Simple treatment for torus fractures of the distal radius

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The use of a "Futura-type" wrist splint versus a traditional forearm plaster-of-Paris cast for the treatment of torus (buckle) fractures of the distal radius in children.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised children with torus fractures of the distal radius.

Setting
The setting was secondary care. The study was conducted in the UK.

Dates to which data relate
The dates to which the effectiveness and cost data referred were not reported. The price year was also not stated.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The cost data were not obtained at the patient level. An average cost of treatment for each intervention was estimated from the expected resource use in routine practice.

Study sample
The study sample consisted of children with torus fractures of the distal radius who attended the fracture clinic of one hospital over a 6-month period. The patients had initially been seen in the Accident and Emergency Department of the hospital (AED), where the diagnosis had been made from a radiograph and the fracture had been immobilised by a metal splint held in place with a crepe bandage.

In total, 201 children were recruited for the study. There were 107 (53.2%) boys and 94 (46.8%) girls, with a mean age of 8.9 years (range: 2 - 15). Of these, 85 had a plaster-of-Paris cast and 116 a Futura splint. Two patients were excluded from the study, one because her parents requested treatment with a cast rather than a splint and one in whom at follow-up (3 weeks later) it was noted that the fracture was of the greenstick type rather than a true torus fracture.
There was no evidence that the initial study sample was appropriate for the clinical study question. No statistical analysis of the results was undertaken. Hence, no power calculations were performed.

The authors also conducted a postal survey by sending a questionnaire to 104 members of the British Society for Children's Orthopaedic Surgery. This survey was carried out to ascertain the incidence of this type of fracture and the methods of treatment used in clinical practice.

**Study design**

The authors characterised the study as a prospective randomised controlled trial (RCT), which was conducted in the fracture clinic of one hospital. However, the method by which the patients were assigned to one of the treatments (cast or split) was not random since it was based on a predefined characteristic, the date on which patients attended the fracture clinic, which was usually the day after injury. A follow-up appointment was made for 3 weeks after the treatment had been applied. At follow-up, the cast or splint was removed and clinical examination and radiography were undertaken. In addition, the parents and patients were questioned to ensure that there had been no problems associated with the treatment.

Of the 201 patients participating in the study, 22 failed to attend the follow-up appointment (4 in the cast group and 18 in the splint group). This left 179 patients in the study, 81 treated with a cast and 98 with a splint. No blinding method was described for the outcome assessment. Seventy-one (68.3%) replies to the postal survey were received, of which 65 dealt with this type of injury and were subsequently analysed.

**Analysis of effectiveness**

The analysis of the prospective study was conducted on the basis of treatment completers only. The health outcomes assessed were cure of fractures, as confirmed by clinical and radiological examination, and patient compliance. It was not shown whether the two groups were comparable at analysis. The postal survey examined the incidence of torus fractures of the distal radius and the type of treatment undertaken in the AED, and also whether and when patients were seen in the fracture clinic, and whether treatment was changed in the clinic and if further radiographs were obtained. The questionnaire also enquired about the length of treatment, and whether further review and follow-up radiographs were undertaken.

**Effectiveness results**

In the prospective study all fractures were united clinically and radiologically with no loss of position.

Compliance with both types of treatment was good, except for two very young patients who tried to remove their splints shortly after they had been applied.

The postal survey revealed that the mean number of torus fractures of the distal radius seen per week was 5.1 (+/- 4.8) for each consultant.

Of the 65 consultants whose answers were analysed, 62 (95%) stated that the injuries were seen in the fracture clinic at a mean of 1.1 (+/- 3.6) days after injury.

In the AED, 48 consultants (73.8%) used plaster-of-Paris backslabs, 16 (24.6%) used full plaster-of-Paris casts, and one (1.5%) used wrist splints.

After the child had been seen in the clinic, these figures altered to 18 (27.7%) plaster-of-Paris backslabs, 42 (64.6%) full plaster-of-Paris casts, and 5 (7.7%) wrist splints.

The fractures were immobilised for a mean of 2.9 (+/- 0.64) weeks (range: 1 - 4). Fifty-four consultants (83.1%) reported that the patients were reviewed again at a mean of 2.5 (+/- 1.3) weeks (range: 2 - 4) after the initial visit.

