic prophylaxis was routine.

The medial parapatellar approach to the knee was used in all our patients. We performed 50 cases of tension banding (Figures b

and c), 18 cases of cerclage, and four cases of tension banding combined with cerclage. For open fractures, osteosynthesis was preceded by debridement. Postoperative follow-up radiographs were prescribed for all patients. The average length of stay was 5 days, with a range of 4 to 7 days. Partial weight-bearing and knee flexion were permitted in patients who underwent tension banding. Isometric quadriceps contractions were recommended in all cases.

Evaluation Criteria

Functional Criteria

The treatment's functional outcomes were assessed using the BOSMAN clinical score. These scores were Excellent (28-30 points), Good (20-27 points), and Poor (<20 points).

Radiological Criteria

The radiological criteria were based on postoperative radiographs. They allowed for assessment of the condition of the osteosynthesis hardware and bone callus.

Results

At a mean follow-up of 24 ± 3 months [14-36 months], we were able to review 72 patients. We noted 14 cases of complications (36% knee stiffness, 29% residual pain, 21% malunion, and 14% infections). The mean time to union was 10 ± 4 weeks [8-12 weeks]. The union rate was 100%. The mean Bosman functional score was 23 ± 7 (12-30). It was excellent in 36 patients [Figure e and f], good in 22 patients, and poor in 14 patients.

Discussion

In our study, patellar fractures accounted for 0.66% of all emergencies. This frequency is consistent with the literature, which reports that they represent less than 1% of human skeletal fractures [2].

Displaced transverse fractures (type I) were the majority in this type, accounting for 63.6% of cases. This finding is related to the direct mechanism observed in all cases. The patella fractures due to sudden contact of the knee with the dashboard or a fall onto the flexed knee. Due to its directly subcutaneous location, all compressive forces related to the energy transmitted by the trauma will be fully absorbed by the patella at the level of the femoral trochlea. The separation of the fragments reflects the concomitant violent contraction of the quadriceps, which tears the retinacula, while the comminution reflects the violence of the direct impact [4]. The therapeutic approach is conservative whenever possible, and the goal of treatment is to firmly reconstruct the extensor apparatus to allow early mobilization, avoiding knee stiffness and quadriceps atrophy [4]. All of our patients underwent surgical treatment, and tension banding was the most commonly used technique, i.e., 67.65% of cases. It was performed in type I fractures and some less comminuted Duparc type II fractures. For several authors [4-6], tension banding is the gold standard for treating these fractures. Its advantage is that it converts the traction forces exerted by the quadriceps system on the patella into compressive forces, thereby enabling early functional rehabilitation.

At a mean follow-up of 24 months, we recorded excellent and good results in 80.56% of cases, with a significant percentage of poor results (19.44%). This result may be related to the predominance of simple, less comminuted fractures, which are amenable to tension banding and then early rehabilitation. Several authors have noted similar results [4-6]. However, we observed complications that are not new. Several authors have reported on them [4-7].

Conclusion

The treatment of patellar fractures should be exclusively surgical. Prepatellar tension banding is the osteosynthesis technique of choice. The primary concern remains knee stiffness, which can be addressed through early rehabilitation—one of the pillars of treatment that requires good patient cooperation.

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