



International Journal of Orthopaedics Sciences

E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2023; 9(4): 94-96
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<https://www.orthopaper.com>
Received: 25-07-2023
Accepted: 04-09-2023

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Anatomical and functional results of distal femur fractures osteosynthesis using locked condylar plate in the elderly in Togo

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DOI: <https://doi.org/10.22271/ortho.2023.v9.i4b.3475>

Abstract

Introduction: The aim of this study was to evaluate the anatomical and functional results of locked condylar plate osteosynthesis in distal femur fractures in elderly Togo patients.

Patients and Method: It was a continuous prospective study with descriptive and analytical aims, conducted over a period of 4 years 6 months, from 1 January 2019 to July 2023. The AO/OTA classification was used for the radiological classification of fractures. The walk was measured by the Parker score. Functional outcome of the knee was evaluated using the MEGY functional score. The population of study was 32 cases. The mean age of the patients was 74.25 years, and the most affected group was 35-45 age. Both sexes were equally represented. Fall at home were responsible of 43.8% distal femoral fracture in patients aged over 60 years old. Fractures were open in 18.8%. In 15.6% cases, these lesions were associated to polyfractures and/or polytrauma and in 3 cases we found "floating knee". AO/OTA A2 type fractures were the most frequent (25%). The average operating time was 25.3 days. The locked condylar plate was the implant used in all our patients. The average operating time was 2h05min.

Results: The rehabilitation was started early in 87.5% of patients. The mean time to consolidation was 4 months. Residual knee pain was the most common late complication (62.5%), followed by knee osteoarthritis (15.6%), knee stiffness (15.6%), and mortality (9.4%). The functional outcome was very good in 18.8% of cases and good in 46.9%.

Conclusion: Osteosynthesis using locked condylar plates for distal femur fractures in patients over 60 years of age must combine stability and solidity with short operability times in order to achieve a good functional result and avoid mortality. Despite our difficult working conditions, anatomical results were good in 59.4% of cases.

Keywords: Fracture, distal femur, osteosynthesis, results

1. Introduction

Fractures of the distal femur account for 3 to 6% of all femoral fractures, and 50% of these fractures occur in elderly patients. Women are affected in 60.5% and are older than men [1, 2]. Most of these fractures occurred after low-energy trauma due to osteoporosis [3]. The challenges of these fractures are double. We have in first, the poor quality of the bone texture, which leads to inadequate anchoring of the implant in the bone, and on the other hand, the morbidity and mortality associated with these fractures. Treatment is surgical, with osteosynthesis using a locked condylar plate. However, double fixation using a knee retrograde locking nail and a locked condylar plate is increasing in geriatric fractures [4, 5]. In Togo, distal femur fractures in elderly patients are fixed with a locked condylar plate [6]. The aim of this study is to evaluate the anatomical and functional results of osteosynthesis of the distal femur fracture in elderly patients using a locked condylar plate.

Our hypothesis is that the anatomical and functional results are satisfactory in the short and long term when osteosynthesis is performed using a locked condylar plate in fractures of the distal femur in elderly patients.

2. Patients and Methods

2.1 Patients

It was a prospective analytical study included patients aged of 60 years and older, which presented distal femur fracture and treated surgically with a locked condylar plate between January 1, 2019, and June 2023. Were included patients with extra- or intra-articular comminuted fractures and pathological fractures? Patients treated by another surgical procedure than locking plate and those lost on follow-up were excluded. The study involved 32 patients, of whom 16 were women. The mean age was 74.25 years (60-97) and a Parker score was more than 8 in 19 patients. Mechanisms of injury were dominated by home accidents. X-rays of the front and side of the knee were taken in all patients. A CT scan of the knee with three-dimensional reconstruction was performed. Fractures were classified according to the AO/OTA classification: subtypes A1 and A2 were the most frequent with 8 cases each, and subtype C3 was found in 5 cases.

2.2 Treatment protocol

The average operative delay was 27.16 days, with extremes of 3 and 69 days. General anesthesia was used. Patients were positioned in the lateral decubitus position in 22 cases. The lateral approach to the knee was used in all patients. For type C fractures, joint fragments were reduced first and temporarily fixed with Kirschner wires or screws. The shaft and distal fragment were then reduced and fixed with the condylar locking plate (Fig1). The surgical wound was drained in all patients and the drain was removed on the second day after the operation. Antibiotic treatment was systematic. Active and passive rehabilitation began on the third or seventh day, depending on pain and the primary stability of osteosynthesis. Patients were regular follow-up at 45 days post-operative, at three months, six months, nine months, twelve months and then every six months for two years. The Support was stated at three months post-operative.

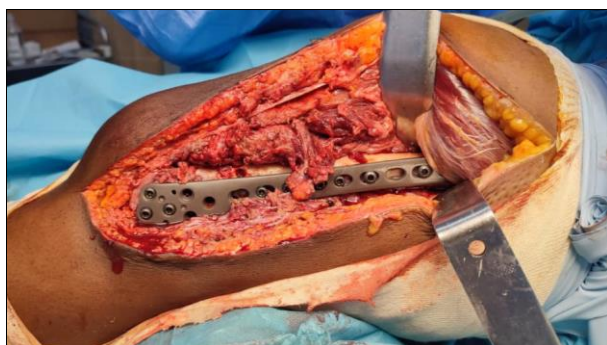


Fig 1: Reduction of the fracture and fixation of locking condylar screw plate

2.3 Evaluation of results

The evaluation was clinical and radiological. The radiological results concerned the quality of reduction, consolidation, the presence of callus and osteoarthritis. At the last follow-up, we assessed the functional outcome using the MEGY functional score (Table 1). The parameters of this score were mobility, pain, stability and walking.

