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CONSEQUENCES OF RETROGRADE SUPRACONDYLAR NAILING AND LOCKING COMPRESSION PLATES FOR TREATMENT OF DISTAL FEMORAL FRACTURES: A RETROSPECTIVE STUDY

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ABSTRACT

Background: Less than 7% of femur shaft fractures have been reported in the literature to involve distal third femoral fractures. The current discourse centers on the management of these fractures, emphasizing two well-known implants: the Locked Compression Plate (LCP) and the Retrograde Supracondylar Nail (RSN). Both of these implants has benefits and drawbacks of its own. Treatments for distal third femoral fractures currently include non-locking plates, pre-shaped locking compression plates, and retrograde supracondylar nails. Our understanding of the biological components of fracture fixation continues to advance.

Objective: To analyze the problems that arise after retrograde supracondylar nailing and locking compression plate treatment for distal femur fractures.

Study design: A retrospective study

Place and Duration: This study was conducted in Khyber Teaching Hospital Peshawar from August 2022 to August 2023

Methodology: All the patients who were involved in this research were those who were operated on for distal third femur fractures with LCP and RSN during the time period of this research. All of the participants were evaluated with X-rays. The clinical examination of each patient was performed. Skeletal traction was used in our study to immobilize individuals who had suffered injuries. Both

surgical consent and pre-operative evaluations were completed. When treating open fractures, external fixation was done first, and within two to three weeks, definitive surgery was planned.
Results: A total of 60 patients were involved in this research. A total of 42 males and 18 females were included in this study. Overall 27 (45%) of the patients were treated with RSN and 33 (55%) of the participants were treated with LCP. A total of 13 patients in the RSN group and 18 patients in the LCP group had complications.
Conclusion: Both plating and nailing have shown benefits in addition to their respective drawbacks. The surgeon should choose the right implant after taking into account the fracture pattern, the patient's physical state, the length of the procedure, and any potential intraoperative difficulties.

Keywords: Locked Compression Plate, Retrograde Supracondylar Nail, distal femur fractures

INTRODUCTION

Less than 7% of femur shaft fractures have been reported in the literature to involve distal third femoral fractures [1, 2]. The current discourse centers on the management of these fractures, emphasizing two well-known implants: the Locked Compression Plate (LCP) and the Retrograde Supracondylar Nail (RSN) [3, 4]. Both of these implants has benefits and drawbacks of its own [5]. Treatments for distal third femoral fractures currently include non-locking plates, pre-shaped locking compression plates, and retrograde supracondylar nails. Our understanding of the biological components of fracture fixation continues to advance [6]. Because these fractures are complex and need to be managed precisely to avoid complications, a technically sound approach is crucial.
The best course of treatment is still up for discussion. Recent improvements in procedures and implants have generally made non-surgical approaches less common [7]. There has been a decrease in the number of complications following the introduction of minimally invasive techniques that follow the guidelines of biological osteosynthesis [8]. In order to preserve the blood flow and shatter the hematoma, locking plates use a biologically favorable, minimally invasive technique that involves minimal disruption of soft tissues [9]. In 1988, a major breakthrough in the treatment of these fractures was made when Green presented intramedullary nails, which were put retrograde and offered various benefits comparable to locking plates, as well as the promise of excellent healing rates [10]. Even though both methods are frequently employed, there aren't many studies that may be utilized to compare them.
Many articles have looked at the unknown risks connected to each individual implant [11,12]. Our study is a retrospective evaluation that focuses on problems that arise after retrograde supracondylar nailing and locking compression plate treatment for distal femur fractures.

METHODOLOGY

All the patients who were involved in this research were those who were operated on for distal third femur fractures with LCP and RSN during the time period of this research. All of the participants were evaluated with X-rays. The clinical examination of each patient was performed.
Exclusion criteria: Patients with complications such as ipsilateral limb shortening, ipsilateral tibia fracture, and grade 3C open fractures were not included in this study.
Skeletal traction was used in our study to immobilize individuals who had suffered injuries. Both surgical consent and pre-operative evaluations were completed. When treating open fractures, external fixation was done first, and within two to three weeks, definitive surgery was planned. Strict aseptic precautions were taken during the plating and nailing processes. After fracture fixation, a postoperative strategy with an emphasis on early knee mobilization was put into place. Antibiotics were given to the patients orally and via injection. Following the initial dressing change, discharge occurred, and follow-ups were subsequently carried out on a regular basis.

