Carpal tunnel syndrome, the search for a cost-effective surgical intervention: a randomised controlled trial

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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
Two surgical procedures for carpal tunnel syndrome (CTS) were examined. These were open surgery (OS) and minimally invasive surgery (MIS).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with CTS. Patients who underwent carpal tunnel decompression in both hands, bilaterally, were excluded.

Setting
The setting was a hospital. The economic study was carried out in the UK.

Dates to which data relate
The effectiveness evidence and resource use data were derived from a study published in 1999. The price year was not stated clearly.

Source of effectiveness data
The effectiveness evidence was derived from a single study that had been published already (Hartley et al. 1999, see 'Other Publications of Related Interest' below for bibliographic details).

Link between effectiveness and cost data
The costing was carried out retrospectively on the same sample of patients as that used in the clinical study.

Study sample
There was limited information on the study sample because most of the details of the single study had been published already. Some of the 194 patients (208 hands) initially identified were excluded because they were undergoing carpal tunnel decompression in both hands. Thus, the final study sample comprised 181 patients/hands. There were 89 patients in the OS group and 92 patients in the MIS group.
Study design
This was a randomised clinical trial. Details of the study centres, methods of randomisation, outcome assessment and length of follow-up were not reported. One patient appears to have been lost to follow-up.

Analysis of effectiveness
The analysis of the clinical study appears to have been conducted on an intention to treat basis since all of the patients included in the initial study sample were accounted for in the analysis of effectiveness. The outcome measures were changes in the severity of symptoms and changes in functional status from baseline (preoperative consultation) to final assessment (postoperative consultation, either for second or third visit). Up to three postoperative visits were possible. Both measures were estimated using a CTS-specific questionnaire. The scores were then converted into percentages, with 0 representing normal functioning or no symptoms, and 100 representing severely restricted functioning or very severe symptoms. The baseline comparability of the study groups was not discussed.

Effectiveness results
For functional status, the pre- and postoperative scores were, respectively:

35.69 +/- 20.51 (minimum 0; maximum 93.75) and 21.88 +/- 19.65 (minimum 0; maximum 75) with OS (difference 13.81 +/- 21.68; minimum -43.75; maximum 75), and

32.50 +/- 20.86 (minimum 0; maximum 85) and 18.30 +/- 20.28 (minimum 0; maximum 90.63) with MIS (difference 14.19 +/- 18.53; minimum -25; maximum 65.63).

For symptom severity, the pre- and post-operative scores were, respectively:

19.52 +/- 6.78 (minimum 2.73; maximum 36.36) and 18.31 +/- 16.62 (minimum 0; maximum 68.18) with OS (difference 1.21 +/- 16.38; minimum -40.91; maximum 29.09), and

17.70 +/- 7.12 (minimum 1.82; maximum 33.64) and 18.60 +/- 16.84 (minimum 0; maximum 61.36) with MIS (difference -0.91 +/- 15.82; minimum -48.18; maximum 31.82).

None of the differences between the pre- and postoperative scores reached statistical significance.

Clinical conclusions
The effectiveness analysis showed that both interventions were effective. A marginally higher, but statistically non significant function effectiveness outcome was observed in the MIS group.

Measure of benefits used in the economic analysis
The summary benefit measures were the changes in symptom severity and functional status. These were both derived from the effectiveness analysis.

Direct costs
Discounting was not relevant since the costs were incurred during a short timeframe. The unit costs were not presented separately from the quantities of resources used. The evaluation of the direct costs considered hospital costs and patient costs associated with transportation. A detailed breakdown of the cost items was not provided. The cost/resource boundary of the payer was adopted in the analysis of the direct costs. Resource use came from patient-level data derived from the clinical trial. The hospital costs were estimated from NHS Trust's financial statements. The patient costs were estimated using a route planner and an estimate of gross motoring costs per mile. Given that the unit costs were obtained from sources published between 1998 and 2000, a unique price year was not clearly stated.
Statistical analysis of costs
Statistical analyses of the costs were carried out.

