An Evaluation on Operative versus Non-Operative Management of Displaced Mid-Clavicle Fracture

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Introduction
Minimally or non-displaced mid-clavicle fractures can be managed conservatively. For displaced mid-clavicle fractures, previous studies showed open surgery resulted in higher union rate, shorter union time and better early functions. In contrast, other studies showed operative group having significant surgical complications and reoperation rate, yet the long-term functions were similar.

Objectives
To evaluate the results of operative and non-operative management of displaced mid-clavicle fracture, in terms of non-union, complication rate and functional outcomes.

Methodology
Adults aged below 60, who sustained fully displaced mid-clavicle fracture according to Robinson classification (2B1/2B2), were included in this cohort non-randomized controlled study. Decision for operation was based on a shared decision-making process, in which benefits and risks of surgery were discussed. Informed consent was obtained for either group. All patients then underwent physiotherapy with similar rehabilitation protocols with passive/active mobilization and strengthening exercises. Non-union and complication rates were monitored by the orthopaedic surgeon, while functional outcomes were assessed by physiotherapists at weeks 2, 4, 8, 12, 16 and 24. The assessment included range of motion of the injured shoulder, Disabilities of Arm, Shoulder and Hand (DASH) Score and Constant Score, a composite score of shoulder impairments and functions. Patients who were uncooperative, having
associated neurovascular injury, impending skin penetration, multiple trauma, concomitant upper limb injuries, previous shoulder fractures or pathological fracture, were excluded.

**Result**

Nine cases were included. Six (5 male, 1 female) with mean age of 36.5 (range: 20-44) underwent surgery while the rest (all male) with mean age of 38 (range: 25-53) did not. Three patients dropped out at week 24 due to job engagement, loss of contact or having an elective surgery for another upper limb condition respectively. No case required surgery due to non-union. No serious complication was observed, except one operative case required removal of implant due to impingement. Both groups showed similar satisfactory functional outcomes from week 16 onwards. Statistically significant better outcomes (Mann-Whitney U Test, p<0.05) were only demonstrated in the operative group in the first month: shoulder flexion range (mean difference = 61°) at week 2, shoulder flexion and abduction ranges (mean difference = 52°, 58°) at week 4 and Constant Score (mean difference = 21) at week 2. The superiority in the operative group faded out since week 8. These results gave rise to an insight of possibility of minimizing surgeries for cases of displaced mid-clavicle fractures.