

Conservative treatment of scaphoid fractures

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Scaphoid fractures are the most common fractures of the carpal bones occurring particularly in young active people. The healing process is often slow, causing both social and economical losses. Nowadays it has become more popular to decide for surgical treatment even in the non-displaced acute scaphoid fractures. The indications for operative treatment have generally been greater than 2 mm fracture dislocation, unstable fracture, concomitant ligament injury and delayed union or nonunion.

Several articles have been published supporting operative treatment of scaphoid fractures. Advocates for early surgical treatment cite faster rehabilitation and shorter immobilisation time after surgery. Internal fixation has resulted in more reliable union and early return to function and work.

A cost/utility analysis of open reduction and internal fixation versus cast immobilization in acute scaphoid fractures found that surgical treatment saves money from the national health policy standpoint by means of shorter sick-leaves (1). Open reduction and internal fixation was more effective from the cost-utility standpoint and is preferred by the patients. However, the investigation is based on a hypothetical scenario. It is based on a questionnaire for 'hypothetical patients' (medical students) and calculation of costs is based on the U.S.A. Medicare value Scale. This scenario shows that adoption of open reduction and internal fixation could save potentially \$ 5911 per patient when total costs are compared (1).

In a prospective controlled trial on 47 patients half of the patients were treated surgically with screw fixation, and the other half with a cast (2). Fracture union was seen in the screw fixation group in mean of 43

days and in the cast immobilisation group in 74 days. The average time for return to work was 8 days for patients with internal screw fixation and 55 days for patients with cast treatment. The overall hand function score was better in the surgical group. The conclusion was that internal fixation of scaphoid fractures is less expensive than conservative treatment (shorter time to union, earlier return to work). In the article it was not told what kind of work the patients returned to. Eight days is a short recovery time for manual working.

Saeden et al. from Stockholm published a prospective randomized study with 12 years of follow-up comparing operative and conservative treatment of scaphoid fractures in 62 patients: 30 were randomized to conservative treatment and 32 to operative treatment (3). The operatively treated scaphoids were fixed with a Herbert screw in a standard open technique, followed by cast immobilization for two weeks. The conservatively treated patients wore a short arm cast (from below the elbow to MP I joint) for 10–12 weeks. The duration of sick leave was shorter for surgical patients, but this was only significant in patients with blue collar occupations. Two of the group of 30 did not unite with cast immobilization and were operated on later. There were no differences between the groups in respect of function (grip strength, range of movement) or radiological healing of fracture at 12 years. The radiographs showed that all fractures had united. The operatively treated fractures showed more often radiological signs of arthritis of the scaphotrapezial joint, but this finding did not correlate with subjective symptoms. The authors found it safe and reliable to treat scaphoid fractures by immobilization in plaster casts, even if it is difficult for many patients to accept

time-consuming immobilization in a plaster cast (3).

In another randomized trial 44 patients were treated with internal fixation (Herbert screw, Whipple screw, K-wires) without a cast postoperatively and 44 patients were treated with a plaster cast below the elbow leaving the thumb free (4). The patients were evaluated several times during 52 weeks. Severity of pain, tenderness, swelling and wrist movement were observed as well as grip strength, symptoms and disability. Radiographs were also taken. The conservatively treated patients returned to work at mean 6 weeks after injury and the surgical patients after 5 weeks. At 12 weeks grip strength was better in the group with surgery. Ten fractures of the 44 conservatively treated did not heal at 12 weeks and the treatment was altered. Complications mostly related to the scar occurred in 13 of the operatively treated patients but no serious complications were encountered. Beside scar problems, the authors did also describe perioperative problems in seven of the 44 patients (16 %). Technical problems such as misplacement of drill or screw and comminution of the fracture were observed. These were recognized and solved during the operation.

Dias et al. (4) found most of the benefits of internal fixation to be transient and early (grip strength, wrist movement). This investigation did not show overall benefit of early fixation of acute scaphoid fractures beyond the decrease in the rate of a change in treatment because of delayed union at twelve weeks. It is known that fixation of the scaphoid can be technically difficult and requires a high level of skill. Early internal fixation of minimally displaced or nondisplaced fractures of the scaphoid waist could lead to overtreatment of a large proportion of such fractures, exposing such patients to avoidable surgical risks.

We report our investigation of conservatively treated scaphoid fractures in Helsinki University Hospital (5).

