FRACTURES OF THE OLECRANON*

BY

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I propose to dismiss briefly all fractures of the olecranon with the exception of the transverse fracture with separation. So long as there is no separation of fragments the injury need not be considered as a bony injury, and should be treated as a bruise of the elbow. And the essential treatment, in my opinion, should be immediate voluntary purposive movements of the elbow-joint (in other words, active use of the limb), with physiotherapy as an adjunct of secondary importance. There need be no fear of later separation of the fragments as the result of using the arm; at least it has never happened in my experience.

Transverse Fracture with Upward Displacement

Transverse fracture of the olecranon with upward displacement of the upper fragment—the usual form of fracture—presents a unique problem. Ordinarily if a bone is fractured, good function cannot be regained without bony union of the fragments. This is not true as regards the olecranon, and in this respect the fracture of the olecranon resembles the fracture of a sesamoid bone such as the patella. If a gap between the fragments is left, union occurs by means of fibrous tissue. This union, from the point of view of function, is as good as a bony union. It is not the fact that the upper fragment is united to the shaft of the ulna by fibrous tissue rather than by bone that constitutes a disability, but the fact that there is separation between the two fragments. Because of this separation, two disabilities follow:

(1) The triceps becomes weaker because when the muscle is at rest the distance between its origin and insertion is lengthened, and when it contracts half its energies are used in taking up the slack. The triceps muscle therefore is weak. But here we have a distinction between the fracture of the olecranon with separation and the fracture of the patella with separation; for whereas a strong quadriceps is essential for maintaining the erect posture, the strength of the triceps is less material to the patient.

(2) The second disability resulting from the leaving of a gap between the fragments is that extension of the elbow is limited by 20 degrees. Normally in full extension the beak of the olecranon is received into the olecranon fossa on the back of the lower end of the humerus just above the condyle. If the olecranon is displaced upwards (as it is in the fracture with separation) there is no hollow on the back of the humerus to receive the beak of the olecranon process when extension of the elbow-joint is attempted, and full extension is thereby limited. Again, comparison with the similar fracture of the patella shows that what is a major disability in the patella fracture is a minor disability in the olecranon fracture; because, although full extension of the knee is essential for normal knee function, full extension of the elbow is of less importance.

My endeavour has been to show that fracture of the olecranon and fracture of the patella, although at first sight similar, are different problems: that whereas the fractured patella with a gap should be operated upon, operation in the case of the fractured olecranon, although advisable, is not a necessity. Useful function follows if the separation is disregarded and the injury treated as one with no separation. In such cases my practice is to rest the arm in a sling at a right angle in the comfortable position, to make no attempt at approximating the fragments, and to encourage immediate active movements. As a rule the patient has regained, for her, a normal use of the arm in a few weeks; for it must be remembered

that the patients are usually elderly or at least no longer young. Attempts to approximate the fragments except by means of an operation seem to me to be doomed to failure and only serve to postpone restoration of function.

Operative Treatment

If operation is decided upon, the aim should be to approximate the fragments, suture them, and hold them approximated until union has occurred. Four problems present themselves: (1) of when to operate; (2) of how to suture; (3) of what suture material to use; and (4) of after-treatment.

When to Operate.—This should be done either on the day of the accident or about ten days after the accident. There is always at every operation a risk of sepsis. Fresh blood is antiseptic. Stale blood is a culture medium, and not until it has become organized into granulation tissue does it cease to be liable to be inoculated by the surgeon.

How to Suture.—There is no sufficiently strong layer of soft tissue to permit of reliance on soft tissue suture alone; the bone itself must be sutured. The difficulty is to obtain firm anchorage for the suture. There is a great tendency for the suture to pull through the bone of the lower fragment. I know no way of ensuring against this. In the upper fragment the suture is prevented from pulling through the bone by the insertion of the triceps muscle; in the lower fragment there is no soft tissue covering the bone, and the pull of the suture is bound to be parallel to the bone lamellae of the cortex. I am now trying to avoid this humiliating occurrence by drilling the shaft of the ulna transversely, passing the suture through the hole and tying it on the surface of the bone, then threading one end transversely above between the top of the olecranon and the attachment of the triceps muscle, and tying it to the second end below. Everyone, however, has his own method of suture. I only wish to point out the frequency with which, in my hands at least, the suture pulls through the shaft of the ulna. Sometimes the shaft of the ulna is comminuted, which renders the accident more likely, and the anchorage to the lower fragment should always be at some distance from the fractured surface.

What Suture Material to Use.—Unabsorbable material has the disadvantage that if it remains loose it may act as an irritant and require removal. On the other hand it is not easy to obtain absorbable material strong enough for the purpose. My experience is that even steel breaks sometimes, and silver nearly always! Wire has the added disadvantage that it is difficult to tie, and twisting the ends is not to be relied on. Wilson has recently advocated the use of fascia, and although its use adds to the complexity of the operation it probably is the most secure material.

