

OSTEOARTHRITIS OF THE ELBOW FOLLOWING AN EXTENSIVE DARRACH PROCEDURE

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Extensive radiohumeral joint degeneration was found at the elbow in a 41-year-old woman after an (extensive) Darrach procedure. Arguments supporting the hypothesis of a proximal migration of the radius are presented.

Keywords : elbow ; osteoarthritis ; Darrach.

Mots-clés : coude ; arthrose ; Darrach.

INTRODUCTION

The influence of radial head resection on the distal radioulnar joint (DRUJ) has been described by several authors. A progressive ascent of the radius occurs, with a pseudolengthening of the ulna (1, 3). This increased ulnar length leads to degeneration of the ulnar compartment of the wrist, the so-called ulnar impaction syndrome.

In 1992, Murata *et al.* (4) demonstrated that degeneration of the radial head resulted in degenerative ruptures of the triangular fibrocartilage complex (TFCC) and explained it through a similar mechanism : cartilage loss leading to progressive ascent of the radius.

Resection of the ulnar head (Darrach procedure) has been associated with several complications, ulnar shift of the carpus and instability of the proximal ulnar shaft being the most frequent.

We describe a case of secondary degeneration of the radiohumeral joint following an extensive Darrach procedure. We were unable to find a previous report of such a case.

CASE REPORT

A 41-year-old female patient consulted the upper limb clinic for progressive pain in her right

elbow. She reported no previous trauma. At the age of 15, she had undergone a resection of the distal ulna, according to her, for a tumor of the ulnar head. No further details about this operation or its indication could be retrieved.

On physical examination, swelling of the elbow joint with marked synovial effusion was obvious. Mobility testing revealed an extension deficit of 10°, with 100° of flexion. Pronation and supination were limited to 30° and were painful. The elbow was stable. The maximum tenderness was located at the radiohumeral joint space. The wrist was without symptoms and the proximal ulnar stump did not cause any symptoms.

Radiographs confirmed the synovial swelling and showed degenerative osteoarthritis of the radiohumeral compartment of the elbow (fig. 1). At the wrist, the extensive resection (4 cm) of the



Fig. 1. — Radiograph of the elbow, demonstrating the signs of osteoarthritis.

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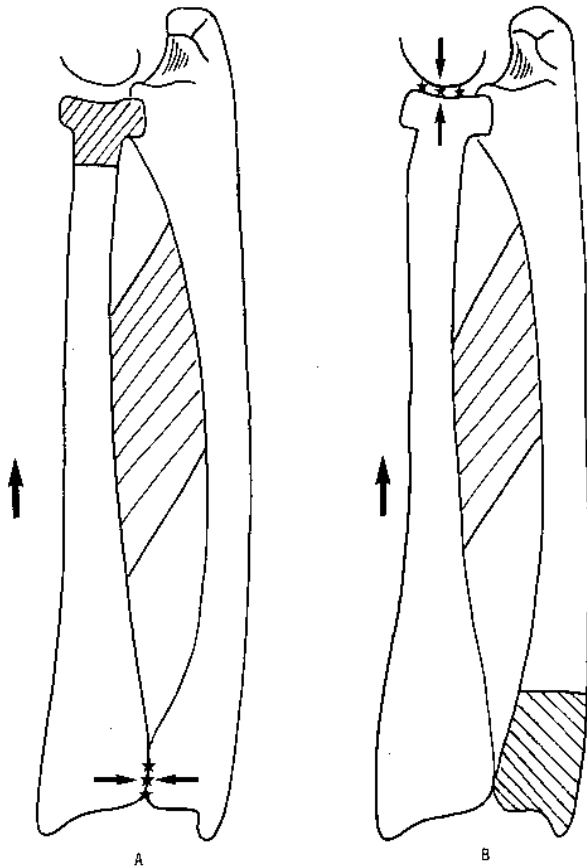


Fig. 2a. — Schematic drawing of the proximalisation of the radius after radial head resection. Disturbances of the distal radioulnar joint (*).

Fig. 2b. — Similar mechanism with ascent of the radius after Darrach's procedure. Higher pressure in the radiohumeral joint leading to degenerative changes (*).

distal ulna was obvious. The joint fluid analysis did not demonstrate an inflammatory reaction.

Arthroscopy was performed to evaluate the cartilage. The head of the radius was completely eroded with bare bone over the whole surface.

