

# **Cow Hitch Suture Cerclage for Fixation of the Greater Tuberosity in Fracture Reverse Total Shoulder Arthroplasty in Elderly Patients with a Minimum Follow Up of 2 Years: A Case-Control Study**

Flamur Zendeli<sup>1</sup>, Samy Bouaicha<sup>2</sup>, Karl Wieser<sup>3</sup>, Florian Grubhofer<sup>4</sup>

<sup>1</sup>Orthopedic Surgery, University Hospital Balgrist Zürich, <sup>2</sup>Balgrist University Hospital Zurich, <sup>3</sup>Balgrist University Hospital, <sup>4</sup>University Hospital Balgrist

## **INTRODUCTION:**

Reverse total shoulder arthroplasty (RTSA) is a well-established treatment option for complex proximal humerus fractures in elderly patients. A crucial factor for successful outcomes is the healing of the greater tuberosity (GT). The purpose of this study was to compare the outcomes of patients receiving the GT refixation with the so-called "cow hitch"(CH) cerclage fixation with that of the recommended standard suture cerclage technique with a minimum follow up of 2 years.

## **METHODS:**

Twenty shoulders in 20 patients with a mean age of 71 years underwent the GT refixation with the cow hitch cerclage fixation after complex proximal humerus fracture between January 2017 and January 2021. They were radiographically and clinically analyzed after a mean follow-up period of 37 months (range, 24-61 months). We compared them with a control group of 52 shoulders in 51 patients with a mean age of 77 years who were treated with the recommended standard suture cerclage technique after complex proximal humerus fracture between October 2005 and October 2013 with a mean follow up of 35 months (range, 24-90 months). The primary outcome measure was the radiological assessment at the final follow up to determine the rate of greater tuberosity healing. Secondary outcome measure included the Constant-Murley score (CS), subjective shoulder value (SSV), and range-of-motion (ROM) assessment.

## **RESULTS:**

The radiographic findings revealed a 96% healing rate of the GT in the cow hitch cerclage fixation group compared to 75% healing rate of the GT in the control group ( $p=0.16$ ). At final follow up, patients treated with the cow hitch cerclage fixation had significantly superior Constant scores than the control group (mean CS 68 (range, 30-81) vs. mean CS 62 (range, 21-83) ( $p=0.04$ )). The SSV was comparable between the two groups (mean SSV CH 86% (range, 50-100%), control group 83% (range, 30-100%) ( $p=1$ )). In terms of postoperative ROM, the cow hitch group was significantly better in terms of external rotation compared with the control group (mean 31° (range, -10-60°) vs. mean 18° (range, 0-65°) ( $p=0.008$ )). The flexion and abduction were better in the cow hitch group but with no significant difference (mean flexion CH 123° (range, 80-155°), control group 118° (range, 40-165°) ( $p=0.87$ ); mean abduction CH 131° (range, 65-170°), control group 111° (range, 40-165°) ( $p=0.06$ )).

## **DISCUSSION AND CONCLUSION:**

In patients with complex proximal humerus fractures undergoing reverse total shoulder arthroplasty, the use of cow hitch suture cerclage refixation for greater tuberosity showed better healing rate of the GT and clinical outcomes, as indicated by significantly higher Constant scores and external rotation. These findings indicate that the cow hitch cerclage fixation technique may offer benefits in terms of clinical outcomes and range of motion when compared to the single suture cerclage technique, suggesting a potential for enhanced healing of the greater tuberosity.