A cost-utility analysis of nonsurgical management, total wrist arthroplasty, and total wrist arthrodesis in rheumatoid arthritis

Cavaliere CM, Chung KC

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.

CRD summary
This study examined the cost-effectiveness of total wrist arthroplasty compared with either nonsurgical management or total wrist arthrodesis, in patients with severe rheumatoid wrist disease. The authors concluded that arthroplasty was a cost-effective strategy for the management of this disease. The study was based on conventional cost-effectiveness methods. A number of assumptions were required, but the authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of total wrist arthroplasty compared with either nonsurgical management or total wrist arthrodesis, in patients with severe rheumatoid wrist disease.

Interventions
Three strategies were considered: nonsurgical management, total wrist arthroplasty, and total wrist arthrodesis.

Location/setting
USA/hospital and secondary care.

Methods
Analytical approach:
The analysis was based on a decision analytic model, with a time horizon of 30 years. The authors stated that a societal perspective was adopted.

Effectiveness data:
A systematic review of the literature was undertaken to identify the key clinical inputs, which were the probabilities of complications (minor, intermediate, or major). Some assumptions were required where no published data were available.

Monetary benefit and utility valuations:
The utility values were from responses to a time trade-off survey in a sample of 49 consecutive patients with rheumatoid arthritis and a national random sample of 109 health care professionals. The patients were recruited from both a hand surgery clinic and a rheumatology clinic for a prospective study. The professionals were hand surgeons or rheumatologists. The survey response rate was 39% for physicians (109 of 300) and 98% for patients (49 out of 50).

Measure of benefit:
Quality-adjusted life-years (QALYs) were the benefit measure.

Cost data:
The economic analysis included the costs of surgeons, anaesthesia, out-patient surgery centre, and nonsurgical management (consultations, medications, splinting, and exercises). Lost productivity due to both disease and treatment was excluded as most patients were likely to be unemployed or unable to work both before and after surgery. The analysis also included the costs of complications. Most of the costs were based on national standards from the Medicare
fee schedule. The costs of hardware were provided, by an industry representative, to the authors’ institution. All costs were in US dollars ($) and the price year was 2008.

Analysis of uncertainty:
A deterministic one-way sensitivity analysis was carried out on the expected survival, complication rates, duration of prostheses, and cost of arthroplasty procedures. Arbitrary ranges of values were used.

Results
The total costs per patient were zero with nonsurgical management, $6,607 with arthrodesis, and $18,478 with arthroplasty. Using patient preferences, the expected QALYs were 12.3 with nonsurgical management, 15.3 with arthrodesis, and 20.4 with arthroplasty. Using physician preferences they were 16.5 with nonsurgical management, 24.0 with arthrodesis, and 25.5 with arthroplasty.

Using patient preferences, the incremental cost per QALY gained compared with nonsurgical management was $2,202 with arthrodesis and $2,281 with arthroplasty. The incremental cost per QALY gained with arthroplasty over arthrodesis was $2,328.

The sensitivity analysis confirmed that these base-case findings were robust and the cost-utility ratio of arthroplasty remained below the threshold of $50,000 per QALY gained even when unfavourable assumptions were made.

Authors’ conclusions
The authors concluded that total wrist arthroplasty was a cost-effective strategy for the management of severe rheumatoid wrist disease.

CRD commentary
Interventions:
The selection of the comparators was appropriate and these strategies are also likely to be relevant in other settings, but the alternatives were not described.

Effectiveness/benefits:
A valid approach was used to find the sources of evidence. A literature review should ensure the identification of relevant studies, but no information was provided on the methods and conduct of this review nor on the design and other characteristics of the selected studies, making it difficult to assess the quality of the evidence. The analysis focused on the assessment of disease-related quality of life, which was analysed using the time trade-off technique, which was valid for this patient population. The authors noted that the utility questionnaire had been tested in a pilot study that involved attending and resident physicians as well as medical students and community members who did not have medical training. The questionnaire response rate and details of recruitment and participation of health care professionals and patients to the study were clearly reported. QALYs were a valid measure and they allow cross-disease comparisons to be made.

Costs:
The authors adopted a wide perspective in the economic analysis and a justification for the exclusion of productivity losses was provided. The unit costs and quantities of resources used were reported. The data sources were also reported and the authors noted that the use of national standards for the cost data should improve the generalisability of the results. The price year was appropriately reported, which will allow reflation exercises for other time periods.

Analysis and results:
The results were clearly reported and the costs and benefits were appropriately combined, using an incremental approach. No discounting appears to have been applied and it would have been relevant given the long time horizon of the analysis. The issue of uncertainty was investigated for a few model inputs that were the most uncertain parameters. The analysis relied on some assumptions due to a lack of reliable published evidence. The utility weights obtained from patients were significantly lower than those obtained from physicians for all health states, which was in contrast with the findings for other diseases. This highlights the negative experience of patients who live with chronic wrist pain. It is unclear why the authors did not estimate the cost-effectiveness ratios using the physicians’ utility values.
Concluding remarks:
The study was based on conventional cost-effectiveness methods. A number of assumptions were required, but the authors’ conclusions appear to be robust.

Funding
Supported by the Integra Corporation, the Robert Wood Johnson Clinical Scholars' Program, the National Institute of Arthritis and Musculoskeletal and Skin Diseases, a Midcareer Investigator Award, and an Exploratory/Developmental Research Grant Award.

Bibliographic details

PubMedID
20193858

DOI
10.1016/j.jhsa.2009.12.013

Original Paper URL
http://dx.doi.org/10.1016/j.jhsa.2009.12.013

Indexing Status
Subject indexing assigned by NLM

MeSH
Arthritis, Rheumatoid /surgery /therapy; Arthrodesis /economics; Arthroplasty /economics; Cost-Benefit Analysis; Decision Support Techniques; Decision Trees; Humans; Postoperative Complications; Practice Patterns, Physicians' /statistics & numerical data; Prospective Studies; Quality-Adjusted Life Years; Treatment Outcome; Wrist Joint

AccessionNumber
22010000801

Date bibliographic record published
11/08/2010

Date abstract record published
15/12/2010