NSAID's, physiotherapy, rest and intra-articular injection with glucocorticoids had only a temporary effect, and a surgical solution was requested. Resection of the radial head with conversion of the forearm to a one-bone forearm was performed. The radius and ulna were approached through a single oblique incision, and both bones were exposed subperiosteally. The interosseous membrane was divided, and facing cortices were abraded. A



Fig. 3. — Postoperative radiograph with interposition of bone graft and tension band wiring.

corticocancellous iliac crest graft was interposed and fixed with 4 pins through the radius and ulna. A double cerclage wiring was performed, each over 2 pins. An above-elbow cast was worn for 4 months. At 6 months the K-wires were removed. The consolidation of the fusion between radius and ulna was slow and required a second operation with the addition of bone grafts (fig. 4). At 8 months consolidation was obvious (fig. 3). The radial head was completely eroded, with all cartilage rubbed off.

The elbow pain was completely resolved with preservation of the preoperative flexion-extension ($-10^{\circ}/100^{\circ}$); wrist and hand function remained normal. The forearm rotation was blocked in 20° of pronation. The patient could use her right upper limb again for usual housekeeping tasks but could not resume her previous job, due to the restriction in mobility.



Fig. 4. — Radiography, 8 months postoperatively.

DISCUSSION

The relationship between radius and ulna has been studied recently but the role of the interosseous membrane (I.O.M.) has not been clearly delineated. That such a strong fibrous structure has an important biomechanical function seems obvious (5, 9). The main direction of the fibers favors an ascent of the radius when the proximal stabilization is lost as after radial head fractures and/or resections (fig. 2a).

When the distal connections between radius and ulna are lost, a similar proximal migration of the radius is, on theoretical grounds, also possible. This could lead to increased pressure in the radial compartment of the elbow joint with secondary osteoarthritis (fig. 2b).

Although the Darrach procedure has been very popular, its application in young adults and children is limited, and the long term effect of this procedure on the elbow has not been reported. In this case, several arguments in favor of the ascending hypothesis are present: the unilaterality of the osteoarthritis in a woman not subjected to heavy labor, the preservation of the ulnar compartment of the diseased elbow, the extensiveness of the resection, probably disturbing all distal radioulnar connections.

Since the upper limb is not weight bearing, osteoarthritis of the elbow is infrequent, usually secondary to trauma, inflammation and other intra-articular processes. The long symptom-free interval between the initial procedure and the complaints reflects the slow progression of degeneration and the good tolerance of elbow osteoarthritis.

Surgical options for treatment of radiohumeral osteoarthritis remain limited, and radial head resection is the gold standard. Replacement of the head by a Silastic implant is no longer recommended; metallic prostheses are available, but have not stood the test of time.

REFERENCES

1. Campbell C., Waters P., Emans J. Excision of the radial head for congenital dislocations. *J. Bone Joint Surg.*, 1994, 74-A, 726-733.
2. Hotchkiss R., An K., Sowa D., Basta S., Weiland A. An anatomic and mechanical study of the interosseous membrane of the forearm: pathomechanics of proximal migration of the radius. *J. Hand Surg.*, 1989, 14-A, 256-261.
3. Mikić Z., Vukadinovic S. Late results in fractures of the radial head treated by excision. *Clin. Orthop.*, 1983, 181, 220-228.
4. Murata M., Ikuta Y., Mrakami T., Ikeda A. Degenerative changes of ulnar variance. Presented at the Vth IFSSH meeting, Paris, May 25, 1992, European Medical Bibliography, 1992, 1, Suppl. 1, p. 44.
5. Zancolli B., Corri E. The inter-osseous membrane of the forearm pathomechanics of proximal migration of the radius. *Atlas of surgical anatomy of the hand, part I.* New York, Churchill Livingstone, 1992, 414-415.

SAMENVATTING

P. STUER, L. DE SMET, G. FABRY. Osteoartrose van de elleboog na uitgebreide Darrach procedure.

Een 41-jarige patiënte werd gezien met ernstige radio-humerale artrose na een Darrach resectie van de distale ulna. We verklaren dit fenomeen op basis van een proximale migratie van de radius.

RÉSUMÉ

P. STUER, L. DE SMET, G. FABRY. Arthrose du coude après résection de l'extrémité inférieure du cubitus selon Darrach.

Les auteurs présentent un cas d'arthrose du coude après résection de l'extrémité inférieure du cubitus. Ils l'expliquent par une ascension secondaire du radius.