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Treatment of distal radial fractures in elderly patients

Leczenie złamań końca dalszego kości promieniowej u osób w wieku podeszłym

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Summary

Fractures of distal radius make up to 30% of all fractures in patients over 50 years of age. Primary goal of treatment of these fractures is preservation of hand and forearm function. Aggressiveness of treatment regimen needs to be tailored to patients comorbidities and preferences. Avoiding complications is of utmost importance. Low mechanical strength of the bone needs to be taken into account. Secondary displacement and implant failure is not rare. Elderly patients, however, have higher tolerance to wrist deformation. Primary treatment method is closed reduction and immobilization in plaster cast. Unstable or displaced fractures require operative stabilization, most commonly with K-wires. Locked plates can provide stable fixation in osteoporotic bone. External fixation is used in the case of severe bone fragmentation. Late result depends on finger motion, therefore metacarpophalangeal joints should not be immobilized. Early range of motion exercises of metacarpophalangeal and interphalangeal joints should be instituted.

Key words: distal radius, fracture, treatment

Streszczenie

Złamania dalszego końca kości promieniowej stanowią około 30% wszystkich złamań u pacjentów powyżej 50 roku życia. Pierwszorzędowym celem leczenia tych złamań jest zachowanie funkcji ręki i przedramienia. Agresywność leczenia należy dostosować do stanu i oczekiwań pacjenta. Priorytetem jest unikanie powikłań. Przy doborze metody leczenia należy brać pod uwagę niską wytrzymałość tkanki kostnej u tych pacjentów oraz łatwość, z jaką dochodzi do przemieszczeń wtórnych złamań i obluzowania zespołów metalowych. Pacjenci w wieku podeszłym lepiej od pacjentów młodych tolerują natomiast deformacje w obrębie dalszego końca przedramienia. Podstawową metodą leczenia jest unieruchomienie w opatrunku gipsowym. Złamania wtórnie przemieszczone lub wykazujące pierwotnie cechy niestabilności wymagają leczenia operacyjnego. Stabilizacja operacyjna najczęściej ma postać przezskórnej stabilizacji drutami Kirschnera. Zastosowanie anatomicznych płyt blokowanych pozwala na uzyskanie stabilnego zespolenia nawet w kości zmienionej osteoporotycznie. W przypadkach znacznego zmiążdżenia tkanki kostnej stosuje się stabilizację zewnętrzną. Na wynik odległy wpływ ma także zachowanie ruchomości palców – należy unikać unieruchamiania stawów śródrečno-palcowych w opatrunku gipsowym i wcześniej wdrażać ćwiczenia zapobiegające przykurczom w stawach śródrečno-palcowych i stawach palców.

Słowa kluczowe: dalszy koniec kości promieniowej, złamanie, leczenie

Fractures of the distal part of the radius constitute approximately 30% of all fractures in patients over 50 years of age (1). These fractures are rarely life threatening, but by leading to disability of the upper limb they may significantly influence the quality of life (2). The distal end of the radius participates in creating a complex system, which comprises the radiocarpal joint (divided into the radioscapoid joint and the radiolunate joint) and the distal radioulnar joint

(3). Together with the triangular cartilage complex, this connection ensures a broad range of movement, which is necessary for the function of the hand. In elderly persons, distal radial fractures are frequently classified as comminuted fractures. In this situation, reconstruction of the normal anatomical position is difficult, or even impossible. For this reason, the main purpose in this situation is to reconstruct the function, not the anatomical structure of the limb (4).

PURPOSE OF THE TREATMENT

Ring and Jupiter distinguished the following treatment objectives for fractures of the distal part of the radius in elderly patients (5):

1. Maintaining function of the hand and fingers.
2. Maintaining function of the forearm.
3. Adapting the treatment method to the situation and the patient's expectations.
4. Avoiding complications.

The authors emphasize that anatomical reconstruction of bone fragments in elderly patients is difficult to achieve, and even if it is successful, secondary displacements easily occur (6). Therefore, the main objective should be to maintain the function of the limb and to avoid treatment complications, while reconstructing anatomical structures should be the secondary objective. Such management is also justified by observation that elderly patients better tolerate deformation within the distal part of the forearm than younger patients do (4).

