

SUSPECTED SCAPHOID FRACTURES CAN WE AVOID OVERKILL ?

S. JACOBSEN, G. HASSANI, D. HANSEN, O. CHRISTENSEN

Among 231 patients with clinical signs of a fractured carpal scaphoid but negative primary radiographs, only 3 fractures of the scaphoid were finally diagnosed on subsequent radiological and clinical examinations. Two of these could be seen retrospectively in the primary radiographs. After an observation period of two to three weeks in dorsal plaster casts, 88.8% of the patients were discharged from the outpatient department as having soft-tissue injuries. They required no further treatment.

This "overkill" is unsatisfactory, as we agree with other studies that almost 100% of factual fractures of the scaphoid bone are visible on initial radiographs of good quality, using 4 or 5 different views and evaluated by a senior radiologist. We propose a more stringent clinical inclusion into the category of "clinical scaphoid fracture" and the use of simple supportive bandages in an observation period.

Keywords : carpal scaphoid ; fracture treatment ; carpal injury ; fractures.

Mots-clés : scaphoïde carpien ; fracture ; traitement ; traumatisme du carpe.

INTRODUCTION

In the emergency department of the county hospital of Nykøbing Falster, Denmark, all clinically suspected fractures of the scaphoid bone with negative radiographs are, in accordance with common consensus (1, 12, 14) immobilized in a cast for two to three weeks until a second clinical and radiological examination.

The reason for this cumbersome and costly regimen is questioned in recent literature : with modern radiographic techniques almost all fractures of the scaphoid are visible on primary radiographs (3, 6, 8). The secondarily detected fractures are often incomplete fissures with intact

periosteal envelopes that heal regardless of immobilization (5, 9, 10). It seems that a delay of immobilization of up to 4 weeks after trauma, or the use of a simple supportive bandage during an observation period, does not negatively affect the healing of a primarily overlooked scaphoid fracture (7, 13).

Retrospectively we have evaluated a series of 231 patients with clinical fracture but negative primary radiology for final diagnoses. On this basis we have formulated a new diagnostic strategy for the suspected fracture of the scaphoid bone.

PATIENTS AND METHODS

Between January 1990 and December 1992, 231 patients with recent trauma to the hand were suspected of having a fracture of the scaphoid. Initially patients were seen by an emergency room doctor, and four radiographs were obtained on standard film : antero-posterior, lateral and oblique views in semipronation and semisupination ; the Ziter view (18) was not used routinely. All radiographs were reported negative by a consultant radiologist and a short dorsal plaster cast with immobilization of the metacarpophalangeal joint of the thumb was applied. The patients were referred to the outpatient fracture clinic after two to three weeks. Again the patients were clinically examined and four new radiographs were obtained.

For the purpose of this study we have reviewed the records of the emergency department and outpatient fracture clinic, the consultant radiologists' descriptions and primary and secondary radiographs of patients with positive findings on the second examination.

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RESULTS

Of the 231 patients studied, 102 were men and 129 were women with a mean age of 44.3 years (range 9-88 years). Most patients had suffered a fall on an outstretched hand. Time between trauma and attendance at the emergency department did not supersede seventy-two hours. No patients had carpal instability or dislocation either at the emergency department or at the out-patient fracture clinic. All primary radiographs were reported negative. The radiological appearances after two-three weeks are summarised in table I. Three undisplaced fractures of the scaphoid were visible at second examination, two of which were located in the distal third of the bone. They were retrospectively, blinded, diagnosed by a consultant radiologist in the primary set of radiographs. The third was a hairline transverse fissure that could only be seen in second radiographs. All healed uneventfully. Interestingly, two of these patients presented no clinical signs of fracture at the fracture clinic. Twenty-three patients had other fissures in the region; seven of the distal radius, six of the radial styloid, four of the ulnar styloid, four of the triquetrum and two of the trapezium. Retrospectively, blinded, only 5 of these could be seen on the primary radiographs. These patients required no other treatment than the immobilization of the observation period. Two hundred and five patients (88.8%) were discharged from the fracture-clinic with no specific diagnosis other than "soft-tissue injury" and required no further treatment.

