

Journal Club: 28 May 2015

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Costa ML, Achten J, Parsons NR, Rangan A, Griffin D, Tubeuf S, Lamb SE.
Percutaneous fixation with Kirschner wires versus volar locking plate fixation in adults with dorsally displaced fracture of distal radius: randomised controlled trial. *BMJ* 2014;349:g4807.

Aim

- To compare the clinical effectiveness of Kirschner wire fixation with locking plates for dorsally displaced distal radius fractures
- The hypothesis was that locking plates would provide improvements in the patient related wrist evaluation (PRWE) score in the 12 months after surgery

METHODS

This is a UK multicentre prospective randomised pragmatic trial of patients 18 years and over with a distal radius fracture.

Patients were randomised by centre, age and whether the fracture was intra- or extra-articular into two groups: Kirschner wire (K wire) fixation or open reduction and internal fixation with a volar locking plate.

The primary outcome was PRWE via postal questionnaire at 3, 6 and 12 months post-operatively. Secondary outcomes were DASH and EQ-5D scores, and complications. Retrospective pre-fixation scores were obtained at baseline.

Inclusion criteria

- Fractures included were within 3 cm of the wrist joint, dorsally displaced and considered by the treating surgeon to require fixation

Exclusion criteria

- Those fractures more than 2 weeks old, more than 3 cm extension proximal to the radiocarpal joint, open fractures, fractures which were irreducible closed, patients unsuitable for general anaesthetic and patients unable to complete the questionnaires

RESULTS

639 patients were eligible to participate, of which 461 were included.

A telephone randomisation service allocated 230 patients to K wire fixation and 231 to plate fixation.

Mean age was 59.7 and 58.3 years respectively.

Baseline characteristics were similar between the groups and surgery was performed by 244 different surgeons.

PRWE improved with time for both groups but remained 15% worse than baseline.

There was no significant difference in PRWE, EQ-5D or complications between groups.

Patients allocated to plate fixation had a marginally better DASH score ($p=0.051$) but the size effect was small (-3.2).

Subgroup analysis of patients by age (<50 years and >50 years), and fracture site (intra- and extra-articular) revealed no difference in PWRE between fixation groups.

Significantly more patients were immobilized following wire fixation (98%) compared with plates (75%).

Discussion

The authors acknowledge the difference between clinical and statistical significance and conclude that there is no difference in functional outcome at 12 months for K wires compared with plate fixation. They state that their results contradict previous studies, suggesting that plate fixation is associated with improved early functional outcomes.

CRITIQUE

Strengths of the study

High compliance with randomisation (over 90% received allocated treatment)

Patient numbers exceeded the number required according to power analysis

Intention to treat analysis

Multicentre

Large number of surgeons included

Reflects routine current practice

Data collection is ongoing for late results

Methodological concerns

Mostly unblinded

Cannot be generalised to fractures requiring open reduction to restore joint congruity

No standardised criteria for 'requires surgical fixation'

No assessment of quality of reduction or re-displacement

Short follow-up

No control group

No objective measures such as range of movement

75% of patients received a cast following plate fixation

Overall conclusion

The results suggest that the early functional outcome of distal radius fractures reducible by closed means is similar when treated with wires or a plate. Whether K wires should be preferentially used is uncertain, particularly given the short follow-up. The study design was robust and correctly focussed on answering the hypothesis, but objective outcomes were not considered. The quality of reduction was not assessed and may have long-term consequences on outcome. Furthermore, plaster immobilization was used in 75% of the plate group. The

duration of casting is unknown, but it may explain why no early functional advantage was detected following plating which has been observed by others.

In conclusion, K wire fixation may be considered a good option if the joint is congruent and the fracture reducible closed. Wires have fallen out of favour in many units, and this paper serves as an important reminder of the value of this fixation technique.