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Dr. Jairam D Jagiasi
Additional Professor,
Department of Orthopaedics,
Dr. R.N. Cooper hospital and
H.B.T. Medical College,
Vile Parle (W), Mumbai,
Maharashtra, India

Dr. Mohit R Upadhyaya
Specialty Medical Officer,
Department of Orthopaedics,
Dr. R.N. Cooper hospital and
H.B.T. Medical College,
Vile Parle (W), Mumbai,
Maharashtra, India

Dr. Tushar V Ubale
Assistant Professor,
Department of Orthopaedics,
Dr. R.N. Cooper hospital and
H.B.T. Medical College,
Vile Parle (W), Mumbai,
Maharashtra, India

Dr. Ganesh B Dole
Registrar, Department of
Orthopaedics, Dr. R.N. Cooper
hospital and H.B.T. Medical
College, Vile Parle (W), Mumbai,
Maharashtra, India

Corresponding Author:
Dr. Mohit R Upadhyaya
Specialty Medical Officer,
Department of Orthopaedics,
Dr. R.N. Cooper hospital and
H.B.T. Medical College,
Vile Parle (W), Mumbai,
Maharashtra, India

ORIF in middle third clavicle fractures: Resumption of occupation and patient satisfaction

Dr. Jairam D Jagiasi, Dr. Mohit R Upadhyaya, Dr. Tushar V Ubale and Dr. Ganesh B Dole

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Abstract

Introduction: Conservatively treated displaced clavicle fractures have a non-union rate of 15% and unsatisfactory patient-reported outcomes in 1/3rd of the patients. ORIF with pre-contoured plate gives better functional outcome but is associated with wound and hardware-related complications in 9% to 64% of cases.

Purpose: To evaluate patient satisfaction in terms of function, activities of daily living and return to occupation following ORIF with plating for fractures of midshaft clavicle.

Methodology: Patients underwent ORIF for midshaft clavicle fracture with pre-contoured clavicle plate using the direct superior approach to clavicle, followed by 4 weeks of sling with gentle range of motion exercises. Resumption of daily activities was allowed after 4 weeks as tolerated by the patient.

Patients were evaluated using the Oxford Shoulder Score, shoulder and pectoral girdle range of motion and a general questionnaire to determine the satisfaction of patients with the procedure, at 6 months post-surgery.

Result: Of the 17 patients that underwent ORIF for midshaft clavicle fracture, 16 patients (94%) had returned to their original occupation with 1 patient requiring assistance in performing overhead tasks. 1 patient was unable to return to occupation due to associated non-union of a tibia fracture. 15 patients (88%) reported that they were satisfied with the outcome of the surgery.

Conclusion: Treatment of midshaft clavicle fractures with ORIF gives good functional outcome and is associated with a high patient satisfaction rate in terms of return to their pre-fracture activity levels for daily living and occupation.

Keywords: Clavicle plating, functional outcome, patient satisfaction

Introduction

Fractures of the clavicle account for 2.6% of all fractures and 44% of fractures of the shoulder girdle. They are common in the young, active population, with a male predisposition of 2.6:1 [1]. Fractures of the middle third are the most common, accounting for 81% of all clavicle fractures [2].

As the clavicle is a part of the shoulder complex, its integrity and anatomic structure is vital for complete range of motion of the complex.

Historically, all middle third clavicle fractures have been treated conservatively with a sling or figure of 8 bandaging [3]. Following the immobilization phase, it was observed that there was no significant change in alignment from post-traumatic state at fracture union. Most patients required physiotherapy to regain shoulder mobility and functional ability.

Recent studies have shown that patients treated conservatively for displaced clavicle fractures have a non-union rate of 15% and unsatisfactory patient-reported outcome in 1/3rd of the patients [4, 5], due to shortening of the clavicle and loss of shoulder range of motion [6].

With advances in surgical techniques and implants, open reduction and internal fixation of midshaft clavicle fractures with a pre-contoured locking plate has been associated with better functional outcome [7] but ORIF is not without its disadvantages. Hardware-related complications like prominent plate, screw loosening, infection, wound dehiscence and scar related complaints are common, ranging for 9% to 64% and are reported in every study [8]. They are a cause for re-surgery and hardware removal [9].

