Cost-effectiveness of computed tomography in the evaluation of patients with headache

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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
Computed Tomography (CT) in the evaluation of patients with headache.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
The study population was derived retrospectively from written reports and image archives. 592 patients who had headache without neurological finding were identified: 416 females and 176 males, aged from 8-88 years (mean age of 44.3 years).

Setting
The practice setting for CT was a hospital. The economic study was carried out by the authors from Gazi University, Ankara, Turkey.

Dates to which data relate
Effectiveness data were collected between January 1990 and October 1993. Dates for the assumed price of CT scan were not explicitly quoted but are assumed to be around the time of publication in 1994. A marginal cost of CT was reported from 1992.

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

Link between effectiveness and cost data
The CRD reviewer has assumed that the charge quoted for CT scan was taken from the same hospital as the effectiveness data.

Study sample
The sample was selected retrospectively and was not determined by power calculations. 592 patients with headache without neurological finding were identified. No data was collected as a control.

Study design
Case series (retrospective). The number of centres was not stated but is believed to be one.

**Analysis of effectiveness**
Analysis was based on treatment completers only: those that had had CT. The primary health outcome was the finding of important pathology. No attempt was made to show that the study sample was comparable to any other population.

**Effectiveness results**
The study found that of those who had received CT for headache without neurological finding, 92% had no abnormalities, 8% had minor abnormalities and 0% had severe abnormalities/important pathology. The incidence of detecting important pathology by CT in this patient group was reported as 0.005 with 95% confidence.

**Clinical conclusions**
CT examination of patients suffering from chronic headache with no additional neurological finding or symptom can be postponed until the patient develops symptoms or signs that appear to place him at risk of an anatomical abnormality.

**Measure of benefits used in the economic analysis**
The finding of cases of important pathology was the outcome measure used in the economic analysis. Clinical measures of health states used were valued by clinicians retrospectively for the period 1990-1993.

**Direct costs**
No discounting was used. Quantities and costs were not separated; a university hospital unit price was presented for CT, including contrast material. The source of the unit cost data was not stated, but is assumed to relate to 1993/94. Marginal cost data were taken from a 1992 study.

**Indirect Costs**
Indirect costs were not considered.

**Currency**
US dollars ($)

**Sensitivity analysis**
No sensitivity analysis was performed.

**Estimated benefits used in the economic analysis**
Analysis was based on treatment completers only: those that had had CT. The primary health outcome was the finding of important pathology. No attempt was made to show that the study sample was comparable to any other population.

**Cost results**
The total cost of a single post-contrast CT examination was $1,000. The comparator was no CT examination, with no cost. The marginal cost of a cranial CT was reported to be $117.

**Synthesis of costs and benefits**
The cost per important pathology case found was reported as $200,000 with 95% confidence. Using the marginal cost of $117 from the 1992 study the cost per case found was reported as $23,400. A synthesis was not really required as a
strategy not using CT examination was dominant: outcomes were at least as good and costs were massively lower. No incremental analysis was performed other than the use of the marginal cost figure from the 1992 study.

Authors' conclusions
Computed tomography was an unrewarding technique in the evaluation of patients with chronic headache whose neurological examinations were normal.

CRD Commentary
The authors did not specify how the sample or sample size was selected and how bias might have been avoided. No justification was provided for the type of study design used. A retrospective case series may not be the most appropriate design, as the sample may have been biased. However, given the clear finding that CT examination was not very effective in detecting serious cases, and was very expensive, this may not alter results drastically. Cost per case of important pathology is an appropriate measure to use in the economic analysis of this intervention. However, there was no proper economic analysis of the comparator, (do nothing). It was assumed that serious cases would present themselves with symptoms which would mean they would be detected anyway. The costs of failing to find a serious case under this strategy were not considered. The hospital perspective used was probably the most useful. Additional costs to patients due to visits for CT examination should have perhaps been considered: it is assumed the authors considered these to be insignificant. As the authors stated, analysis was likely to be sensitive to the cost of CT examination. As no sensitivity analysis was performed generalisability of results to other settings/countries may be difficult given price variation. Opportunity cost was mentioned indirectly in emphasising the budget constraint. The methodology of the economic analysis was clearly not rigorous, however it is probable that similar results would be achieved with a more thorough approach. However, only a proper economic analysis comparing alternatives will reveal this.

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