2023 Congress Abstracts: Shoulder Fractures

Category: Shoulder - Fractures

Arthroscopically Assisted Coracoclavicular (CC) Stabilization Using a Suture Button Device for Lateral Clavicle Fracture with CC Ligament Injury

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All Authors:
Yoshimasa Saigo MD JAPAN
Daichi Morikawa MD, PhD JAPAN
Hirohisa Uehara MD JAPAN
Yoshiaki Itoigawa MD, PhD JAPAN
Takayuki Kawasaki JAPAN
Muneaki Ishijima MD, PhD JAPAN

Summary:
Arthroscopically assisted coracoclavicular (CC) stabilization using a suture button device for lateral clavicle fracture with CC ligament injury founded satisfactory radiologic and clinical outcomes with low risk of implant irritation.

Data:
Background: The treatment for lateral clavicle fracture is still controversial, especially with coracoclavicular (CC) ligament injury. Various fixation techniques including, a pre-contoured plate, a hook plate, K-wire fixation and coracoclavicular (CC) stabilization, has been proposed to manage lateral clavicle fracture. We performed arthroscopically assisted CC stabilization using a suture button device for lateral clavicle fracture with CC ligament injury in order to achieve vertical stability of the central clavicle fragment and decrease the risk of implant irritation and removal. The purpose of this study was to evaluate the radiologic and clinical outcomes of arthroscopically assisted CC stabilization using a suture button device for lateral clavicle fracture with CC ligament injury.

Methods: Five consecutive patients with lateral clavicle fracture with CC ligament injury were treated with arthroscopically assisted CC stabilization using the suture button device. (Dog bone button and FiberTape, Arthrex, Naples, FL, USA). The mean follow-up period was 10 months (range, 6-12 months). Radiologic analysis was performed to evaluate bone union and the existence of CC ligament ossification using serial plain radiographs at 3 and 6 months after operation. Post-operative range of motion (ROM) was evaluated at 3 and 6 months after operation. Shoulder functional score was evaluated using Japanese Orthopedics Association score (JOA score) at 6 months after operation. Results: Mean operation time and amount of bleeding were 75.8 ± 8.2 min and 20.2 ± 10.8 ml. There were no perioperative complications, including surgical site infection, nerve injury, and fractures of coracoid and clavicle. All cases showed complete bony union (2 cases at 3 months and 5 cases at 6 months after operation). Mean postoperative ROMs at 3 and 6 months after operation were 140.0 ± 21.0 and 162.0 ± 17.2 in anterior elevation, 49.0 ± 15.0 and 64.0 ± 8.0 in external rotation, and 11.0 ± 4.0 and Th11 ± 4.0 in internal rotation. Mean JOA score was 98.0 ± 3.1 at 6 months after operation. No case showed implant irritation and needed for implant removal. Conclusion: Arthroscopically assisted CC stabilization using a suture button device for lateral clavicle fracture with CC ligament injury founded satisfactory radiologic and clinical outcomes. The major advantages of this technique are high rate of bone union and low rate of complications including implant irritation.

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Dual Plate Fixation Of Midshaft Clavicle Fractures May Reduce Reoperation Rates Compared To Single Plating With Anterior Or Superior Fixation Techniques

Abstract ID# 22294
All Authors:
Rajiv Pabbati Reddy BS UNITED STATES
Shaquelle Charles Msc UNITED STATES
Stephen Ryan Chen MD UNITED STATES
Peter N Mittwede MD UNITED STATES
Ajinjka Rai BS UNITED STATES
Matthew Como BS UNITED STATES
Gele B. Moloney MD UNITED STATES
Soheil Sahzevari MD UNITED STATES
Albert Lin MD UNITED STATES

