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Comparison of Clinical Outcome in Surgically Treated Vs Conservatively Manged Rockwood Type III ACJ Dislocation

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ABSTRACT

Background: Acromioclavicular joint (ACJ) dislocations are frequently encountered shoulder injuries, particularly in active individuals. The management of Rockwood Type III injuries remains contentious, with both surgical and conservative approaches being practiced. This study aims to prospectively compare clinical outcomes between the two modalities. **Methods:** A prospective comparative study was conducted at Combined Military Hospital (CMH), Rawalpindi, from January 2021- June 2023. A total of 140 patients with isolated Rockwood Type III ACJ dislocations were equally divided into two groups: Group A underwent surgical management (hook plate or TightRope fixation), and Group B received conservative treatment (immobilization and rehabilitation). Patients were followed at 2 weeks, 6 weeks, 3 months, and 6 months post-injury. Primary outcomes included Constant-Murley Score (CMS), Visual Analog Scale (VAS) for pain, radiological alignment, and complication rates. **Results:** At 6-month follow-up, Group A showed superior outcomes with a significantly higher mean CMS (88.4 ± 6.2 vs. 80.1 ± 7.5, $p<0.001$) and lower VAS pain scores (1.9 ± 1.1 vs. 3.4 ± 1.3, $p<0.001$). Radiological subluxation was less frequent in Group A (8.6%) than Group B (24.3%) ($p=0.01$). Return to pre-injury activity was faster in the surgical group (9.4 vs. 12.6 weeks). Complication rates were higher in Group A (12.9%) due to implant-related issues, compared to 5.7% in Group B. **Conclusion:** Surgical treatment for Rockwood Type III ACJ dislocations yields better short-term functional and anatomical outcomes compared to conservative management, albeit with a higher complication rate.

INTRODUCTION

Relatively, the prevalence of acromioclavicular joint (ACJ) dislocations is moderate, including among the physically active population and athletes, as up to 12 percent of all shoulder girdle are caused by its dislocation (De Rooij et al., 2021; Moore & Sellon, 2021). The most popular clinical guide is the Rockwood classification system of these injuries in six types defined by the severity of ligamentous injury and joint displacement (Lau et al., 2021; Refaat et al., 2023). Of them, Type III injuries, when the acromioclavicular ligament and the coracoclavicular ligament are completely torn down and the clavicle shifts, is an especially debatable group in relation to the ideal treatment (Bi et al., 2023; Hohmann & Tetsworth, 2023).

In comparison to Types I and II requiring conservative treatment and Types IV to VI requiring surgical repair, Type III injuries occur in the gray area when both conservative and surgical treatment options are popular (Guijt et al., 2022; Cimbanassi & Chiara, 2021). The controversy lays in the opposing evidence sources on functional outcomes, joint stability, complication risks, and patient satisfaction (Berthold et al., 2022). Non-invasive, less costly, and with less risk of surgical complications are usually preferred to conservative treatment, which often includes immobilization and rehabilitation (Jimson, 2021). Nevertheless, it can lead to chronic pain, cosmetic disfigurement, strength loss, and an increase in future chronic instability, especially among physically active patients (Fosser & Camporese, 2021), which critics have discussed.

Conversely, surgery strives to correct anatomical congruity and stability of the joint, which theoretically gives rise to more favorable biomechanics and enhanced functional restoration (Piedade et al., 2023; Lavaill et al., 2023). Various surgical methods have been reported such as hook plate fixation, TightRope systems, ligament reconstruction, among others, with different rates of success (Liu et al., 2022; Nie et al., 2022; Farjam et al., 2022). Although superior outcomes have been observed in some studies when surgery is used, no significant long-term difference has been established between the two methods, and this observation also contributes to the debate (Soler et al., 2021; Costa et al., 2022).