Materials and methods

This is a follow-up study of 63 initially conservatively treated scaphoid fractures. Fractures of the scaphoid tubercle were excluded. Treatment was the classical short arm thumb spica cast; below the elbow cast with the metacarpal and proximal phalanx of the thumb immobilized. The mean immobilization time was 8 weeks (range 2–14). The mean follow-up time was 54 months (range 21–82).

Location of the fracture was: 1 in the proximal

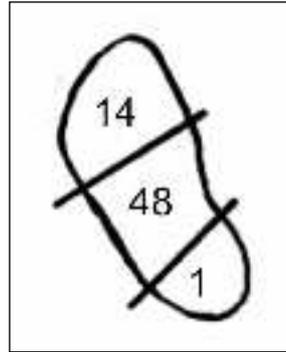


Figure 1.

pole of scaphoid, 48 in the middle third and 14 in the distal pole of scaphoid (Figure 1).

At the follow-up appointment, standard wrist and scaphoid radiographs were taken. The range of wrist motion was measured, and grip strength was measured (taking into account the difference between dominant and nondominant hand). These were compared with the uninvolved wrist. All the patients were asked to fill out a questionnaire with special attention to their daily ability to work and symptoms during their spare time. Arthrosis was graded. Evaluation of bony union, deformity and sclerosis were made by a radiologist. DISI-deformity (dorsal intercalated segment instability) as well as scapholunar angles and intrascaphoid angles were measured from the radiographs. The functional result was assessed by using a Bradway modification of clinical scoring system by Green and O'Brien (6).

Results

Bony union was achieved in 56 of the 63 fractures by conservative means (89 %). Four patients were operated on during the course of initial treatment: three because of delayed union/nonunion and one because of dislocation of fracture in cast, and subsequent delay in union. One of these fractures was in the proximal third, one in the distal third and two were in the middle waist area of the scaphoid. For three of these patients the fracture diagnosis was delayed 2–4 weeks.

Three nonunions were found at the follow-up appointment, which were considered united at the end of cast immobilization. In one case with a nonunion there was an initial fracture dislocation of two mm. In another case there was a delay of five weeks between accident and diagnosis and the immobilization was only five weeks. The third case did not show any special reason for poor healing. All of these fractures were

in the middle third of scaphoid. A correlation was found between the delay in fracture diagnosis (and beginning of treatment) and nonunion.

The mean sick leave was 9 weeks for those who were working (range 0–24 weeks). At the follow-up examination 43 of 49 patients (88 %) who were employed claimed they had no problems while working. Six patients had some problems and had reduced their work load.

Ten patients (17 %) had a mean wrist extension deficiency of 14 degrees (5–25) and eight patients had a mean volar flexion deficiency of 13 degrees (5–25). Grip strength deficiency was found in 11 patients (19 %). The mean grip strength was 79 % compared with the normal healthy side.

At the follow-up examination osteoarthritis was found in 19 of 59 cases (32 %). Most of the arthrotic changes were mild and did not correlate with ability to work or leisure activities. However, osteoarthrotic changes correlated with the age of the patient.

There were more symptoms related to spare time activities: 24 patients (41 %) claimed to have some problems, especially in strenuous activities such as in sports. However, the average wrist score was 88 (60–100) and most of the fractures healed uneventfully and the patients were satisfied. The overall clinical result was excellent or good in 81 % of fractures.

Discussion

With early diagnosis and adequate immobilization, the majority of scaphoid fractures can be expected to heal by conservative treatment. Even if it is becoming more popular to operate on non-displaced scaphoid fractures with the new percutaneous techniques, we must keep in mind not to expose our patients to avoidable surgical risks. Early internal fixation of these minimally displaced or nondisplaced fractures can lead to overtreatment of a large proportion of such fractures which would heal in a cast. Cast treatment is a reliable, safe and reasonably effective method of treating scaphoid waist fractures.

Early surgical treatment should be reserved for scaphoid fractures with a dislocation greater than 1–2 mm, or with significant instability and with multi-trauma and associated injuries

An “aggressive” conservative treatment as Dias has proposed in his article can be discussed: after 6–8 weeks of cast treatment the wrist is mobilized. If there is concern about the union (persistence of a gap,

movement of the fracture etc. in radiographs) a CT scan is taken. If a gap in the fracture site is seen there is an option for surgical treatment: internal fixation of the fracture with or without a bone graft followed by cast immobilisation. Dias shows in his investigation that such a fine-tuning of indications of internal fixation results in a fracture healing of 95 % in scaphoid fractures (4).

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