Table I. — Suspected scaphoid fractures in 231 patients : final diagnosis

Fracture		Percentage of observed pts.
Scaphoid	3	1.3
Distal radius	7	3.0
Radial styloid	6	2.6
Ulnar styloid	4	1.7
Triquetral	4	1.7
Trapezium	2	0.9
Soft tissue injuries	205	88.8

DISCUSSION

Although some authors have questioned radiographs as a reliable mean of diagnosing scaphoid fractures and advocated the use of bone scanning (16, 17), our study agrees with that of Leslie and Dickson (8) and Duncan and Thurston (6) and conclude that with radiographs of good quality and the use of at least four different views, almost all scaphoid fractures can be seen in the primary set of radiographs. Undisplaced fissures with intact periosteal envelopes will almost certainly heal irrespective of external fixation (10). Furthermore, if it is possible to rule out carpal instability in the casualty department, nothing is gained by immobilizing patients with soft tissue injuries in plaster casts (13): in our material 205 patients (88.8%) of 231 with suspected scaphoid fractures. The use of ice, dynamic bandages, NSAIDs and physiotherapy seems more appropriate for this group of patients.

Is it possible to omit a second set of radiographs and reserve this for patients with severe clinical signs? In this study almost 90 percent of the patients presented no symptoms of fractures or serious distortions at the fracture clinic, including two patients with verifiable fractures of the scaphoid. Undoubtedly there are subclinical fractures in need of immobilization that are missed without repeated radiographs. In the authors' opinion a more stringent inclusion into the regimens for the suspected scaphoid fracture is possible and necessary to reduce the cost and inconvenience for patient and hospital. Casualty officers are often satisfied by demonstrating direct tenderness in the anatomical snuffbox, before admitting the patient to follow up trials. By forgetting the cutaneous branch of the radial nerve directly over the snuffbox and the normal pain elicited from it, the patient is too hastily suspected of a scaphoid fracture. A proper examination includes axial load through the first metacarpal and the combination of full pronation and ulnar deviation of the hand (11); a test with almost 100 percent negative predictive value.

Our flow sheet for examination and treatment of the suspected scaphoid fracture (fig. 1), proposes a thorough primary examination, the initial use

