Choosing a strategy for the diagnostic management of suspected scaphoid fracture: a cost-effectiveness analysis

Tiel-van Buul M M, Broekhuizen T H, van Beek E J, Bossuyt P M

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
Diagnostic management of suspected scaphoid fracture.

Type of intervention
Diagnosis; Therapy.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with clinically suspected fracture of the scaphoid after carpal injury.

Setting
Not stated. The economic study was conducted in Amsterdam, the Netherlands.

Dates to which data relate
Not stated.

Source of effectiveness data
One descriptive management study and a review of studies.

Study sample
160 consecutive patients with clinically suspected fracture of the scaphoid after carpal injury.

Study design
Case series.

Analysis of effectiveness
The primary health outcomes considered were the effectiveness and adequacy of treatment (as measured by expected non-union rate) and immobilisation time (weeks).

Effectiveness results
The non-union rate (%) was 4.7% for strategy A, 4.2% for B and 3.1% for C, compared to 3.1% for the reference
strategy. The immobilisation time (mean, weeks) was 5.7 for A, 8.6 for B and 6.9 for C, compared to 5.6 for the reference strategy.

Clinical conclusions
The use of bone scintigraphy in the diagnostic management of scaphoid fractures was accurate and also convenient for the patients.

Modelling
A decision-analytic model was built in order to assess the social consequences in terms of the immobilisation period.

Outcomes assessed in the review
Prevalence of scaphoid fracture, sensitivity and specificity of radiographs and bone scintigraphy. Incidence of non-union was also assessed.

Study designs and other criteria for inclusion in the review
Not stated.

Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Not clearly stated.

Methods of combining primary studies
Narrative.

Investigation of differences between primary studies
Not applicable: different outcomes were assessed by the primary studies.

Results of the review
The estimates used in the analysis were:

prevalence of scaphoid fracture: 44%,

sensitivity of radiography: 59% first series, 31% two weeks, 30% six weeks, with a specificity of 100%.

For bone scintigraphy, the specificity was 98%, with a sensitivity of 100%.
The non-union rate was 7% for adequate therapy and 20% for inadequate therapy.

**Measure of benefits used in the economic analysis**
The primary health outcomes considered were effectiveness and adequacy of treatment (as measured by expected non-union rate) and immobilisation time (weeks).

**Direct costs**
Direct health service costs were considered such as cost of materials, personnel, analysis and cost of surgery for non-union. Price dates were not stated.

**Currency**
European Currency Unit: ECU (1 ECU = US$1.15, 0.68, DM1.97)

**Sensitivity analysis**
One-way sensitivity analyses were performed to assess the effects of plausible changes in values of various unspecified parameters. In addition, a simultaneous probabilistic sensitivity analysis was carried out, using Monte Carlo simulations, to test primary health outcomes.

**Estimated benefits used in the economic analysis**
The non-union rate (%) was: 4.7% for strategy A, 4.2% for B, and 3.1% for C, compared to 3.1% for the reference strategy.

The immobilisation time (mean, weeks) was 5.7 for A, 8.6 for B and 6.9 for C, compared to 5.6 for the reference strategy.

The baseline estimates used in the analysis were:
- prevalence of scaphoid fracture: 44%,
- sensitivity of radiography: 59% first series, 31% two weeks, 30% six weeks, with a specificity of 100%.
- For bone scintigraphy, the specificity was 98%, with a sensitivity of 100%.

The non-union rate was 7% for adequate therapy and 20% for inadequate therapy.

**Cost results**
The overall costs were ECU 273.7, ECU 317.7 and ECU 316.1 for strategies A, B, C. The cost per non-union saved for the additional use of bone scintigraphy (C) was ECU 2618 when compared to strategy A, while this was ECU 8973 for strategy B using radiography up to six weeks.

**Synthesis of costs and benefits**
The incremental benefits associated with strategy C were positive, while the overall final costs were negative. Radiography followed by bone scintigraphy was the dominant strategy.

**Authors' conclusions**
The use of bone scintigraphy in the diagnostic management of scaphoid fractures was accurate, convenient for patients and cost-effective.
CRD Commentary
This was, overall, a good and elaborate study. More information on the primary studies considered for the baseline estimates of effectiveness would have added more weight to the final conclusions.

Source of funding
None stated.

Bibliographic details

PubMedID
7799080

Indexing Status
Subject indexing assigned by NLM

MeSH
Carpal Bones /injuries /radiography /radionuclide imaging; Casts, Surgical /economics; Cost-Benefit Analysis; Decision Support Techniques; Fracture Fixation /economics; Fractures, Bone /diagnosis /therapy; Fractures, Ununited /diagnosis /economics /surgery; Humans; Radiography /economics; Radionuclide Imaging /economics; Sensitivity and Specificity

AccessionNumber
21995000148

Date bibliographic record published
31/01/1998

Date abstract record published
31/01/1998