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ORIGINAL ARTICLE

Evaluation of Outcome of Pre-Contoured Locking Compression Plating in Midshaft Clavicle Fracture

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ABSTRACT:

Background: This study was conducted for Evaluation of Outcome of Pre-Contoured Locking Compression Plating in Midshaft Clavicle Fracture. **Material and methods:**This study involved 25 individuals with mid-shaft clavicle fractures managed using precontoured locking plates, marking the adoption of this surgical technique. Participants were invited via telephone to attend an interview and final evaluation. During this visit, demographic data, fracture union status, and functional outcomes were assessed through physical examination and radiographs. Pain intensity was measured using the 100 mm Visual Analog Scale (VAS), where 100 represents the most severe pain. Categorical data were summarized as counts and percentages, while continuous data were expressed using range, mean, and standard deviation, depending on distribution. **Results:**In this study, out of 25 subjects, 16(64%) were males and 9 (36%) were females. Among 8 (32%) cases, right side was involved. Among 17 (68%) cases, left side was involved. Among 25 cases, just 1 case showed non-union and 24 cases showed union. The union rate was 96%. Infection was seen in 1 case accounting for 4% of cases. **Conclusion:**Fracture was more common in males than in females and the left side was commonly involved as compared to right side. Also, the union rate was 96% and just 1 case showed infection.

Keywords: Clavicle, Fracture, Union, Non-Union.

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INTRODUCTION

Clavicle fractures comprise approximately 5% to 10% of all fractures, with the midshaft region involved in nearly 80% of cases. Historically, even markedly displaced midshaft fractures were managed nonoperatively, supported by early reports citing nonunion rates below 1%. However, these earlier studies often overlooked patient-centered outcomes that may have highlighted persistent functional impairments.[1, 2] Contemporary research indicates that nonunion rates in displaced midshaft fractures treated conservatively may exceed 15%, and such cases of malunion or nonunion are frequently associated with significant long-term disability in the affected limb.Recent studies suggest that surgical management of clavicle fractures is associated with reduced long-term complications, particularly lowering the rates of symptomatic malunion and nonunion, while enhancing functional outcomes.[3, 4] Although intramedullary fixation is a recognized operative technique, traditional devices often lack fracture site compression and pose a risk of pin migration due to their smooth design. Newer-generation implants featuring differential pitch threads aim to address these limitations and improve fixation stability.[5, 6] Hence; this study was conducted for Evaluation of Outcome of Pre-Contoured Locking Compression Plating in Midshaft Clavicle Fracture

MATERIAL AND METHODS

This study involved 25 individuals with mid-shaft clavicle fractures managed using precontoured locking plates, marking the adoption of this surgical technique. Participants were invited via telephone to attend an interview and final evaluation. During this visit, demographic data, fracture union status, and functional outcomes were assessed through physical examination and radiographs. Pain intensity was measured using the 100 mm Visual Analog Scale (VAS), where 100 represents the most severe pain. Categorical data were summarized as counts and percentages, while continuous data were expressed using range, mean, and standard deviation, depending on distribution. All the results were analysed using SPSS software.

RESULTS

Table 1: Gender-wise distribution of subjects

Gender	Number of subjects	Percentage
Males	16	64
Females	9	36
Total	25	100

In this study, out of 25 subjects, 16(64%) were males and 9 (36%) were females.

Table 2: Side of fracture

Side	Number of cases	Percentage
Right	8	32
Left	17	68
Total	25	100

Among 8 (32%) cases, right side was involved. Among 17 (68%) cases, left side was involved.

Table 3: Union-rate of fractures

Parameter	Number of cases	Percentage
Union	24	96
Non-union	1	4
Total	25	100

Among 25 cases, just 1 case showed non-union and 24 cases showed union. The union rate was 96%. Infection was seen in 1 case accounting for 4% of cases.