Indirect Costs
The indirect costs were included in the analysis because a societal perspective was adopted. In particular, the analysis considered the time spent at the clinic for consultation and the actual surgery, the time away from work while recovering, and inconvenience due to a delay in returning to normal activities of daily life. Gender-specific average gross earnings were used to value the opportunity cost of a patient's time spent at hospital and away from work while recovering. Forgone non-work activity and leisure time was valued using a published source. As in the analysis of the direct costs, no discounting was performed and the price year was not reported.

Currency
UK pounds sterling (£).

Sensitivity analysis
The authors stated that to control for any uncertainty, the data were subjected to bootstrapping and a cost-effectiveness acceptability curve was generated.

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

Cost results
The patient costs were 801.23 +/- 749.13 (minimum 65.23; maximum 3,522.78) with OS and 779.30 +/- 734.82 (minimum 66.52; maximum 3,971.43) with MIS, (p=0.87).

The hospital costs were 861.06 +/- 68.01 (minimum 741.48; maximum 1,042.98) with OS and 935.88 +/- 60.85 (minimum 809.98; maximum 1,102.48) with MIS, (p<0.01).

The total costs were 1,662.29 +/- 748.05 (minimum 912.43; maximum 4,432.26) with OS and 1,715.18 +/- 749.43 (minimum 884.50; maximum 4,947.41) with MIS, (p=0.46).

Synthesis of costs and benefits
An incremental cost-effectiveness ratio (ICER) was calculated to combine the average costs of each of the two benefit measures.

When the benefit measure was symptom severity, OS dominated MIS, which was both more expensive and less costly.

When the benefit measure was functional status, the ICER with MIS over OS was 196.79 per one percentage point of improvement from a hospital perspective and 139.11 from a societal perspective. The authors noted that functioning was scored on a scale from 1 to 8, thus a 1-point increase corresponds to a 12% improvement. Thus, to achieve a 1-point improvement in functional status, the additional cost of MIS would be approximately 2,300.

The cost-effectiveness acceptability curve showed that no matter what the providers' willingness-to-pay for the benefits achieved, there was never no more than 55% probability that MIS would be more cost-effective than OS.

Authors' conclusions
Minimally invasive surgery (MIS) was not a cost-effective option for the surgical treatment of carpal tunnel syndrome (CTS). Thus, traditional open surgery (OS) represented the preferred option.
CRD COMMENTARY - Selection of comparators
The authors provided a justification for their choice of the comparators. OS represented the traditional surgical procedure for CTS while MIS was the most common alternative. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness evidence came from a clinical trial, which was appropriate for the study question and usually has a robust design. However, there was limited information on the methods of sample selection, characteristics of the patients included in the study, and other methodological aspects of the trial, as the study had already been published. Thus, it was difficult to examine the validity of the primary estimates.

Validity of estimate of measure of benefit
The summary benefit measures were specific to the disease considered in the study and are not comparable with the benefits of other health care interventions. They were directly derived from the effectiveness study.

Validity of estimate of costs
The authors adopted a broad perspective and all the relevant categories of costs were included in the analysis. Inconvenience due to delays in returning to normal activities was considered in the estimation of indirect costs alongside productivity losses. This represented a strength of the analysis. However, a detailed breakdown of the items included in the category 'hospital costs' was not provided. The unit costs were not provided. The price year was also not reported, which limits the possibility of performing reflation exercises. The costs were specific to the study setting and sensitivity analyses were not carried out on single cost estimates. The source of the data was reported. The authors stated that a similar resource consumption profile was observed in the two groups, thus the cost-difference was entirely due to the high instrumentation costs for MIS.

Other issues
The authors compared their findings with those from some published studies and stated that similar results were achieved, although with less pronounced differences. The issue of the generalisability of the study results to other settings was not clearly addressed. Thus, the external validity of the analysis was low. The study referred to patients undergoing surgery for CTS and this was reflected in the authors' conclusions.

Implications of the study
The study results did not support the use of MIS for the surgical treatment of CTS. However, if the price of MIS instrumentation is reduced, MIS could represent a cost-effective alternative to OS.

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None stated.

Bibliographic details

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Other publications of related interest


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