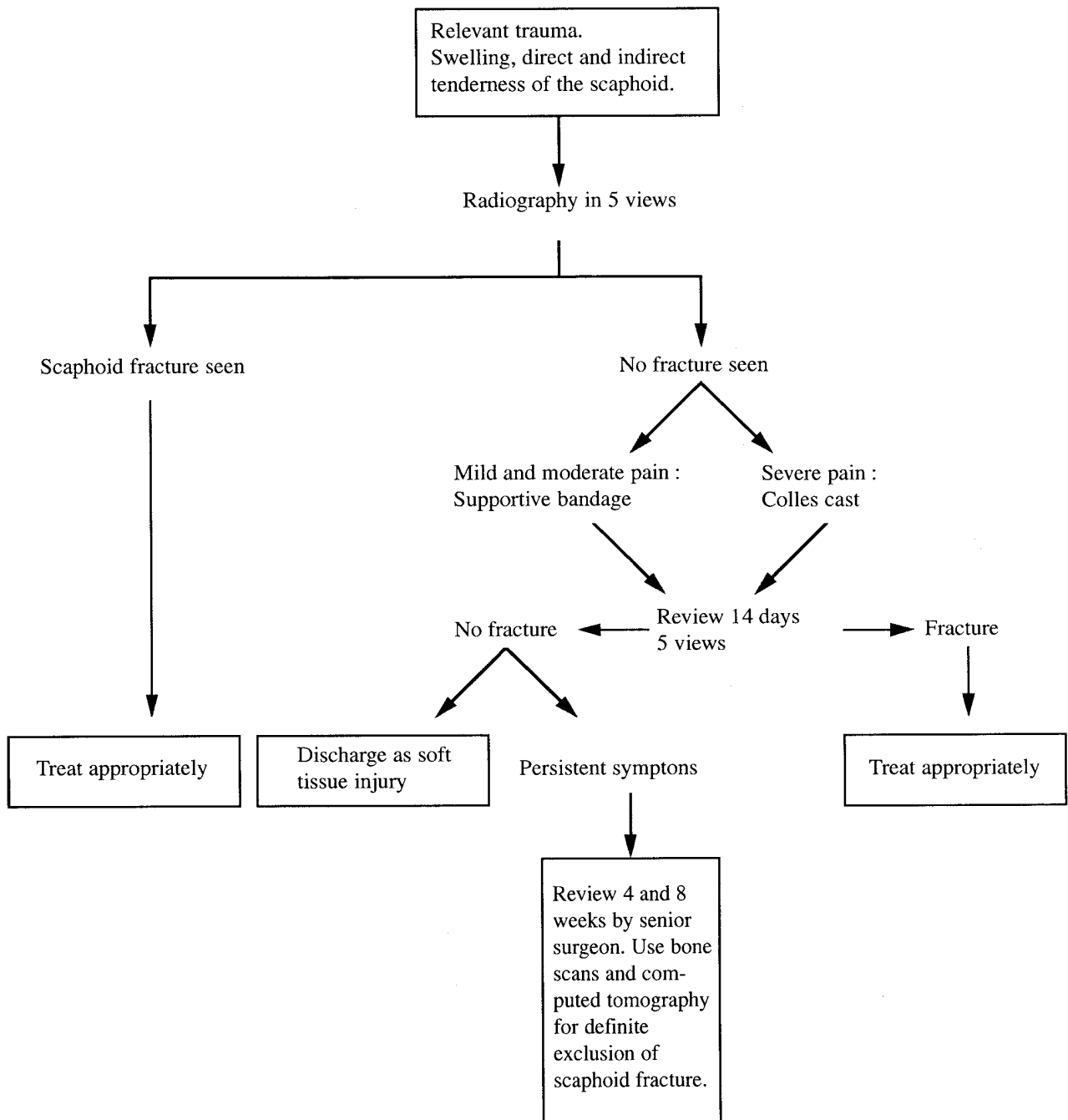


Fig. 1. — Flowsheet for examination and treatment of the suspected scaphoid fracture.

of four standard views and the Ziter view (18), and reserves plaster casts only for patients with serious pain. Such casts take the form of a dorsal plaster slab with the thumb left free (4). All radiographs should be evaluated by a senior radiologist before the second examination at the fracture clinic. A supportive bandage during an observation period of two weeks is usually sufficient. In cases of persistent symptoms at the fracture clinic but negative secondary radiological findings and no specific soft tissue injury, we propose a review out of cast at 4 and 8 weeks and the use of bone scans and computed tomography for definitive exclusion of a scaphoid fracture (2, 15, 17).

The flowsheet should leave no fractures undiagnosed, while avoiding an uncomfortable plaster cast for a majority of patients during the observation period. A thorough initial clinical examination by the emergency room doctor should limit the number of patients suspected of having a scaphoid fracture.

REFERENCES

1. Böhler L., Trojan E., Jahna H. Behandlungsergebnisse von 734 frischen einfachen Brüchen des Kahnbeinkörpers der Hand. *Reconstr. Surg. Trauma.*, 1954, 2, 86-111.
2. Brismar J. Skeletal scintigraphy of the wrist in suggested scaphoid fracture. *Acta Radiol.*, 1988, 29, 101-107.
3. DaCruz D. J., Bodiwala G. G., Finlay D.B. L. The suspected fracture of the scaphoid : a rational approach to diagnosis. *Injury*, 1988, 19, 149-152.
4. Clay N. R., Dias J. J., Costigan P. S., Gregg P. J., Barton N. J. Need the thumb be immobilized in scaphoid fractures ? A randomized prospective trial. *J. Bone Joint Surg.*, 1991, 73-B, 828-832.
5. Cooney W. P., Dobyns J. H., Linscheid R. L. Fractures of the scaphoid : a rational approach to management. *Clin. Orth.*, 1980, 149, 90-97.
6. Duncan D. S., Thurston A. J. Clinical fracture of the carpal scaphoid, an illusionary diagnosis. *J. Hand Surg.*, 1985, 10-B, 375-376.
7. Langhoff O., Andersen J. L. Consequences of late immobilization of scaphoid fractures. *J. Hand Surg.*, 1988, 13-B, 77-79.
8. Leslie I. J., Dickson R. A. The fractured carpal scaphoid. Natural history and factors influencing outcome. *J. Bone Joint Surg.*, 1981, 63-B, 225-230.
9. London P. S. The broken scaphoid bone. The case against pessimism. *J. Bone Joint Surg.*, 1961, 43-B, 237-244.
10. McLaughlin H. L., Parkes J. C. Fracture of the carpal

navicular (scaphoid) bone : gradations in therapy based upon pathology. *J. Trauma*, 1969, 9, 311-319.

