Changes in Treatment of Collar Bone Fractures

After 40 years of treating fractures of the collar bone (clavicle) with a sling or harness, there's evidence that a different treatment approach works better. Surgery may be needed, especially when the fracture is displaced. With a displaced fracture of the midshaft, the two ends of the bone are separated and no longer line up properly. The result can be malunion, continued pain, and loss of function.

In this report on clavicular fractures, surgeons from Tulane University in New Orleans review the various surgical options available and when to use them. Surgeons will find this information helpful given the rise in number of clavicular fractures in the last 10 years. Falls in older adults and high-impact sporting injuries (skiers, snowboarders) in young patients make this one of the most common shoulder injuries.

What does the research show about why surgery is needed, when surgery is required, and which procedure to use? First, the why of surgery. Comparing patients over time who were treated conservatively with a sling or figure-eight harness versus those who had surgery to repair the fracture, they found malunion was a major problem in the conservative care group. With a malunion, the fracture heals but the bone isn't lined up properly.

As many as 25 per cent never achieved healing and developed additional problems such as injury to the nerves and blood vessels, refracture, and arthritis. Injury to the nerves and blood vessels caused paralysis and loss of motor function (nerve damage) and blood pooling in the tissues (blood vessel injury). Patients were not satisfied with the results of nonoperative treatment.

When is surgery indicated? When there is 100 per cent displacement along the middle of the clavicle. That means the two ends of the bone are so far apart vertically (up and down direction) that even if the ends were brought back together, they wouldn't meet or touch. In some cases, the two ends of the bone overlap (one on top of the other). Severe shortening caused by this type of displacement requires surgery to restore the natural length of the bone needed for normal shoulder function.

There are two types of surgical procedures being used and investigated. These are plate osteosynthesis and intramedullary nailing. Let's take a look at what we know about each one. Plate osteosynthesis refers to the use of a metal plate screwed in place along the front (anterior) portion of the clavicle.

Surgeons used to put the plate along the top of the clavicle but it stuck up too much and irritated the skin. There is also less risk of damaging nerves and blood vessels in the area when the plate is placed anteriorly. There are times when even anterior plating isn't successful but for the most part, reports show high rates of

healing without complications.

Older adults seem to do better when the surgeon uses a locking plate. That's especially true when there is thinning or weakening of the bone. There is less chance the plate will come loose. There are fewer reports of revision surgery needed when locking plates are used with patients 60 years old and older.

Most of the time, the plates used are left in (for all age groups). If it's bothering the patient for any reason, the surgeon can remove the hardware once the fracture is completely healed. But the surgery is considered elective meaning it's the patient's choice, not the surgeon's recommendation. The hardware could just as easily stay in place with no reason to remove it.

A second type of surgery done for displaced mid-shaft clavicular fractures is the use of intramedullary nail fixation. Just as the name implies, a long but flexible fixation device that looks like a nail is inserted inside the bone. That avoids the problems of sticking up and rubbing on soft tissue structures or poking into nerves or blood vessels.

It's a bit less invasive, too because a small incision can be made and the nail slid under the skin then guided inside the two ends of the bone. But there can be problems with intramedullary nail fixation. It can move or migrate and since it isn't as strong as the armor of a plate, nonunion occurs more often.

Intramedullary nail fixation is good for simple fractures, especially those without tiny bone fragments. If the bones are overlapping and there are many pieces, then the plate is a better choice. The plate helps restore as much length as possible in the clavicle and it is more stable.

How do these two procedures compare? Compared with nonoperative care, they both speed up healing and provide a more stable and functional collar bone. Compared with each other -- well, that's a bit like comparing apples to oranges. They are both surgeries intended for displaced midshaft fractures of the clavicle but each one has its place as we have described.

These surgical procedures are fairly new so studies are based on small numbers of patients. We hope to see more information in the next 10 years as comparisons are made and complications and outcomes are reported. The authors assure us that new materials and techniques will improve performance of these fixation devices in the near future.

Reference: Michael J. O'Brien, MD, and Felix H. Savoie III, MD. Upper Extremity: Clavicular Fractures. In Current Orthopaedic Practice. September/October 2010. Vol. 21. No. 5. Pp. 429-434.

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