Midshaft Clavicle Fractures: The Saga Continues

Commentary on articles by Marcel Jun Sugawara Tamaoki, MD, PhD, et al.: “Treatment of Displaced Midshaft Clavicle Fractures: Figure-of-Eight Harness Versus Anterior Plate Osteosynthesis. A Randomized Controlled Trial” and E.B. Goudie, MRCSEd, et al.: “The Influence of Shortening on Clinical Outcome in Healed Displaced Midshaft Clavicular Fractures After Nonoperative Treatment”

Brian K. Lee, MD, and John M. Itamura, MD

A landmark article by Hill et al., which was published in 1997, shed new light on shoulder function after nonoperative treatment of displaced midshaft clavicle fractures. The traditionally held belief that these fractures could generally be treated nonoperatively was brought into question, and the controversy over the optimal treatment has continued over recent years.

When the decision to treat a displaced clavicle shaft fracture nonoperatively is made, one can expect the fracture to result in nonunion or malunion. Goudie et al. present the results of nonoperative treatment of patients with midshaft clavicle fractures that went on to malunion. A major strength of their investigation is the use of 3-dimensional computed tomography (3DCT) to gain a more accurate measurement of absolute shortening and proportional shortening. While they found no difference between patients with final shortening of >2 cm or ≤2 cm, the authors point out the relatively low sample size (5 patients with >2 cm of shortening) for this particular cohort and the overall low prevalence of that degree of shortening in malunions. Indeed, in the aforementioned study by Hill et al., no patient with ≥2 cm of shortening went on to have union.

Goudie et al. clearly state that their findings excluded all patients who went on to nonunion, which has been consistently shown to be a factor for a poor outcome. The conclusions of their study should therefore be interpreted carefully. The shortening in a malunion as studied in the present investigation may be well tolerated, while initial shortening at the time of injury should still be seen as a substantial risk factor for nonunion.

Tamaoki et al. aimed to compare the results of operatively treated clavicle fractures using an anterior plate and nonoperatively treated fractures managed with a figure-of-eight brace. The patients were randomized to treatment, and although 19 (16%) of 117 eligible patients were lost to follow-up, the study met exactly the required number of patients according to their power analysis. Interestingly, their study population comprised mostly male patients (89%), although the disparity was not significant. A single anteroposterior radiograph including both clavicles was used to quantify shortening. The authors found no difference between the groups with respect to the Disabilities of the Arm, Shoulder and Hand or visual analog scale scores, and they observed a lower rate of hardware removal for symptoms related to the use of anterior plates compared with published data on superiorly positioned plates. Unfortunately, patients with nonunion or malunion were not specifically studied with regard to outcome.

While both studies describe careful measurement of radiographs, and the use of 3DCT scans in the study by Goudie et al., they both allude to our current inability to reliably measure clavicular position. Radiographs, although more practical in general practice, are less precise than CT in measuring true shortening. Furthermore, malrotation is an important variable that was not measured in either study. Ristevski et al. recently examined the position of the scapula with 3DCT in patients with scapular winging after clavicle malunion. The scapula can be expected to rotate anteriorly, medially, and internally as a result of its connection to the distal or lateral clavicle fragment. Such winging may result in diminished mechanical advantage of the shoulder as well as shoulder dysfunction and may be a confounding factor when outcomes of shortening in clavicle fractures are compared.

These 2 well-designed studies provide further valuable insight into the ongoing debate on the optimal treatment of displaced clavicle shaft fractures. Their results largely support what has been shown in the literature previously—that is, nonunion rates following nonoperative management were 15% and 17%, and plate fixation was found to be a safe treatment option with a very high rate of union.

In light of previous studies demonstrating poor results for clavicle shaft fractures with ≥2 cm of shortening, a surgeon may have recommended surgical management of a shortened malunion. The study by Goudie et al. provides a well-designed investigation that allows us to better counsel that cohort of patients. Future studies, particularly those examining the position of the scapula following clavicle fractures, are necessary to help us identify which patients would most benefit from operative intervention in the setting of an acute fracture.
Disclosure: The authors indicated that no external funding was received for any aspect of this work. On the Disclosure of Potential Conflicts of Interest forms, which are provided with the online version of the article, one or more of the authors checked "yes" to indicate that the author had a relevant financial relationship in the biomedical arena outside the submitted work (http://links.lww.com/JBJS/E273).

References