11. Powell J. M., Lloyd G. J., Rintoul R. F. New clinical test for fracture of the scaphoid. *Can. J. Surg.*, 1988, 31, 237-238.
12. Russe O. Fracture of the carpal navicular. Diagnosis, non-operative treatment and operative treatment. *J. Bone Joint Surg.*, 1960, 42-A, 759-768.
13. Sjölin S. U., Andersen J. C. Clinical fracture of the carpal scaphoid : supportive bandage or plaster cast immobilization ? *J. Hand Surg.*, 1988, 13-B, 75-76.
14. Soto-Hall R. Recent fractures of the carpal scaphoid. *J. Am. Med. Assoc.*, 1945, 129, 335-338.
15. Stordahl A., Schjöh A., Woxholt G., Fjermeros H. Bone scanning of fractures of the scaphoid. *J. Hand Surg.*, 1984, 9-B, 189-190.
16. Tiel-van Buul M. M. C., Van Beek E. J. R., Broekhuizen A. H., Nooitgedacht E. A., Davids P. H. P., Bakker A. J. Diagnosing scaphoid fractures : radiographs cannot be used as a gold standard ! *Injury*, 1992, 23, 77-79.
17. Young M. R. A., Lowry J. H., Laird J. D., Ferguson W. R. ⁹⁹Tcm-MDP bone scanning of injuries of the carpal scaphoid. *Injury*, 1988, 19, 14-17.
18. Ziter F. M. H. A modified view of the carpal navicular. *Radiology*, 1973, 3, 706-7.

SAMENVATTING

S. JACOBSEN, G. HASSANI, D. HANSEN, O. CHRISTENSEN. Vermoeden van fractuur van het naviculare carpi.

Onder de 231 patiënten met klinische tekenen van een scaphoïd fractuur, maar met negatieve eerste röntgenopnamen, werden slechts 3 fracturen later gediagnosticeerd, aan de hand van röntgencontroles en heronderzoek. Twee van deze fracturen waren reeds zichtbaar op de eerste röntgenopnamen. Na een observatie van 2 tot 3 weken, met een achterspalk, werden 88,8% van de patiënten uit de spoedgevallendienst ontslagen, met de diagnose van weke delen letsels. Er gebeurde geen verdere behandeling.

De „overshooting” is niet bevredigend, vooral wanneer men zich realiseert, zoals reeds in andere studies aangetoond, dat bijna 100% van de fracturen van het scaphoïd zichtbaar zijn op de eerste röntgenopnamen, indien van goede kwaliteit, indien er 4 of 5 incidenties gebruikt worden en indien zij door een ervaren röntgenoloog gezien worden. De auteurs stellen veel strengere criteria voor, om de diagnose van „klinische fractuur van het os scaphoïd” te stellen ; zij suggereren ook het gebruik van een eenvoudig verband tijdens de observatieperiode.

RÉSUMÉ

S. JACOBSEN, G. HASSANI, D. HANSEN, O. CHRISTENSEN. Suspicion clinique de fracture du scaphoïde.

Parmi 231 patients qui présentaient des signes cliniques de fracture du scaphoïde carpien mais dont les radiographies initiales étaient négatives, les examens cliniques et radiologiques ultérieurs n'ont mis en évidence que 3 fractures du scaphoïde. Deux d'entre-elles ont pu rétrospectivement être diagnostiquées sur les radiographies initiales. Après une période d'observation de deux à trois semaines en attelle plâtrée dorsale, les patients ont été revus en consultation et 88,8% d'entre

eux ont été considérés comme présentant uniquement des lésions des tissus mous. Ils n'ont eu besoin d'aucun autre traitement.

Les auteurs considèrent que la politique habituelle entraîne une surconsommation médicale non justifiée ; ils sont d'avis, comme d'autres l'ont démontré, que près de 100% des fractures du scaphoïde sont visibles sur des radiographies initiales de bonne qualité réalisées en utilisant 4 ou 5 incidences différentes et évaluées par un radiologue senior. Les auteurs proposent davantage de rigueur pour inclure des patients dans la catégorie des «suspensions cliniques de fracture du scaphoïde» et ils suggèrent la mise en place d'un simple bandage de soutien pendant la période d'observation.