



Centre for Clinical Effectiveness

Enhancing patient outcomes through clinical application of the best available evidence

EVIDENCE CENTRE
CRITICAL APPRAISAL
Series 2002: Therapy

Hip resurfacing in patients with osteoarthritis

Vivienne Bernath

Centre for Clinical Effectiveness
Monash Institute of Health Services Research
Monash Medical Centre
Locked Bag 29
Clayton VIC 3168
Australia

Telephone: +61 3 9594 7505
Fax: +61 3 9594 7552
Email: cce@med.monash.edu.au (quote author of report)
URL: <http://www.med.monash.edu.au/healthservices/cce/>

November 2002

SUMMARY STATEMENT

Disclaimer - please refer to Appendix 1 for information.

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Publication of materials – please use the following format when citing this article:

Bernath, V. (2002). Hip resurfacing in patients with osteoarthritis. (The Centre for Clinical Effectiveness), Available: <http://www.med.monash.edu.au/healthservices/cce>

[Accessed:Access date...]

Form Version – B.2002.01.05.1

REQUEST

How does hip resurfacing (Birmingham hip) compare with total hip replacement in improving mobility in patients who have osteoarthritis in the hip?

REQUESTED BY

Dr Vaidya Bala, Registrar, Rehabilitation, Hampton Rehabilitation Hospital, Hampton.

METHODOLOGY

Search Strategy

The Centre for Clinical Effectiveness defines the 'best available evidence' as that research we can identify that is least susceptible to bias. We determine this according to pre-defined National Health and Medical Research Council (NHMRC, 2000) criteria (see Appendix 1).

First, we search for systematic reviews, evidence based clinical practice guidelines, health technology assessments and randomised controlled trials. If we identify sound, relevant material of this type, the search stops. Otherwise, our search strategy broadens to include studies that are more prone to bias, less generalisable or have other methodological difficulties. We include case-control and longitudinal cohort studies in our critical appraisal reports. While we cite observational and case series studies, and narrative reviews and consensus statements, in our reports we do not critically appraise them. Such studies can produce accurate results but they are generally too prone to bias to allow determination of their validity beyond their immediate setting.

Details of Evidence Request

Patients (Subjects): no age limit, with osteoarthritis

Intervention: "Birmingham hip" resurfacing

Comparisons: total hip replacement

Outcomes: improved mobility, pain control

Search terms

(see Appendix 2 for exact search strategy)

Intervention: birmingham hip, surface replacement and hip, hip resurfacing

Resources Searched

We searched the following databases:

The Cochrane Library (Update Software)- 2002 Issue 4

Medline (OVID)- 1966 to October Week 5 2002

PREMEDLINE (OVID)- November 6, 2002

Current Contents (OVID)- 1993 Week 27 to 2002 Week 45

CINAHL (OVID)- 1982 to October Week 4 2002

Australasian Medical Index (INFORMIT)- October 2002

Refinements, Searching & Reporting Constraints

Since the mid-1990s hip resurfacing procedures have increasingly employed metal-on-metal components, as they are less prone to loosening, wear and failure than the previously used polyethylene bearings. Only articles concerning metal-on-metal components have been considered for this report.

A simple search strategy uncovered a recent comprehensive and regularly updated systematic review. References listed in the relevant publications identified by the search have also been checked for any other potentially useful material.

RESULTS

We found no controlled trials comparing metal-on-metal hip resurfacing with total hip replacement.

However, from our sources we identified two relevant recently published health technology assessment reports, a Technology Appraisal Guidance and an Australian procedure brief on the metal hip resurfacing prosthesis. The health technology assessments are summarised in the attached spreadsheets.

Based on our refinements, searching and reporting constraints we are reasonably confident these articles represent the most relevant findings published to date.

The general findings of the reports is that the available evidence, while not of a high level and lacking longterm followup, suggests metal-on-metal resurfacing of the hip may be a viable and bone-conserving option for adults who are likely to outlive total hip replacement. Training, high-volume practice and patient selection are issues requiring consideration.

EVIDENCE SUMMARIES

Format

Evidence summaries are presented as spreadsheets attached to this report. Each spreadsheet contains the article citation, details of the study design, patient description, scientific validity of the article, results, and pertinent remarks from the authors and Centre for Clinical Effectiveness reviewer.