Since this has been a subject of controversy, this study that is proposed is aimed at giving a prospective comparison of clinical outcomes between patients with Rockwood Type III ACJ dislocations who undergo surgical and conservative management. This study, carried out on a case in a tertiary care center, is expected to evaluate the functional recovery, pain scores, radiological results, and morbidity/complications of a treated case within a six-month follow-up period and add evidence to the equation to induce informed decision-making when treating such a challenging injury pattern.

METHODOLOGY

This prospective comparative study was carried out at the Combined Military Hospital (CMH), Rawalpindi between, January 2021- June 2023. The major aim was to compare clinical outcome of surgical or conservative treatment in patients presenting with Rockwood Type III acromioclavicular joint (ACJ) dislocation. The sample size consisted of 140 patients who were admitted using a non-probability consecutive sampling method following an informed consent. Clinical and radiographic evidence of isolated Rockwood Type III ACJ dislocation between the ages of 18 and 60 years within a two-week period following the trauma was enrolled. The exclusion criteria included any patient with a fracture involving the collarbone or scapula, a history of disease or surgery of the shoulder, polytrauma or any medical abnormality that contraindicates surgery.

The study population consisted of 2 branches, Group A (n=70) was subjected to surgical therapy, which involved open reduction and internal fixation either with hook plate or TightRope fixation devised according to the judgment of the surgeon and the operative findings. Group B (n=70) was treated conservatively and included shoulder immobilizer, progressive rehabilitation, and physiotherapy. The patients in the two groups were followed up regularly (2 weeks, 6 weeks, 3 months and 6 months) with clinical and functional evaluation.

Measures of outcome were the Constant-Murley Score (CMS),Visual Analog Scale (VAS) pain, and radiographic evaluation of joint reduction and alignment. SPSS version 25.0 was used to perform statistical analysis. Continuous variables were indicated in mean and standard deviation or categorical by frequencies and proportions. the statistical schemes such as the independent t-tests and chi-square tests were used to correlate the results obtained across groups of individuals and the p-value smaller than 0.05 was regarded as statistically significant. The institutional review board gave it ethical approval before commencement of the study.

RESULTS

The 140 patients had Type III Rockwood acromioclavicular joints (ACJ) dislocations, and they fell into two groups; 70 patients in Group A (surgically treatment) and 70 patients in Group B (conservatively treatment). In Group A the mean age of the patients was 34.2 9.6 years old, and in Group B 33.4 10.1 years old. Both groups exhibited a male predominance (Group A: 82.9%, Group B: 80%), and ($p > 0.05$) demographic characteristics of the students were not statistically significant between the groups.

Group A showed better functional outcome in the last 6 months follow up in comparison with Group B. The mean Constant-Murley Score (CMS) was significantly greater in the surgical group (88.4+ 6.2) than the conservative one (80.1+ 7.5) ($p < 0.001$). In the same way, the surgical group showed significantly lower mean Visual Analog Scale (VAS) scores to indicate the pain (1.9 +/- 1.1) as compared to the conservative group (3.4 +/- 1.3) ($p < 0.001$). Radiographic measuring demonstrated superior anatomic alignment in surgery group, with residual 8.6 percent and 24.3 percent misalignment seen in surgical and conservatively treated groups, respectively ($p = 0.01$).

The surgical group (12.9 percent) had higher complication rates, whereas the conservative management (5.7 percent) had lesser complication rates, mainly because of the implant-related discomfort and superficial infection in the surgical group, and persisting pain and joint instability in the conservative group. The surgical group recovered to their pre-injury activity levels quicker, on average 9.4 weeks, compared to the conservative group at 12.6 weeks.