Summary:
Dual plate fixation has been proposed as a solution to the high rates of reoperation secondary to operative management of displaced midshaft clavicle fractures. Previous studies have recommended dual plating for patients specifically at higher risk of reoperation. Therefore, the purpose of this study was to compare reoperation rates among patients who underwent single superior, single anterior, and dual plating while adjusting for risk factors including age, smoking status, and high-risk fracture morphology. We hypothesized lower rates of reoperation among patients who underwent dual plate fixation. Methods: This was a retrospective cohort study of all patients who presented with a midshaft clavicle fracture and underwent ORIF between 2007 and 2021 to our trauma/sports divisions. Patient demographics, fracture pattern, plating technique, postoperative complications, date of surgery, reoperation status, date of last follow up, and date of reoperation were documented. We report hazard ratio (HR) estimates using a multivariate multilevel mixed-effects parametric survival model, which accounted for patients with multiple reoperations and adjusted for covariates. Results: A cohort of 395 patients (mean age 38.5±14.4 years, 81.7% male) were identified with average follow-up of 5.5±8.6 months. There were 77 x-type, 157 transverse, and 161 oblique fractures. With regards to plating technique, 152 underwent single superior plating, 149 experienced single anterior plating, and 94 had dual plating. After initial operation, there were 8 total instances of non-union (2.0%), 0 in the dual plating cohort (0%), 4 in the superior plating cohort (2.6%), and 4 in the anterior plating cohort (2.7%) (p=0.35). A total of 28 reoperations took place among 19 patients (4.8%), with 6 patients experiencing multiple reoperations. Single plating with superior placement revealed the highest reoperation rate of 0.26 per person-years, followed by anterior placement with 0.17 per person-years, and finally dual plating with 0.02 per person-years (Figure 1). Patients who underwent single plating (either anterior or superior placement) revealed a greater rate of reoperation when compared to patients who underwent dual plating (HR: 8.3, p=0.045). Patients who underwent single plating with superior placement had a rate of reoperation ten-times greater than patients who underwent dual plating (HR:10.1, p=0.03). Patients who underwent single plating with anterior placement had a rate of reoperation six-times greater than patients who underwent dual plating (HR: 6.4, p=0.09), although not statistically significant. Conclusion: Dual plate fixation of displaced midshaft clavicle fractures has an eight-fold lower risk of reoperation compared to single plate fixation, while accounting for age, smoking, and high-risk fracture morphology. More specifically, dual plating had lower rates of
reoperation than both single plating with anterior and superior placement. Therefore, when operative management is indicated for a midshaft clavicle fracture, dual plating may be an excellent treatment alternative in patients at high risk for reoperation.

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Skin Tenting Associated with Completely Displaced Midshaft Clavicle Fractures in Adolescents: Results from the FACTS Multi-Center Prospective Cohort Study

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All Authors:
Ben E. Heyworth MD UNITED STATES
Eric William Edmonds MD
Philip L. Wilson MD UNITED STATES
Donald Bae MD UNITED STATES
Andrew Pennock UNITED STATES
Ying Li MD UNITED STATES
Henry B. Ellis MD UNITED STATES
Jeffrey J. Nepple MD UNITED STATES
David D Spence MD
Cliff Willimon MD UNITED STATES
Crystal A. Perkins MD UNITED STATES
Nirav Pandya UNITED STATES

Summary:
In this prospective multi-center study, the 12% of adolescent clavicle fracture patients with skin tenting, showed no differences in complications, PROs, or RTS with sling vs. ORIF, suggesting that early fracture settling, enhanced healing capacity, and bony remodeling in adolescents yield equivalent outcomes following non-operative treatment and close early observation.

Data:
Introduction: Skin tenting is a commonly applied relative indication for operative treatment of clavicle fractures. However, the influence of this injury feature and optimal treatment for adolescent patients with skin tenting has been minimally investigated. This study therefore sought to evaluate the outcomes of non-operatively and operatively treated clavicle fractures associated with skin tenting in adolescents. Methods: 10-18 year-old patients with completely displaced midshaft clavicle fractures who received non-operative or operative treatment at eight participating institutions from 2013-2022 were screened for two categories of skin tenting at initial presentation: (1) ‘skin tenting’ or (2) ‘skin-at-risk for necrosis’ (tented, white, hypo-vascular). Demographics, fracture characteristics, and treatment were recorded, and patients were followed for a minimum of one year. Return to sport (RTS) time, validated patient-reported outcomes (PROs: ASES, Quick DASH, Marx shoulder activity, EQ-VAS), and complications were analyzed. Results: 92 of 768 (12%) prospectively enrolled adolescents with completely displaced midshaft clavicle fractures were reported with skin tenting (of either category) and demonstrated greater age, comminution, shortening, and superior displacement, when compared to patients without tenting (Table 1). Of those with tenting, 32 (35%) were treated non-operatively (Non-Op), while 60 (65%) underwent open reduction and internal fixation (ORIF) (Table 2). Three Non-Op patients (9%) converted to ORIF treatment at a mean of 20 days (range, 6-41 days) post-injury, due to increased symptoms or clinical concern. While Non-Op patients were, on average, less than one year younger than ORIF patients (Non-Op 14.5 years; ORIF 15.4 years, p=0.02), there were otherwise no significant differences between treatment cohort characteristics, including sex (p=0.13), shortening (p=0.10), superior displacement (p=0.06), and comminution (p=0.20). The majority of patients provided PROs at 1 or 2 years post-treatment (64%), with no differences in response rates, RTS, PROs, or complications between treatment cohorts (RTS: p=0.70, ASES: p=0.16, Quick DASH: p=0.07, Marx: p=0.26, EQ-VAS: p=0.68, complications: p=0.99). Conclusion: In this prospective multi-center cohort study, 12% of adolescent clavicle fracture patients demonstrated skin tenting, but showed no differences in complications, PROs, or RTS, whether treated non-operatively or operatively. 9% of patients initially treated non-operatively converted to operative treatment, but had comparable outcomes to both overall treatment cohorts. These data suggest that early fracture settling, enhanced healing capacity, and bony remodeling potential unique to younger patients may allow for tolerance of skin tenting without adverse effects when non-operative treatment and close early observation are pursued.