REFERENCES

ARTICLES CRITICALLY APPRAISED FOR THIS REPORT

Alberta Heritage Foundation for Medical Research Health Technology Assessment (2002). Technote TN 33. Metal-on-metal hip resurfacing for young, active adults with degenerative hip disease. Available <http://www.ahfmr.ab.ca> (accessed 7 November 2002)

Vale L, Wyness L, McCormack K, McKenzie L, Brazzelli M & Stearns SC (2002). A systematic review of the effectiveness and cost-effectiveness of metal-on-metal hip resurfacing arthroplasty for treatment of hip disease. Health Technology Assessment (Winchester, England). 6: 1-109. Available <http://www.nice.org.uk> (accessed 7 November 2002)

ARTICLES NOT CRITICALLY APPRAISED

Technology appraisal guidance

National Institute for Clinical Excellence (2002). Technology Appraisal Guidance No. 44 Guidance on the use of metal on metal hip resurfacing arthroplasty. Available <http://www.nice.org.uk> (Accessed November 7 2002)

Procedure brief

Australian Safety and Efficacy Register of New Interventional Procedures - Surgical (2001). New and Emerging Techniques - Surgical. Procedure brief: Metal hip resurfacing prosthesis. Available http://www.racs.edu.au/asernip-s_net-s/procedures.htm (accessed 7 November 2002)

APPENDIX 1

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Levels Of Evidence

Based on "How to use the evidence: assessment and application of scientific evidence" (National Health & Medical Research Council, Canberra, 2000):

Level I		Evidence obtained from a systematic review (or meta-analysis) of all relevant randomised controlled trials.
Level II		Evidence obtained from at least one randomised controlled trial.
Level III	-1	Evidence obtained from pseudo-randomised controlled trials (alternate allocation or some other method).
	-2	Evidence obtained from comparative studies (including systematic reviews of such studies) with concurrent controls and allocation not randomised, cohort studies, case control studies or interrupted time series with a control group.
	-3	Evidence obtained from comparative studies with historical control, two or more single-arm studies or interrupted time series without a parallel control group.
Level IV		Evidence obtained from case series, either post-test or pretest/post-test.

APPENDIX 2

Search strategy

	Search terms for MEDLINE, PREMEDLINE, Current Contents and CINAHL
1	hip resurfac\$.mp
2	surface replacement.mp
3	hip.mp
4	2 and 3
5	1 or 4

<p>Evidence Summary Systematic Review</p> <p style="text-align: center;">Hip</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: 80%;"> <p>Hip resurfacing in patients with osteoarthritis</p> </div>	<p style="text-align: center;">Study 1</p> <p>Vale L, Wyness L, McCormack K, et al (2002). A systematic review of the effectiveness and cost-effectiveness of metal-on-metal hip resurfacing arthroplasty for treatment of hip disease. Health Technology Assessment (Winchester, England). 6: 1-109</p>	<p style="text-align: center;">Study 2</p> <p>Alberta Heritage Foundation for Medical Research Health Technology Assessment. (2002). Technote TN 33. Metal-on-metal hip resurfacing for young, active adults with degenerative hip disease.</p>
<p>STUDY DESIGN & NHMRC LEVELS OF EVIDENCE</p>	<p>Systematic Review Level I</p>	<p>Unclear, draws on "limited reviews and analysis of relevant literature."</p>
<p>DESCRIPTION: Patient (subjects), Interventions, Comparisons, Outcomes, Inclusion & Exclusion Criteria</p>	<p>Patients (Subjects): Studies of the intervention in those people who would be likely to outlive the life of a total hip replacement (THR) (ie aged under 65), those who would not be expected to outlive their prosthesis because of age (over 65) but who would participate in activities predicted to shorten the life of a THR and would thus outlive its life, and those who would not be suitable for consideration for THR for other reasons. Intervention: Metal-on-metal hip resurfacing arthroplasty. Comparisons: Watchful waiting, THR, arthrodesis and arthroscopy of the hip joint. Outcomes: Not restricted. Incl and Excl criteria: Details provided. Only English language articles were included in the review. Any randomised controlled trial (RCT) or comparative observational study of metal-on-metal (MoM) hip arthroplasty with any other comparator with concurrent controls, which provided revision rates, clinical assessment or patient-based outcomes were included. Single prosthesis observational studies of MoM were limited to those that provided those details plus a minimum followup of 2 years. For the comparators, inclusion was restricted to studies with relevant data and a minimal followup of 5 years (10 years for osteotomy.) For THR inclusion was restricted to RCTs with a minimum followup of 5 years, and systematic reviews of such trials. Excluded studies not reporting patient outcome data, such as laboratory only studies.</p>	<p>Patient (Subjects): Young active adults 65 years or less, with degenerative hip disease. Intervention: Metal-on-metal total hip resurfacing surgery Comparisons: Not stated, but includes THR Outcomes: Not stated Incl and Excl criteria: Not stated</p>
<p>VALIDITY: Methodology, rigour, selection, analysis</p>	<p>Focussed question: "To assess the effectiveness and cost-effectiveness of metal-on-metal hip resurfacing arthroplasty compared with watchful waiting, osteotomy, arthrodesis and arthroscopy of the hip joint." Patients, intervention and comparisons clearly stated. Search strategy: Details of search terms and strategies provided. Comprehensive strategy, range of appropriate</p>	<p>Focussed question: Provides only a broad statement of purpose on the need for information on the "current status" of the use of MoM in stated target group. Search strategy: Search limited to 1997 onwards, English language. Although stated that the search was limited to controlled clinical trials, none were identified and the report is obviously based on other material.</p>

