The role of ultrasonography in the diagnosis of pyloric stenosis: a decision analysis

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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
Using ultrasonography (US) as the initial diagnostic test for the replacement of upper gastrointestinal series (UGI) in infants presenting with vomiting and the potential diagnosis of pyloric stenosis.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Infants presenting with vomiting and the potential diagnosis of pyloric stenosis.

Setting
Hospital. The economic study was carried out in the USA.

Dates to which data relate
Effectiveness data were based on the literature published between 1980 and 1991. Resource use data were not reported. The price year was not explicitly specified.

Source of effectiveness data
Effectiveness data were derived from a review of the literature.

Modelling
A decision tree model was used to estimate the costs and benefits associated with the two strategies.

Outcomes assessed in the review
The test sensitivity and specificity, and the incidence of pyloric stenosis among vomiting infants presenting to the community pediatrician or after a negative examination by an experienced examiner.

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

Sources searched to identify primary studies

NHS Economic Evaluation Database (NHS EED)
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Criteria used to ensure the validity of primary studies
Not reported.

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

Number of primary studies included
11 studies were directly used as the references for the outcomes assessed in the review, while 14 studies were included in the review.

Methods of combining primary studies
Not reported.

Investigation of differences between primary studies
Not reported.

Results of the review
The UGI sensitivity and specificity was 100% (range: 0.9 - 1.0), while sensitivity for the US were 90% (range: 0.8 - 1.0) and specificity was 100% (range: 0.9 - 1.0). The incidence of pyloricstenosis among vomiting infants presenting to the community pediatrician was 0.3 (range: 0.1 - 0.9), while the corresponding value after an examination by an experienced observer with negative findings was between 0.02 to 0.18.

Measure of benefits used in the economic analysis
No summary benefit measure was identified in the economic analysis, and only separate clinical outcomes were reported.

Direct costs
Costs were not discounted as they occurred over a period of time of less than one year. Resource utilisation was not reported separately from the costs. The median (range) charges of US and UGI were reported based on a survey of 24 pediatric institutions throughout the USA. The perspective adopted in the cost analysis was not explicitly specified. Charges were used as a proxy for true costs. The date to which the price data related was not explicitly specified. The cost calculation did not cover the costs associated with additional imaging required after missed cases of US evaluation. The costs of risk and complications associated with UGI in comparison to US were not incorporated in the study since they were considered to be minimal.

Indirect Costs
Not considered.

Currency
US dollars ($)

Sensitivity analysis
One-way and two-way sensitivity and threshold analyses were conducted on disease incidence, sensitivity of the ultrasound to detect pyloric stenosis, and cost of ultrasound relative to the cost of a UGI.

**Estimated benefits used in the economic analysis**
Not applicable.

**Cost results**
The median charge (range) for US was $389 (range: $279 - $539) versus $267 (range: $136 - $340) for UGI. The charge ratio of US/UGI adopted in the study was 1.06 (range: 0.6 - 1.9).

**Synthesis of costs and benefits**
Costs and benefits were not combined as, in both decision trees, UGI was the dominant strategy. Threshold analyses also showed that under most reasonable ranges of values for the parameters of the model, the UGI remained the dominant strategy.

**Authors’ conclusions**
Under assumptions that fit most clinically relevant circumstances, the UGI as the initial study is the most cost-effective radiological diagnostic test in the evaluation of the vomiting infant.

**CRD COMMENTARY - Selection of comparators**
A justification was given for the choice of the comparator. UGI was regarded as the classic diagnostic test in the context in question. You, as a database user, should consider whether this is a widely used health technology in your own setting.

**Validity of estimate of measure of benefit**
The internal validity of the effectiveness results may have been weakened by the lack of a comprehensive literature review, and quality assessment of the primary studies included. The study may be considered as a cost-consequences study.

**Validity of estimate of costs**
Resource utilisation was not reported separately from the costs. Adequate details of the methods of cost estimation were given.

**Other issues**
The authors made appropriate comparisons with other studies. In view of the lack of information concerning the comprehensiveness of the literature review, and quality assessment of the primary studies included in the review, the results need to be treated with some caution. Cost results may not be generalisable to other settings and countries.

**Source of funding**
None stated.

**Bibliographic details**
PubMedID
9607467

Original Paper URL
http://www.jpedsurg.org/abs/abs33_5/268483.html

Indexing Status
Subject indexing assigned by NLM

MeSH
Contrast Media /administration & dosage; Cost-Benefit Analysis; Decision Trees; Digestive System /radiography; Female; Humans; Infant, Newborn; Male; Pyloric Stenosis /economics /radiography /ultrasonography; Sensitivity and Specificity; Ultrasonography /economics

AccessionNumber
21998000738

Date bibliographic record published
31/03/2000

Date abstract record published
31/03/2000