Surgical treatment of scapula fractures yields excellent results

By Maureen Leahy

**Study suggests ORIF yields predictably good functional outcomes**

Fractures of the scapular body and neck are traditionally treated nonsurgically with good results. A subset of these fractures, however, respond poorly to nonsurgical treatment, suggesting that some patients may benefit from open reduction and internal fixation (ORIF).

A prospective study examining clinical and functional outcomes after ORIF of scapular body and neck fractures found that surgery for extra-articular fractures of the scapula is associated with excellent functional results and an acceptable complication rate.

Conducted by researchers from the University of Minnesota, the results of "Surgical and Functional Outcomes after Operative Management of Extra-Articular Glenoid Neck and Scapula Body Fractures" were presented by Erich M. Gauger, MD, at the 2010 annual meeting of the Orthopaedic Trauma Association.

**Single cohort**

The patient cohort comprised 131 patients who were enrolled in a prospective scapula database and surgically treated for a scapular fracture between July 2002 and October 2009. Of these patients, 72 (82 percent male; average age: 45 years) met this study's inclusion criteria (surgery performed less than 1 month from date of injury; no process fractures or fractures with intra-articular involvement).

In all cases, fractures were caused by high-energy trauma; 61 fractures were of the scapular body (64 percent comminuted) and 11 were extra-articular glenoid neck fractures (91 percent comminuted). Participating patients had a 96 percent rate of associated injury, most commonly rib or clavicle fractures. Only three patients had an isolated scapula fracture.

Researchers used two- and three-dimensional (3-D) computed tomography (CT) scans and 3-D reconstructions to measure deformity and to determine which patients were candidates for surgery. Indications for surgical treatment included the following:

- **medial/lateral (M/L) displacement of the glenohumeral joint greater than 20 mm**
- **angular deformity in the scapular plane greater than 45 degrees**
- **a combination of angulation greater than 30 degrees plus M/L displacement greater than 15 mm**
- **glenopolar angle (GPA) less than 22 degrees**
- **double disruptions of the superior shoulder suspensory complex displaced greater than 10 mm**
- **open fractures**
- **M/L displacement was the most common surgical indication, and 25 patients met two or more of the indications.**

"The fractures were all highly displaced with a large amount of M/L displacement, angulation, and low GPA," said Dr. Gauger, a resident at the University of Minnesota. "Just having a floating shoulder was not reason enough for surgery; 17 of the 27 patients who had a floating shoulder lesion met the surgical criteria for a displaced double lesion of the superior shoulder suspensory complex."

Surgery on all patients was performed using the posterior approach, most commonly with the Judet incision and utilization of the intermuscular interval between the infraspinatus and teres minor or creation of a muscular flap (Fig. 1).

"More recently, a less-invasive surgery, with strategic incisions placed along the scapular borders for fixation at those points, has been used," Dr. Gauger said.

Good functional outcomes

At mean follow-up of 24 months (range: 6 to 70 months), all fractures demonstrated clinical and radiographic union. Malunion was determined using the following four parameters:

- **M/L displacement greater than 0.5 cm on the anteroposterior radiograph**
- **translation greater than 0.5 cm on the scapula-Y radiograph**
- **angular deformity on the scapula-Y radiograph**
- **a GPA greater than or equal to 10 degrees different from preoperative measures of the uninjured shoulder**

Strength, range of motion (ROM), and Disabilities of the Arm, Shoulder, and Hand (DASH) and Short Form 36 (SF-36) functional outcomes scores were obtained from 82 percent of the patients. At follow-up, nominal differences were found in the surgically treated shoulder versus the uninjured shoulder for both ROM and strength. The mean DASH score at follow-up was 14.1 (range: 0 to 58), which was well within the standard deviation of 14.68 for the normative mean of 10.1, noted Dr. Gauger. The patients’ mean scores for all SF-36 parameters were comparable to those of the normal population.

Complications included hardware removal in five patients, manipulation under anesthesia for shoulder stiffness in three patients, immediate postoperative exchange of intra-articular screws in two patients, and repeat ORIF of one clavicle nonunion.

Dr. Gauger noted that although the study involved the largest series of surgically treated scapular body and neck fractures and the largest series of any type of scapular fracture with significant patient follow-up, it had no nonsurgical or comparative cohort.

“Therefore,” he said, “we cannot definitively state which fractures should be treated surgically, only that highly displaced scapula fractures can be treated surgically with predictably good functional outcomes and acceptable complication rates.”

Dr. Gauger’s coauthor is Peter A. Cole, MD.

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**Bottom Line**

- Surgical indications for scapular fractures of the body and neck are not clearly defined.
- A certain subset of patients with these fractures may benefit from ORIF.
- Extra-articular fractures of the scapula can be treated surgically with predictably good functional outcomes and an acceptable complication rate.