	<p>databases searched and details of other sources included.</p> <p>Assessed validity: No comparative studies were found. Case series were used to estimate effectiveness of each of the interventions. Details of study design, participants, settings and timing, interventions, patient characteristics and outcomes were recorded and then assessed using a quality assessment form based on a checklist used to assess the quality of studies in orthopaedic research journals.</p> <p>Consistent results: Limited evidence was identified. Substantial differences were identified for the different interventions in terms of preoperative diagnosis, length of followup and outcome measures reported.</p> <p>Appropriate analysis of results: A Markov model was developed to estimate costs and quality-adjusted life-years.</p>	<p>Assessed validity: Details of assessment methods not provided.</p> <p>Consistent results: The only primary research identified was from case series and manufacturer's material. The most relevant information for the report was derived from several health technology assessment (HTA) reports. Authors note difficulty in assessing results as the most relevant data were derived from observational studies with short to mid-term followup conducted in specialist centres which may limit the generalisability of the reported results.</p> <p>Appropriate analysis of results: No original analysis conducted, reports of findings from other HTA reports are provided.</p>
<p>RESULTS: Generally favourable or unfavourable, specific outcomes of interest, estimate of experimental effect and precision if appropriate</p>	<p>Based on the limited evidence available, over a 3-year followup period, 0-14% of patients who received MoM required a revision. The available data came from a comparatively small number of surgeons. THR (depending on the prosthesis used) was associated with revision rates of 10% or less over a 10-year followup period. Data from one study suggests that 91% patients who underwent MoM were pain free at 4 years, compared with 84% at 11 years for THR. The cost of MoM for a patient under 65 years was estimated to be GBP 5515, and THR GBP 4195. THR was calculated to be more cost-effective than MoM, but the calculations were constrained by lack of data on key parameters such as revision rates for alternative methods of MoM and health outcomes for revision THR following MoM.</p>	<p>The authors conclude that the evidence suggests that MoM may be a viable and bone-conserving option for adults with degenerative hip disease who would otherwise receive and are likely to outlive conventional THR.</p>
<p>AUTHORS COMMENTS: Limitations, implications for practice and research</p>	<p>The authors note that the few data on MoM came from a very small number of clinicians and it is not clear whether their results could be replicated in practice. To achieve the promising low revision rates may require substantial training and high-volume practice of the techniques. There is a strong case for further research, especially for controlled studies with longterm followup.</p>	<p>Authors note that patient selection is important for this procedure, as good bone stock is required. Potential candidates for MoM should be made aware of the lack of data on longterm safety and efficacy of the implants currently in use. It is unknown how MoM as a primary procedure will affect the effectiveness of secondary surgical procedures.</p>
<p>OUR COMMENTS: Opportunity for bias, weakness and strength</p>	<p>This is a comprehensive review of the available evidence.</p>	<p>This is a brief report based largely on other HTAs.</p>