Purpose

To evaluate patient satisfaction in terms of function, activities of daily living and return to occupation following ORIF with plating for fractures of midshaft clavicle.

Methodology

The study was conducted at a tertiary care hospital over a period of 1 year, between August 2017 and December 2018 with due approval from institutional ethics committee.

A convenient sample of 17 cases who underwent ORIF with pre-contoured compression plate for midshaft clavicle fracture during the time period was included.

Patients with compound fractures of clavicle and polytrauma patients with other fractures of the same upper limb were excluded.

Patients underwent ORIF for midshaft clavicle fracture with pre-contoured clavicle plate using the direct superior approach to clavicle, followed by 4 weeks of sling with gentle range of motion exercises. Resumption of daily activities was allowed after 4 weeks as tolerated by the patient. Patients were evaluated using the Oxford Shoulder Score^[10], shoulder and pectoral girdle range of motion and a questionnaire to determine satisfaction of patients with the procedure, at 6 months post-surgery.

Results

Of the 17 patients that underwent ORIF for midshaft clavicle fracture, 15 were male and 2 females, with a mean age of 34 years (range 19 to 60 years). 16 patients (94%) showed a complete range of motion at shoulder and pectoral girdle, with a mean Oxford Shoulder Score of 47(39-48), with 1 case of difficulty in overhead object lifting. Complications reported were [table 1]: 3 cases (18%) of tingling sensation around the scar site. 1 case (5%) hardware irritation and scar pain requiring implant removal. 1 case (5%) of late infection requiring implant removal. 5 patients (29%) had prominent implants not requiring removal. 16 patients (94%) had returned to their original occupation with 1 patient requiring assistance in performing overhead tasks. 1 patient was unable to return to occupation due to associated non-union of a tibia fracture. 15 patients (88%) reported that they were satisfied with the outcome of the surgery.

Table 1: Complication

Complication	Number of cases	Implant removal
Infection (late)	1 (5%)	yes
Hardware irritation	1 (5%)	yes
Prominent implant	5 (29%)	no
Paraesthesia around scar	3 (18%)	no

Discussion

The clavicle, though small in size forms a bridge between the axial and the appendicular skeleton^[11]. Along with the scapula, it forms a strut that provides stability and allows for the high range of mobility and function of the shoulder girdle. The clavicle, due to its horizontal and anterior location also serves as a shield for the underlying neurovascular structures^[12]. The subcutaneous nature and unique anatomical position of the clavicle also makes it vulnerable to fracture from trauma to the shoulder region.

Clavicle fractures tend to occur in a younger, more active age group, consisting of people who are earning members of society. Conservative management is associated with shortening of clavicle and loss of range of motion at the shoulder complex. It is also associated with a longer time to

union, 12 weeks^[13] and immobilization period which precludes activities necessary for daily life and gainful employment. The loss of shoulder function associated with conservative management may further reduce the individual's ability to resume his/her pre-fracture occupation.

ORIF with plating provides patients with the necessary anatomical alignment and rigid fixation to allow early mobilization for the upper limb, with minimal loss of function and quick return to their occupation and pre-fracture activity level. ORIF is not without its complications. Hardware-related complications like prominent implants and wound complications are commonly reported. Intra-operative complications like injury to subclavian vessels and brachial plexus have also been reported^[9].

The goal of this study was to determine the satisfaction of patients in terms of their ability to perform activities of daily living and to return to their occupation, in spite of the known complications of the surgery.

We found that patients reported satisfactory outcomes in most cases (88%) and had no limitation in resuming their respective occupations. It was found that the hardware-related complications in our study (12%) corresponded with those reported in literature^[9]. The functional outcome of patients was also found to be excellent by the oxford shoulder score, with only one patient having some difficulty in lifting objects overhead. We had no cases of non-union following surgery and we did not encounter any major complications like neural or vascular damage, wound dehiscence or implant breakage in our study.

Conclusion

Treatment of midshaft clavicle fractures with ORIF shows a high patient satisfaction rate and is associated with return to pre-fracture functional levels in terms of activities of daily living and occupation. However, our study did not have a control group and the follow up period was short; hence we cannot comment about the late complications.

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