The Parker score was used for evaluation of patient's autonomy after surgical treatment and compared with their autonomy before the trauma. We considered a patient to be semi-autonomous when this score was below 9. This postoperative score has been cross-referenced with the operative delay using the chi-square test [8].

3. Results

Reduction was satisfactory in 25 patients. (Fig. 2). Anatomical reduction was achieved in 7 patients.



Fig 2: (A) C2 fractures in a 68-year-old patient, (B) Post-operative control radiograph

The average time to consolidation was 4 months (3 and 5 months).

Late complications included malunion in 3 cases, knee stiffness in 5 cases, osteoarthritis in 5 cases and one case of pseudarthrosis.

According to MEGY scores, we obtained good results in 21 patients overall. Functional results were good in 27 patients (Fig. 3).



Fig 3: Full flexion at 6 months post-op in a 62-year-old patient

We noted that Parker score decreased postoperatively. The graph (Fig 4) shows the 32 coordinate points representing the patient. The Cross-referencing the post-operative Parker score and the operative delay using the chi-square test revealed a $P = -6.14$.

The correlation is significant. Therefore, the longer was the operative delay, the lower will be the post-operative Parker score.

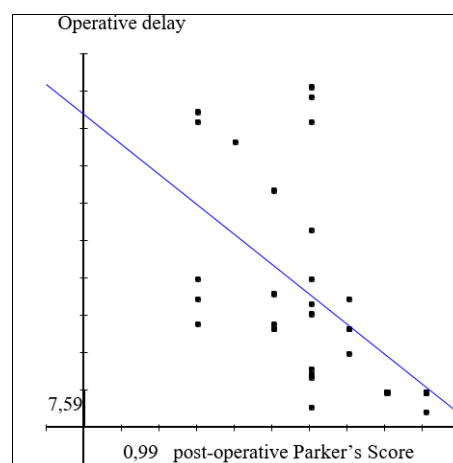


Fig 4: Distribution of patients according to the correlation between operative delay and Parker postoperative score from 1 January 2019 to 30 June 2023

4. Discussion

In this study, we evaluated the results of surgical treatment of fractures of the distal femur fractures using a locked condylar plate in elders. Weaknesses of this study were small sample due to patients lost to follow-up and those who discharged against medical advice. Nevertheless, at last follow-up, the functional outcome was judged to be good according to MEGY score. Subtype A lesions accounted for 50% of our series. This result was found by Pietua G *et al* ^[9], who reported 47% of subtype A. We found good results in Type A, C1 and C2 lesions. Poor results were seen in type C3 fractures. These results corroborate the fact that comminuted fractures are difficult to treat even if we have a good fixation. We recorded 5 cases of knee stiffness (15.6%). This rate is higher comparing to study of Ehlinger *et al* ^[10], in the United States in 2014, who found 0.9%.

This difference could be explained by the long operative delay and the lack of good physiotherapy. These differences can be explained also by the existence of knee arthritis before de fracture, which is responsible for residual knee pain that prevents patients from mobilizing the knee properly during physiotherapy sessions.

The study of our series shows that despite a long operative delay, and the difficulties of physiotherapy, we obtained 46.9% good results according to the MEGY score. However, this result is still lower than those reported in the literature. ^[11, 12]. This could be explained not only by the long operating time, but also by the difficulty of carrying out rehabilitation. The mean Parker score postoperatively in our series was 5.97%, with a mean operating time of 27.16 hours. This result is lower than that of Myers *et al* ^[13] in 2015 in the United Kingdom, who found a mean score of 7.37% for an operating time of 2 days. This reduction in the Parker score postoperatively could be explained by the long operating time due to a lack of universal health insurance in our country.

The study showed a significant correlation between operative delay and postoperative Parker score. The use of a locked condylar plate does not solve the problem of postoperative weight-bearing. We then suggest a combination of retrograde nail and locked condylar plate to allow immediate postoperative weight-bearing, in order to help our patients, regain their initial autonomy.

5. Conclusion

Distal femur fractures in elderly patients are dreadful injuries, with a life-threatening and functional prognosis, especially if surgery is delayed. Only urgent and appropriate management can prevent patients from complications. The perfect application of the technique for fitting locked condylar plates should be respected, so that knee physiotherapy can be started as early as possible. Early treatment should also include support for patients through easy access to health insurance.

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How to Cite This Article

Kanfitine KN, Akloa Kolima E, Towoezim TH, Dellahn YY, Ayouba G, Bakriga B, Walla A. Anatomical and functional results of distal femur fractures osteosynthesis using locked condylar plate in the elderly in Togo. International Journal of Orthopaedics Sciences 2023; 9(4): 94-96.

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