REFRESHER COURSE FOR GENERAL PRACTITIONERS

FRACTURE OF THE CARPAL SCAPHOID

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A fracture of the scaphoid is of special interest to the general practitioner for many reasons: it is the commonest injury to befall the wrist of a working man; the local trauma is so mild as to induce the sufferer to consult his own doctor rather than to report to a hospital; it is easily overlooked; treatment is within the capacity of any practitioner who is able to put on a plaster; and if not treated properly it may cause severe and permanent disability.

Any accident that imposes violent dorsiflexion on the wrist is apt to fracture the scaphoid. It is worth while inquiring into the reason for this in order to understand the rationale of treatment. Motion at the wrist is shared by the radio-carpal joint and the joint between the proximal and distal row of carpal bones (the intercarpal joint). The scaphoid is part of both rows of carpal bones, and when the intercarpal joint is dorsiflexed the distal end of the scaphoid can conform to the movement of the other bones of the distal row only by rotating. The scaphoid willy-nilly opposes dorsiflexion, and when the intercarpal joint is excessively dorsiflexed the scaphoid breaks. For practical purposes it may be assumed that the fracture line has always the same position and the same direction: it runs transversely across the middle of the bone, at right-angles to its long axis.

Diagnosis

Signs of local trauma are minimal. Although movement at the wrist is painful and restricted there may be little if any swelling, and the first diagnosis to suggest itself is a sprain of the wrist. This diagnosis should never be accepted unless clear radiographs show unmistakably the absence of any fracture. The first step on the road to diagnosis is the awareness that, of all injuries of the wrist in a working man, a fracture of the scaphoid is the most likely.

When the fracture is suspected the scaphoid should be palpated for local tenderness. The bone can be felt in front of the wrist, but it is easier to find on the dorsum; it lies in the floor of the anatomical snuff-box, just distal to the lower end of the radius.

The diagnosis is confirmed by radiographs. But here again are pitfalls. The fracture line may not be seen unless three views are taken—an antero-posterior, a lateral, and an oblique—and often the fracture is represented only by a linear crack, without any displacement (Fig. 1). Even experts may be in doubt whether a

fracture is present. In such cases it is justifiable to treat the injury as a sprain, provided that another radiograph is taken ten days later. A fracture will have become obvious by then, since the opposing raw surfaces undergo rarefaction.

Treatment

Most fractures in the body will unite without splintage, and often the sole purpose of a splint is to preserve alignment. The scaphoid is an exception, because, no muscles being attached to either fragment, the two ends cannot be held immobile except by external splintage; and unless the two ends are held immobile they do not join. During dorsiflexion of the wrist the scaphoid rotates, and if the bone is fractured any movement of dorsiflexion shifts the distal fragment on the proximal. In order to immobilize the two ends this movement must be eliminated. Any splint closely applied to the front and back of the forearm and hand would abolish movement at the intercarpal joint, but to prevent the splint from slipping up and down it should be bent and applied with the wrist in slight dorsiflexion. This has the additional advantage of being the natural position in which a person fixes his wrist when using his fingers. The purpose of the splint is to prevent movement at the intercarpal joint, and therefore it must be applied as closely as possible to the back and front of the hand. The plaster should be skin-tight—that is, there should not be any wool under the plaster, though a layer of stockinet is allowable and advisable for the sake of comfort—and the lower edges of the plaster should be squeezed together while it is setting (Fig. 2).

The efficacy of the plaster can be tested by seeing how much antero-posterior play the metacarpals have. The hand should be used throughout the period of fixation, because repair is thereby hastened. The lower edge of the plaster should not therefore extend beyond the proximal of the two transverse creases in the palm, and the thumb should be held separated from the index finger and at right-angles to the palm (Figs. 3 and 4). This is the position of function; it enables a person to use his thumb and forefinger as pincers.

The palmar portion of the plaster soon gets soft and papery. The plaster is then no longer efficient and might just as well not be there. It needs to be inspected frequently so that it can be reinforced before the hand gets any antero-posterior play.

FIG. 1.—The fracture may appear on the radiograph as no more than a linear crack.

