Four strategies for the management of esophageal coins in children

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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
Management of esophageal coins in children.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The hypothetical patients were children under 18 years of age who were found, on radiographic evaluation, to have a single coin lodged in the esophagus. Children must have presented within 24 hours of ingestion, have no history of previous esophageal disease or surgery, and no respiratory compromise on presentation.

Setting
Hospital. The study was carried out in Boston, Massachusetts, USA.

Dates to which data relate
Effectiveness and resource use data were collected from studies published between 1985 and 1996. Cost data were collected from a 1997 source. The price year was 1997.

Source of effectiveness data
Effectiveness data were derived from a literature review and chart review data from the authors' institution.

Modelling
A decision analytic model was used to determine the cost-effectiveness of the 4 management strategies.

Outcomes assessed in the review
The review assessed the success and complication rates of each procedure.

Study designs and other criteria for inclusion in the review
Case reports and articles describing the removal of foreign bodies other than coins were excluded, as were articles in which success and complication rates of the procedure were not reported.
Sources searched to identify primary studies
Medline was searched for all articles published since 1975.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Summary statistics from individual studies.

Number of primary studies included
At least 9 studies were included.

Methods of combining primary studies
Narrative method.

Investigation of differences between primary studies
Not stated.

Results of the review
The success and complication rates of endoscopy were 100% (95% CI: 99.2% - 100%) and 5.8% (95% CI: 4.6% - 8.9%), respectively. The success and complication rates of esophageal bougienage were 100% (95% CI: 94% - 100%) and 0% (95% CI: 0% - 4%), respectively. The success rate of spontaneous passage of esophageal coins to the stomach was 28% (95% CI: 21% - 41%).

Measure of benefits used in the economic analysis
The overall complication rate was used as the measure of benefits.

Direct costs
Direct costs were not discounted given the short time frame of the study (less than 1 year). Quantities and costs were reported separately. Direct costs reflected the cost of the procedure, professional fees, operating and recovery rooms. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. Hospital charges were derived from the authors' institution. The price year was 1997.

Statistical analysis of costs
Not reported.

Indirect Costs
Not included.

Currency
US dollars ($).

Sensitivity analysis
Sensitivity analyses were conducted on the success rates of bougienage (94% to 100%), complication rates of bougienage (0% to 4%), and rates of spontaneous passage of coins to the stomach (21% to 41%).

Estimated benefits used in the economic analysis
The overall complication rates were 5.8% for the endoscopic removal strategy, 0% for the bougienage strategy, and 4.2% for each of the observation strategies. All strategies resulted in a decreased overall complication rate compared with the endoscopy strategy for all feasible values in the sensitivity analysis.

Cost results
The total cost per patient amounted to $3,297 for the endoscopic removal strategy, $382 for the bougienage strategy, $2,439 for the outpatient observation strategy, and $3,141 for the inpatient observation strategy. Sensitivity analysis over the range of success rates of esophageal bougienage resulted in a cost per patient ranging from $382 to $566 for the bougienage strategy. Sensitivity analysis over the range of spontaneous coin passage rates resulted in a cost per patient ranging from $2,040 to $2,652 for the outpatient observation strategy, and $2,742 to $3,355 for the inpatient observation strategy.

Synthesis of costs and benefits
Cost and benefit measures were not combined into a cost-effectiveness ratio.

Authors' conclusions
Given the high success and low complication rates reported for esophageal bougienage, substantial savings in overall complications and costs would be expected with the use of this procedure. With spontaneous passage rates greater than 23%, either an outpatient or an inpatient observation strategy would reduce costs and complications, compared with endoscopic removal of all esophageal coins. Endoscopy remains the procedure of choice for patients not meeting the authors' inclusion criteria.

CRD COMMENTARY - Selection of comparators
A justification was given for the comparators used, namely these were commonly used procedures to remove esophageal coins. You, as a user of the database, should decide if these health technologies are relevant to your own setting.

Validity of estimate of measure of benefit
The authors appear to have adopted a systematic approach to derive their estimates from the literature. However, the methods used to conduct the review could have been more extensively reported. Effectiveness estimates were combined using narrative methods. The estimate of effectiveness was derived credibly from the primary studies. The estimation of benefits was obtained directly from the effectiveness analysis.

Validity of estimate of costs
All categories of costs relevant to the perspective adopted were included in the analysis. Quantities and costs were reported separately. No sensitivity analysis was conducted on costs or quantities. The cost analysis was made more generalisable by the use of a charge-to-cost ratio process. The price year was also reported.

Other issues
The authors did compare their findings with those from other studies, although the issue of generalisability to other settings was not addressed. The authors did not present their results selectively. The study examined patients with esophageal coins and this was reflected in the authors' conclusions. Some limitations included the uncertainty surrounding the effectiveness estimates of esophageal bougienage and complications that may occur post-operatively.
after endoscopic coin removal were not included.

**Implications of the study**
Strategies including outpatient observation periods would decrease overall complication rates and costs, compared with prompt endoscopic removal of all coins. Strategies including inpatient observation periods may not result in a cost reduction, but would still decrease overall complications.

**Source of funding**
None stated.

**Bibliographic details**

**PubMedID**
10617738

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Antitussive Agents /therapeutic use; Child; Cough /drug therapy /therapy; Expectorants /therapeutic use; Home Nursing; Humans; Information Services /standards; Internet /standards; Parents; Practice Guidelines as Topic; Quality Control

**AccessionNumber**
22000000192

**Date bibliographic record published**
31/10/2000

**Date abstract record published**
31/10/2000