The “Clip U2”, a new device in treating distal radial fractures

Abstract Fracture of the distal radius is one of the most common lesions in the trauma practice. The relation between anatomic reconstruction, early motion and good or excellent clinical outcome, is well known. The “Clip U2”, a new elastic pinning device used in the treatment of the distal radius fracture, promised to secure the reduction and to allow early functional treatment with a simple and minimally invasive technique. Convinced of the possible advantages of this technique, as presented to us by the inventor of the technique, we started a prospective trial in the setting of a university teaching hospital. Both the clinical and radiographic results were disappointing, so we were forced to abandon the trial after 14 patients. We present our clinical and radiographic data.

Keywords Distal radius · Fracture · Clinical outcome · Radiographic outcome · Osteosynthesis

Introduction Fracture of the distal radius is one of the most common lesions in the trauma practice, representing every sixth fracture treated in an emergency room. Typically, one can distinguish between fractures in the young, male, patient due to a high-energy trauma and those in older, post-menopausal women following a low-energy fall. In both age groups, most fractures show radiographic signs of articular disruption [14]. Many forms of treatment have been advocated, all having their own indication based on fracture type, population profile, surgeon’s experience and patient desires and expectations. The relation between functional outcome and anatomic reconstruction of the distal radius and ulna has been proved by many authors [1, 3, 6, 10, 20]. Recently, the “Clip U2” has been introduced as a new device for the treatment of distal radius fractures. As reported by its developer, it should combine the advantages of a secure fixation of reduction allowing immediate mobilisation following an easy, minimally invasive technique [4]. We planned a prospective evaluation of the technique and implant, after the reporting of excellent results by the developer of the technique [4].

Materials and methods Between June and October 2000, 14 patients with fractures of the distal radius were consecutively included in the study. Exclusion
criteria were volar displaced fractures, patients in whom a follow-up of 6 months was not guaranteed, patients with concomitant lesions of the same arm or bilateral fractures, previous fracture of the ipsilateral or contralateral wrist or hand, extensive comminution both of the articular surface and metaphysis, and refusal to participate. Two male and 12 female patients were included. Mean age was 64.1 (range 17–83) years.

Fractures were classified according to the Fryckman [5] classification. Two patients had a Fryckman I fracture, nine a II, one a IV, one a VI, and one a VII. The majority of fractures (11/14) were extra-articular (concerning the radio-carpal joint). One of the Fryckman II fractures was treated in the first instance with closed reduction and plaster cast immobilisation, but it re-dislocated and was included 10 days after initial trauma.

In the 12 women patients (62–83 years) a low-energy trauma caused the fracture; in all instances, pre-existing osteoporosis (post-menopausal) was an etiologic co-factor. Both male patients (17 and 29 years) were victims of a high-energy trauma, causing a more complex fracture form.

The operation was performed under tourniquet control. After sterile draping, the arm was positioned on a radiolucent side table. The fracture was reduced and held reduced by an assistant. The device held the reduction but was no reduction aid. An incision of ± 3 cm was made over the tuberculum listeria. The third extensor compartment was opened and the extensor pollicis longus tendon was transposed to the ulnar side. The second extensor loge was dissected from the distal radius in a sub-periosteal fashion and transposed to the radial side. On both sides of the tuberculum listeria, a hole was made in the dorsal cortex as distally as possible using a sharp owl. The Clip U2 was then introduced using the manual assist device and pushed firmly against the dorsal cortex. Reduction and exact positioning of the clip were shown under the image intensifier. If reduction was sufficient, the tendons were brought back into place. The retinaculum extensorum was closed, with subcutaneous transposition of the extensor pollicis longus tendon (Fig. 1).

On the first post-operative day, active range of motion exercises of the hand, wrist and elbow were started. Physiotherapy was prescribed, with active ROM and strengthening exercises.

Post-operative control, both clinical and radiographic, was planned at day 1 and weeks 3, 6, 9, 13 and 26. Radiographic control consisted of an antero-posterior (AP) and a lateral view. Clinical evaluation at weeks 3, 6, 9, 13, and 26 consisted of wound and ROM control, as in evaluation of the neuro-vascular status. At weeks 13 and 26, grip strength and a questionnaire on activities of daily living (ADL) completed the clinical evaluation.

Results

Intra-operatively during one procedure, we were obliged to cancel the planned clipping and perform a Kapandji pinning because of too great a comminution of the metaphysis, making an intra-osseous localisation of the implant impossible.

Mean hospitalisation was 2.45 (range 2–4) days. On the first post-operative day, physiotherapy was initiated, with active and passive mobilisation of all joints of the upper extremity including the wrist joint. Strengthening exercises were started as soon as the first signs of bony consolidation of the fracture were recorded.

In one patient, a loss of reduction with posterior tilting was recorded 1 week post-operatively. On day 12 post-operatively, a conversion to open reduction and fixation with a volar AO T-plate was performed.

At the 3-month post-operative evaluation, one patient was lost to follow-up (deceased following an unrelated illness). At 6 months, two more patients were lost to follow-up. These patients mentioned no specific problems when contacted by telephone, but would not present for a clinical control investigation; both scored rather badly both clinically and radiographically at the 3-month follow-up investigation. Between the 3- and 6-month follow-ups, we were obliged to remove the implant in two patients because of loosening of the implant, which caused a painful migration that limited the extension.

At the 3-month investigation, we were able to evaluate 11 patients and, at the six-month investigation, nine. Clinically, five patients (45%) reported complaints limiting their ADL after 3 months. None reported major limitations. After 6 months, only one patient (16%) reported limited ADL. Mean Cooney score [2] after 3 months was 75.6 (range 65–95) points (maximum score 100). One patient obtained an excellent result, six good, and two fair. After 6 months, the mean Cooney score was 88.8 points (three excellent and five good results). The worst scoring evaluation criteria were strength of grip and ROM, both at 3 and 6 months post-operatively.

Radiographic evaluation after 3 months showed radial shortening (Fig. 2) in all patients, ranging from 1 to 6 (mean 3) mm. Clip migration was present in 9/11 patients (82%) ranging from 0 to 18 (mean 5.7) mm. Loss of reduction (Fig. 3.) was seen in the lateral plane in five patients (45%) and in the AP plane (radio carpal angle) in three (27%). Radiographic results at 6 months were similar, although the two patients who refused re-evaluation had bad radiographic results after 3 months. In all patients, an excellent reduction was obtained intra-operatively.

Discussion

Although fractures of the distal radius are common, they are not easy to treat and remain a challenging problem in the trauma practice. The wrist is composed of three