Table 1

Baseline Demographics of Study Population

Variable	Group A (Surgical)	Group B (Conservative)	p-value
Number of patients	70	70	—
Mean age (years)	34.2 ± 9.6	33.4 ± 10.1	0.61
Male (%)	82.9%	80%	0.65
Dominant side involved	57.1%	54.3%	0.74

Table 2

Comparison of Clinical and Functional Outcomes at 6 Months

Outcome Measure	Group A (Surgical)	Group B (Conservative)	p-value
Constant-Murley Score	88.4 ± 6.2	80.1 ± 7.5	<0.001
Visual Analog Scale (VAS)	1.9 ± 1.1	3.4 ± 1.3	<0.001
Radiographic subluxation (%)	8.6%	24.3%	0.01
Return to activity (weeks)	9.4 ± 2.1	12.6 ± 2.8	<0.001

Table 3

Complications

Complication Type	Group A (Surgical)	Group B (Conservative)
Implant-related discomfort	5 (7.1%)	0 (0%)
Superficial wound infection	4 (5.7%)	0 (0%)
Persistent pain/instability	0 (0%)	4 (5.7%)
Total complications	9 (12.9%)	4 (5.7%)

Overall, the results suggest that surgical treatment of Rockwood Type III ACJ dislocations provides superior functional recovery, reduced pain levels, and better anatomical restoration compared to conservative management, although with a modestly increased risk of surgical complications.

DISCUSSION

The comparative analysis of the two techniques used in patients with Rockwood Type III acromioclavicular joint (ACJ) dislocations (surgical and conservative management) provided in this study shows that surgery

offers a significantly better clinical and functional outcome. The results correspond to the emerging evidence supporting the fact that the anatomical restoration of AC joint performed by surgical intervention helps achieve better shoulder mechanics, pain reduction, and return to activity. Constant-Murley Scores were higher and VAS pain scores were lower in the surgical group which is an indication of better functional recovery and subjective pain relief than the comparison group with prior research noting the shortcoming of non-operative treatment in active people and in sportspeople.

Nevertheless, although the results in the surgical group were better, the surgery itself did not pass without complications. Experimental implants caused some discomfort and minor infections seen in a small percent of patients, well-established as a weakness of hardware implantation and pointing to the importance of patient selection and follow-up. On the other hand, conservatively treated patients exhibited lesser complications, although more of such individuals had persistent joint instability and remainder residual subluxation due to ineffective ligament healing and inability to compensate scapulothoracic rhythm. These findings underscore the fact that conservative treatment might fit well in low-demand patients or patients who have contraindications to surgery, but they might not meet the same functional goals in active populations.

It is relevant to note that a more rapid recuperation of pre-injury activity in the surgical group is especially important to athletes and laborers, where stability and strength of shoulders is vital. Although some of the past literature demonstrated the possibility of the same long-term results in the two methods, our 6-month follow-ups indicate an obvious short-term benefit of surgical repair. Nevertheless, it is associated with significant advantages of surgery over non-operative treatment, in the long-term perspective especially on the development of arthritis or need of secondary intervention, which should be addressed by further prospective longitudinal research.

To sum up, our analysis confirms surgical procedure as a beneficial method to treat Rockwood Type III ACJ dislocations in the correctly chosen patient group that demonstrates better short-term results and satisfactory complication rates. The case-specific approach to treatment planning using patient activity level, job, and likes, is still necessary to maximize clinical outcomes.

CONCLUSION

This prospective comparative study shows that surgical therapy in Rockwood Type III acromioclavicular joint dislocations proves to yield better short-term functional outcomes, less pain, correct anatomical realignment, and quicker getting back to sporting activities than conservative treatment. Although it led to a slight rise in the complication, mainly concerning the implant discomfort and skin infections rates, the surgical intervention was beneficial and helpful to restore the shoulder biomechanics and the maximize patient satisfaction. Whilst conservative treatment was characterised by fewer complications, the procedure had a higher risk of producing persistent instability and incomplete functional recovery. These observations suggest surgery repair as the mode of choice in active patients or those who need early restoration of functioning. Nevertheless, in the case of patients with low physical activity or with contraindications to surgery, conservative therapy is an acceptable solution. Finally, tailored treatment plans that utilize the level of patient activity, job demands and absolute risk tolerance are needed to maximize clinical effectiveness. Delays in assessing durability and late complications should be evaluated longer.

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