RESULTS

A total of 60 patients were involved in this research, among them 42 were males and 18 were females. Overall 27 (45%) of the patients were treated with RSN and 33 (55%) of the participants were treated with LCP. A total of 13 patients in the RSN group and 18 patients in the LCP group had complications. Table number 1 shows the demographics of our study's participants.

Table no. 1: demographics of study's participants

Parameters	RSN group	LCP group
Mean age (years)	45.6	44
Gender		
● **Female**	8	11
● **Male**	19	22
Side		
● **Left**	9	13
● **Right**	18	20

Table number 2 shows the classification of the patients.

Table no. 2: classification of the patients

Classifications (AO/OTA)	RSN group	LCP group
33-A1	8	7
33-A2	11	6
33-A3	4	7
33-C1	3	8
33-C2	1	3
33-C3	0	2

Table number 3 shows the various complications in our research.

Table 3: various complications in the study participants

Complications	RSN group	LCP group
Knee stiffness	8	5
Plate offset	-	4
Plate break	-	1
Screw pullout	6	-
Non union	3	3
Infection	3	7
Shortening	1	4
Anterior knee pain	4	-
Nail protrusion	2	-

DISCUSSION

Handling fractures of the distal third femur is complicated and necessitates a careful preoperative assessment [13]. In the past, there were more instances of these fractures not being successfully managed [14, 15]. Open anatomical realignment and stiff fixation with traditional plates were used in the past; as a result, 29% to 38% of cases had incomplete or delayed healing, and 7% to 20% of cases had infection [16]. Most current systems are designed to provide choices for minimally invasive implant application, with the goal of protecting the local biological environment and reducing problems associated with infection and fracture healing.

Modern implants, like intramedullary retrograde nailing and LISS, have shortened recovery times and raised the percentage of effective bone union [17]. Malunion, fixation loss, and other implant-related problems have surfaced despite the use of minimally invasive methods with these implants. When it comes to nailing, issues with insufficient alignment, loosening of the screws, nail insertion into the joint, retro curvature, non-union, and joint cartilage piercing have all occurred. In contrast, misaligned plates, misaligned Varus, rotation of the distal fragment, infections, and plate fractures have all caused problems with plating.

Knee stiffness was the most common consequence in our study, affecting 13 out of 60 patients (more common in RSN cases than LCP instances). Patients with a range of motion (ROM) of fewer than ninety degrees were classified as having significant knee stiffness at the one-year follow-up. By treating arthrofibrosis, post-implant fixation with early quadriceps exercises, can avoid this condition. The importance of the extensor mechanism in preventing knee stiffness was emphasized by Dong-Wook Son et al [18]. Three months later, patients still suffering knee stiffness received physiotherapy using a continuous passive motion (CPM) equipment. According to Ehlinger et al., it is not uncommon for knee flexion to decrease after surgery by 30 to 40 degrees when compared to a normal knee [19].
Accurately aligning fracture fragments, carefully choosing the right entry point with sufficient fluoroscopic guidance, and carefully selecting the diameter and length of nails can all help to lower the risk of intraoperative problems [20]. On the other hand, there was a chance of implant failure due to the length of the plate; however, this danger might have been avoided with a few little technical changes. We recommend adopting comparatively longer structures for the management of distal third femur fractures using locking plates in order to reduce the risk of complications.

CONCLUSION

Both plating and nailing have shown benefits in addition to their respective drawbacks. The surgeon should choose the right implant after taking into account the fracture pattern, the patient's physical state, the length of the procedure, and any potential intraoperative difficulties.

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Conflict in the interest

The authors had no conflict related to the interest in the execution of this study.

Permission

Prior to initiating this study, approval from the ethical committee was obtained to ensure adherence to ethical standards and guidelines.