OVERVIEW OF TREATMENT METHODS

Immobilization in a plaster cast

The majority of fractures are immobilized in a plaster cast (7-9). This method is used in the case of undisplaced fractures and stable fractures after reduction.

Due to the aforementioned comminuted bone tissue, the secondary displacement of bone fragments should be considered (4, 5).

Fixation with percutaneously inserted wires

Fixation with percutaneously inserted Kirschner wires is performed after obtaining closed reduction of the fracture (fig. 1). Wires measuring 1.4-1.8 mm in diameter are used, and they are maintained over the period of 6 weeks (10).

External fixation

The secondary displacement inevitably occurs after reduction if the bone tissue is severely comminuted and the bone fragments do not have suitable support. Applying an external fixation (fig. 2) protects against the occurrence of these secondary displacements of the bone fragments, while the bone is healing (11-13).

Internal fixation

Unstable fractures of the distal end of the radius may be treated with an internal fixation method (fig. 3). Anatomically modelled plates, which support the angular locking of the screws, have been available for a



Fig. 1. Closed reduction and K-wire fixation of an unstable extra-articular fracture.



Fig. 2. External fixation of the distal radial fracture with significantly comminuted cortical layers.

few years (14, 15). The plate with the locked screws is similar to a comb, which holds the bone fragments together (16). For this reason, weight bearing is transferred through the fusion, not through the cortical layers, which were comminuted as a result of the fracture. Locking the screws in the plate significantly increases fusion durability and protects it from the occurrence of secondary displacements. This method facilitates early rehabilitation of the patient, which is an advantage over other methods, which require longer immobilization (17-20).

MANAGEMENT DURING TREATMENT

Antiedema therapy

As it was mentioned before, regardless of the selected treatment method, maintaining the function of the hand and fingers significantly influences the final outcome. Therefore, it is necessary to act in order to limit increase of limb edema – it is recommended to keep the limb elevated. The frequently used arm sling

does not have any anti-edematous effect! Gravitation drainage of edematous fluid is ensured by placing the limb according to the following rule: “fingers above the elbow, and the elbow above the heart”. Such position should be necessarily used at night and, if possible, during the day.

Rehabilitation of fingers

Besides antiedema therapy, maintaining the mobility of the fingers is equally important. This objective is achieved by a few simple exercises performed from the first day following the fracture (fig. 4).

SUMMARY

The primary objective in the treatment of distal radial fractures in elderly patients is to maintain the function of the hand and the forearm. The treatment method should be adapted to the patient’s condition and expectations. It is of major importance to avoid treatment related complications.



Fig. 3. Internal fixation of an unstable intra-articular fracture.

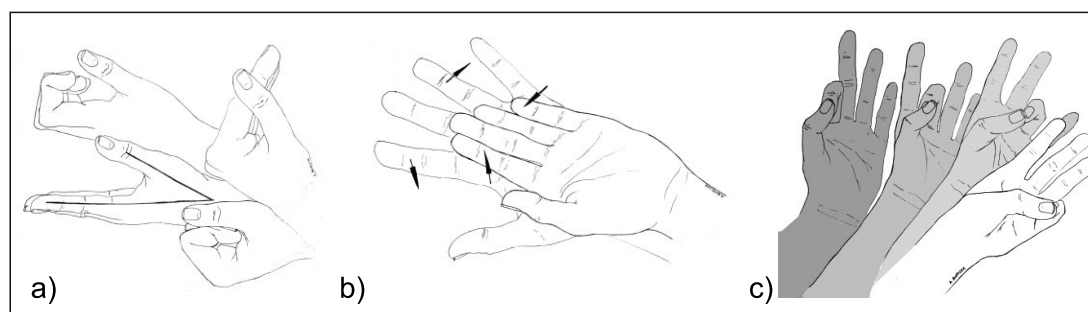


Fig. 4. Finger exercises in the metacarpophalangeal joints, the proximal interphalangeal joints and the distal interphalangeal joints (a), abduction exercises and the adduction of fingers (b), exercises of the thumb and the fingers opposition (c). (Author of the drawing – Agata Boszczyk).

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