FIG. 2.—Illustrating the method of squeezing the lower edges of the plaster while it is setting.

It is my belief that the fractured surfaces are rarely displaced and that reduction is therefore seldom called for. Nevertheless, the plaster is best applied under general anaesthesia, since accurate moulding may otherwise be prevented by tenderness. The plaster should not be uncom-

FIG. 3.

FIGS. 3 and 4.—Note that the plaster does not extend beyond the proximal transverse palmar crease, and the position of the thumb.

FIG. 4.

fortable: if it is, something is wrong. A patient who uses his hand vigorously may rub the skin over the head of the ulna during rotation of the forearm, and this can be anticipated by cutting a small window in the plaster at this site.

Duration of Plaster Fixation

A transverse fracture of the upper limb takes six weeks to unite and twelve weeks to consolidate. For six weeks therefore the intercarpal joint must be prevented from moving, and only gentle movement allowed for another six weeks. In practice it is advisable to retain a complete plaster for six weeks and then to replace it with a removable plaster holding the wrist in the same position. So long as the fingers and thumb have been used throughout the period of fixation the wrist will move through half its range as soon as it is freed from fixation, and thereafter full movements gradually return with ordinary use. Physiotherapy is rarely required.

Old Fracture of the Scaphoid

There is a clear-cut distinction between delayed union and non-union. Delayed union implies that the fragments will unite if they are held in apposition and immobile for a longer period of time. Non-union means that no matter how long the two ends are held splinted they will not unite until something more is done. Since delayed union and non-union call for different treatments it is essential to place each case in the right category.

A fracture of the scaphoid is often missed either because the injury seems too trivial for the patient to seek advice or because the doctor overlooks the possibility of a fracture, and the diagnosis is not made for perhaps some months after the injury. The doctor then has to decide whether he is dealing with delayed union or with non-union. The decision is made on radiographic evidence. In a delayed union the fracture line is vacuolated (Fig. 5); in non-union the fractured ends are separated by a space and are covered in with sclerosed bone (Fig. 6).

A fracture with delayed union should be treated like a recent fracture, except that the period of fixation may need to be doubled. If at the end of six months the fracture has not united, splintage should be discarded and the fracture treated as one of non-union. A fracture with non-union will not unite unless the sclerosed bone sealing the two ends is removed. This can be done only at an open operation, and is a procedure beyond the scope of a general

practitioner. Indeed, the results of operative intervention are so poor that it is questionable whether any operation designed to promote union is worth doing—especially when it is known that many people have negotiated life successfully with an ununited scaphoid, sometimes even engaging in heavy manual work.

This adds another complication, for not infrequently after a recent injury the radiograph reveals an old fracture of the scaphoid and yet the patient denies ever having injured the wrist. The doctor needs to be on his guard lest he treats such a patient as suffering from a recent fracture. The radiographs clearly demonstrate that the fracture is old, for there is a gap between the fragments and the ends are sclerosed (Fig. 6), whereas a recent fracture shows a linear crack through a bone of normal architecture (Fig. 1). When a wrist containing an old fractured scaphoid sustains an injury it should be treated as a sprain, without any splintage and with early physiotherapy.

Non-union, as has been said, is not incompatible with a useful wrist. It may, however, be associated with so much pain on movement that the hand is for practical purposes useless. This is especially the case when the non-union has been the sequel to an aseptic necrosis of the proximal half of the bone—a not uncommon complication. A permanent cock-up splint may immobilize the wrist enough to enable the patient to use his fingers without pain, but usually he is not satisfied until the radiocarpal and intercarpal joints have been fused. This is a task for a surgeon; indeed the general practitioner would be wise to hand over all cases of delayed union and non-union, although the treatment of a recent fracture of the scaphoid is well within his province.

FIG. 5.—The fracture line in delayed union.

FIG. 6.—Non-union of the carpal scaphoid.

Dr. Glenn T. Seaborg and his colleagues at the University of California have produced a new element, the 97th, which has been given the provisional name of berkelium. It was obtained by bombarding another recently discovered element, americium, with alpha particles from the cyclotron. This is the fifth new element to be discovered since 1940.