DISCUSSION

Precontoured clavicle plates were developed to overcome fixation challenges by conforming to the natural anatomy of the clavicle, thereby eliminating the need for intraoperative plate bending. This design not only reduces operative time but may also minimize the risk of fatigue-related plate fractures.[6- 8] A study involving 200 cadaveric clavicles found that these anatomically shaped plates fit well on the superior clavicular surface in most cases, although they were less compatible in white females and when applied more laterally.[9]

In this study, out of 25 subjects, 16(64%) were males and 9 (36%) were females. Among 8 (32%) cases, right side was involved. Among 17 (68%) cases, left side was involved. Among 25 cases, just 1 case showed non-union and 24 cases showed union. The union rate was 96%. Infection was seen in 1 case accounting for 4% of cases.VanBeek C et al compared the outcomes after precontoured and noncontoured superior plating of acute displaced midshaft clavicle fractures. Primary outcomes were rate of plate prominence, rate of hardware removal, and rate of complications. Secondary outcomes were ROM and pain and function scores. They retrospectively reviewed 52 patients with 52 acute, displaced midshaft clavicle fractures treated with either noncontoured or precontoured superior clavicle plate fixation. Fourteen patients with noncontoured plates and 28 with precontoured plates were available for followup at a minimum of 1 year postoperatively. Patients complained of prominent hardware in nine of 14 in the noncontoured group and nine of 28 in the precontoured group. Hardware removal rates were three of 14 in the noncontoured group and three of 28 in the precontoured group. Postoperative ROM and postoperative subjective scores were similar in the two groups. Conclusions Precontoured plating versus noncontoured plating of displaced midshaft clavicle fractures results in a lower rate of plate prominence in patients who do not undergo hardware removal.[10]Narsaria et al. conducted a comparative study evaluating the outcomes of two fixation methods—titanium elastic intramedullary nail (EIN) versus anatomical precontoured dynamic compression plate—for displaced midshaft clavicle fractures in 66 patients aged 18 to 65. Patients were randomized into two treatment groups and followed clinically and radiographically over two years.The EIN group showed significantly shorter incision length, reduced operative time, lower blood loss, and shorter hospital stays. While early functional scores (ASES and Constant) favored the plating group within the first two months ($p < 0.05$), no significant differences were observed at the two-year follow-up in terms of radiological and overall functional outcomes. Notably, the plating group had a higher rate of refracture after implant removal ($p = 0.045$), along with higher but statistically insignificant rates of infection and revision surgeries ($p > 0.05$).EIN offers a minimally invasive alternative to plating with fewer complications, faster recovery, better cosmetic outcomes, and similar long-term efficacy in managing displaced midshaft clavicle fractures.[11]Kim JW et al assessed the effectiveness of internal fixation using a precontoured locking compression plate for the treatment of the displaced clavicle fracture by analyzing both radiological and clinical outcomes. Materials and Methods: We reviewed 34 cases of displaced clavicle shaft fracture treated by internal fixation using precontoured locking compression plates between May 2009 and February 2010. Radiological outcomes were analized on the basis of bone union and the differences between the time for bone union depending on sex and age. Clinical outcomes were analyzed on the basis of quick DASH Scores and the differences in the range of motion of the affected shoulder compared to the contralateral shoulder. Results: In the radiological evaluation, all fractures showed bone union, and the average time for bone union was 12.3 weeks, without delayed unions. Time for bone union did not differ significantly with respect to sex and age ($p=0.87$). In the clinical evaluation, the average final quick DASH Score was 23.5 (range, 12~42). At final follow up, the range of motion after bone union in the affected shoulder was not significantly different from that of the contralateral shoulder ($p=0.69$). Conclusion: The internal fixation achieved using precontoured locking compression plate in displaced clavicle shaft fracture showed effective bone union and can be considered as a reliable method with fine clinical results showing early range of motion at the shoulder joint.[12]

CONCLUSION

From the results of this study, it can be concluded that the fracture was more common in males than in females and the left side was commonly involved as compared to right side. Also, the union rate was 96% and just 1 case showed infection.

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