REFERENCES

1. Rajheiman R, Senthilnathan A, Prabhakar R, Vijaya K. A retrospective analysis of complications following distal femoral fractures treated with retrograde supracondylar nailing and locking compression plate. International Journal of Orthopaedics. 2022;8(1):13-6.
2. Krishna C, Shankar RV. Current concept of management of supracondylar femur fracture: retrograde femoral nail or distal femoral locking plate. International Surgery Journal. 2016 Dec 9;3(3):1356-9.
3. Gill SP, Mittal A, Raj M, Singh P, Singh J, Kumar S. Extra articular supracondylar femur fractures managed with locked distal femoral plate or supracondylar nailing: a comparative outcome study. Journal of Clinical and Diagnostic Research: JCDR. 2017 May;11(5):RC19.

4. Hartin NL, Harris I, Hazratwala K. Retrograde nailing versus fixed-angle blade plating for supracondylar femoral fractures: a randomized controlled trial. ANZ journal of surgery. 2006 May;76(5):290-4.
5. Munzur R. Surgical Management of Supracondylar Femoral Fracture with Locking Compression Plate.
6. Pushkar D, Bhan N. Comparisonof Results of Distal Femoral Fractures Treated by Internal Fixation with Locking Compression Plate and Retrograde Femoral Nail.
7. Zhang J, Wei Y, Yin W, Shen Y, Cao S. Biomechanical and clinical comparison of single lateral plate and double plating of comminuted supracondylar femoral fractures. Acta Orthop Belg. 2018 Jun 1;84(2):141-8.
8. AHMED U, AHMAD U, ZAHEER M, SADAQAT A, KHALID Z. Comparison of outcome with retrograde nailing versus locked compressive plating in the treatment of extra articular supracondylar femur fractures. Methodology. 2021 Nov.
9. Yogi LK, Mahi G, Lokhande M. Evaluation of short term complications following use of retrograde intramedullary femoral interlocking nail for fractures of distal femur. Int J Orthop. 2020;6(3):149-52.
10. Memon R, Patel D, Patel N. Functional outcomes of retrograde femoral nailing in extra articular distal third femoral fractures. International Journal of Orthopaedics. 2020;6(1):143-6.
11. Halpenny J, Rorabeck CH. Supracondylar fractures of the femur: results of treatment of 61 patients. Can J Surg. 1984;27:606-609.
12. Healy WL, Brooker AF Jr. Distal femoral fractures. Comparison of open and closed methods of treatment. Clin Orthop Relat Res. 1983;174:166-171.
13. Seinsheimer F 3rd. Fractures of the distal femur. Clin Orthop Relat Res. 1980;153:169-179.
14. Schatzker J, Lambert DC. Supracondylar fractures of the femur. Clin Orthop Relat Res. 1979;138:77-83.
15. Sanders R, Swiontkowski M, Rosen H, et al. Doubleplating of comminuted, unstable fractures of the distal part of the femur. J Bone Joint Surg Am. 1991;73:341- 346.
16. Ricci WM, Loftus T, Cox C, et al. Locked plates combined with minimally invasive insertion technique for the treatment of periprosthetic supracondylar femur fractures above a total knee arthroplasty. J Orthop Trauma. 2006;20:190-196.
17. Kregor PJ, Stannard JA, Zlowodzki M, et al. Treatment of distal femur fractures using the less invasive stabilization system: surgical experience and early clinical results. J Orthop Trauma. 2004;18:509-520.
18. Son DW, Kim HS, Choi WY. Risk Factors for Knee Stiffness in Distal Femoral Fractures. J Korean Fract Soc. 2018;31(4):123-131.
19. Ehlinger M, Dujardin F, Pidhorz L, Bonnevialle P, Pietu G, Vandenbussche E. SoFCOT: Locked plating for internal fixation of the adult distal femur: influence of the type of construct and hardware on the clinical and radiological outcomes. Orthop Traumatol Surg Res. 2014;100:549-554.
20. Carmack DB, Moed BR, Kingston C, Zmurko M, Watson JT, Richardson M. Identification of optimal intercondylar starting point for retrograde femoral nailing: An anatomical study. J Trauma. 2003;55(4):692-695.