Seven consultants (10.8%) stated that a radiograph was taken after changing the treatment at the initial visit and 11 (16.9%) took a radiograph routinely at the end of treatment.
Clinical conclusions
According to the authors, the prospective clinical study showed that both treatments were effective and well tolerated. There were no complications, suggesting that clinical and radiological follow-up was not required. The postal survey demonstrated that torus fractures of the distal radius were a common injury in children and that there was wide variation in the way in which these injuries were treated.

Measure of benefits used in the economic analysis
No summary measure of benefit was used in the economic analysis. The study was characterised as a cost-consequences analysis.

Direct costs
The perspective of the study was not stated, but it seems to have been that of the health care provider. The costs of treating torus fractures of the distal radius in children were included in the analysis. These costs covered the radiograph in the AED, attendance at the fracture clinic, application of a cast or splint, the temporary splint required before the application of a cast, and an additional cost arising from further attendance in the case of patients treated by cast. The cost components were reported separately. The estimation of costs was not derived from the patient sample, but was based on authors’ opinion on expected resource use in routine practice. The costs were obtained from the contracts department of the hospital where the study took place. Discounting was not necessary, since the costs were incurred during a short time (maximum 3 weeks). The price year was not reported.

Statistical analysis of costs
The costs were treated deterministically. No statistical analysis of the costs was undertaken.

Indirect Costs
The indirect costs were not included in the analysis.

Currency
UK pounds sterling (£).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The total cost per case was 65.75 for treatment with a "Futura-type" wrist splint and 116.98 for treatment with a forearm plaster-of-Paris cast.

If the 85 children treated with a cast had had a "Futura-type" wrist splint, this would have resulted in a total saving of 4,505.

Synthesis of costs and benefits
Not applicable as this study was, in effect, a cost-consequences analysis.
Authors' conclusions
The "Futura-type" wrist splint was a safe and acceptable treatment for torus fractures of the distal radius in children. It was also associated with major benefits in terms of cost and a reduction in the number of attendances.

CRD COMMENTARY - Selection of comparators
The selection of the comparator (plaster-of-Paris cast) was not clearly justified. The results of the postal survey showed that there was considerable variation in the treatment of torus fractures of the distal radius in children, with plaster-of-Paris backslabs, full plaster-of-Paris cast, or wrist splints being used. You should consider whether the comparator reflects widely used practice in your own setting.

Validity of estimate of measure of effectiveness
The basis of the analysis was a non-RCT. The authors characterised their study as an RCT, but the patients were assigned to treatment based on a predefined characteristic, such as the date of presentation to the fracture clinic, and not randomly. This method of assignment is subject to selection bias. The study sample was likely to be representative of the patient population, although this was not discussed. No statistical analysis was performed in order to investigate whether the results were statistically significant. It was not shown whether the two groups were comparable at analysis. The analysis was conducted on the basis of treatment completers only. No blinding method was used to avoid assessment bias.

Validity of estimate of measure of benefit
The authors did not derive a summary measure of health benefit. The analysis was therefore categorised as a cost-consequences analysis.

Validity of estimate of costs
The study perspective was not stated, but it was consistent with that of the health care provider. All the categories of cost relevant to this perspective were included in the analysis. The cost components were analysed separately, which increases the generalisability of the results. The costs were not derived from the study sample. Instead, they were derived from authors' estimates on the expected use of resources in routine practice. No statistical or sensitivity analyses of the costs were undertaken and this limits the interpretation of the study findings. The year to which the prices referred was not reported, which hinders the reproducibility of the results.

Other issues
The authors did not compare their findings with those of other studies. The issue of generalisability to other settings was not addressed. The authors did not report any limitations. The results of the study were adequately reported. The authors' conclusions reflected the scope of the study. However, the lack of any statistical analysis of the results limited the validity of their interpretation.

Implications of the study
The authors recommended use of a "Futura-type" wrist splint for the treatment of torus fractures of the distal radius in children, with subsequent review of patients on the following day of application in order to confirm the diagnosis and give appropriate advice.

Source of funding
None stated.

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