After-treatment.—This assumes an importance when one realizes how frequently the suture material either breaks or tears out of the bone. I am a great advocate of early voluntary purposive movements following injury; and I have tried to find a fool-proof method of suture which would allow the patient to use the elbow immediately after the operation. Reluctantly I must confess that I have failed. My present belief is that the elbow should be prevented from moving and the triceps prevented from acting—two distinct things—for fourteen days after the operation. Movement can be prevented by a plaster cast reaching from the upper part of the arm to and including the lower radio-ulnar joint. Wrist and fingers may be free. It is not, however, necessary to hold the elbow in extension for the purpose of keeping the elbow still. If the suture has been adequately performed it should be possible at the time of the operation to flex the elbow fully without visible separation of the frag-

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ments; splinting the elbow afterwards at a right angle (in the position of greatest comfort) will not then put strain on the suture. To prevent the triceps from acting—that is, to cut off nerve impulses from the cord to the muscles—it is only necessary to keep the arm to the side. Splinting the elbow in extension is of no assistance in this respect. Fourteen days of immobilization of the elbow and disuse of the triceps will be sufficient; at the end of that time the elbow may be freed from restraint.

This is time enough, as we all know to our cost in the treatment of fractures elsewhere in the body, to disconnect the brain from the muscles. The use of the elbow will return gradually and there is little risk of a sudden violent contraction of the triceps causing the suture to break or pull out.

One last point: accurate approximation does not seem to be essential for bony union or for complete restoration of movement and function.

PLASTIC OPERATIONS FOR HYDRONEPHROSIS

BY

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(With Special Plate)

The idea of conserving a hydronephrotic kidney in which a considerable amount of potentially functional parenchyma remains—that is, a hydronephrosis mainly of the pelvic type—is by no means new. Many plastic procedures on the pelvic-ureteral junction have been suggested and tried, but, so far as one can judge, in this country and in most other countries they have been given up.

Professor Marion a few years ago stated that all kinds of plastic procedures on hydronephrosis were unsatisfactory. The failure of these measures has been variously ascribed to infection, new stricture formation, loss of continuity of peristalsis of the ureter, and so on, but the great bugbear has always been the early or late supervention of infection. Discussing these operations in the case of unilateral hydronephrosis, F. Hinman states that even if the obstruction is removed they are doomed to failure, for the opposite kidney, having undergone anatomical hypertrophy, will not release its function. In view of these authoritative and widespread opinions, to suggest that with good fortune even a pyonephrosis with renal tissue remaining can be converted into a healthy functioning kidney would, to many, appear ridiculous, yet that is what I hope to do.

Before proceeding further it is necessary to point out that a small band of surgeons have continued to work on this subject, and it is to the writing of H. Wildbolz of Switzerland and of several accomplished American surgeons whose work I have reviewed for the *Medical Annual* that I owe most of my ideas.

Principles to be Observed

For a successful operation on a hydronephrotic kidney, whether it be a sole existing kidney or has a partner, certain principles must be adhered to strictly.

1. The hydronephrotic renal pelvis must be resected so as to reduce its capacity drastically. The reconstructed pelvis should be smaller than a normal one. When the obstruction is removed damaged renal parenchyma tends to regenerate, but a dilated renal pelvis remains as a bag to invite stasis and favour infection.

2. The kidney must be drained by temporary nephrostomy for ten days. With the diathermy knife a clean hole can be made through the convex border of the kidney and this accommodates a winged catheter.

3. The anastomosis should be supported for five days or more by an in-dwelling ureteric catheter.

4. It is unnecessary, and when they are large harmful, to divide abnormal renal vessels which are so often the cause of obstruction at the pelvic-ureteric junction.

Less important but possible factors which make for

success are that the interior of the kidney shall be washed out twice daily with mercuriochrome solution through the nephrostomy tube, and that as soon as the nephrostomy wound has closed the patient shall receive a full course of sodium mandelate.

CASE I

A man, aged 27, was admitted to hospital on account of anuria. There was a large stone in the bladder, with another stone in the lower third of the right ureter. Under spinal anaesthesia suprapubic cystostomy was performed. The stone in the bladder was removed, and the stone in the right ureter was extracted by slitting up the right ureteric orifice. The patient was then given continuous intravenous injection of isotonic sodium sulphate, which produced copious diuresis. Later the left kidney was shown by pyelography to be hydronephrotic, the hydronephrosis being mainly of the pelvic type. Three weeks after the first operation the left kidney was

exposed, and the plastic procedure detailed in this paper was carried out. The wound healed within three weeks. Excretory pyelography shows that both kidneys are now functioning satisfactorily.

CASE II

In a woman, aged 31, laparotomy had been performed eighteen months previously for an abdominal condition, believed to be acute appendicitis. A hydronephrosis was found and aberrant renal vessels were stated to have been divided. The attacks of right-sided abdominal pain had continued. Pyelography showed a large hydronephrosis, mainly of the pelvic type. An operation similar to the above was carried out, a very large hydronephrotic sac being excised. The temporary nephrostomy closed four days after the tube was removed, and the kidney has been shown to be functioning admirably.

FIG. 3.—The obstruction at the pelvi-ureteric junction is identified and the ureter is severed from the hydronephrotic sac.