Expectant, medical or surgical treatment for spontaneous abortion in first trimester of pregnancy: a cost 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
The use of misoprostol therapy and expectant care for spontaneous abortion in the first trimester of pregnancy. The comparator was surgical evacuation by dilatation and curettage (D&C).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised a hypothetical cohort of patients presenting with signs and symptoms of uncomplicated spontaneous abortion in the first trimester of pregnancy.

Setting
The setting was not reported. The economic evaluation was carried out in Hong Kong.

Dates to which data relate
The effectiveness data were derived from papers published between 1995 and 2005. The price year was not specified.

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

Modelling
A literature-based decision-analytic model (decision tree) was developed to assess the clinical outcomes and economic costs associated with each of the treatment alternatives. The time horizon was 2 weeks.

Outcomes assessed in the review
The outcomes assessed were:

the rates of complete abortion and complications associated with the study alternatives;

the patient acceptance rates for misoprostol and expectant care;

the rate of surgical complications;
the rate of treatment;

the rate of treatment complications associated with expectant care;

the rate of treatment complications associated with misoprostol treatment; and

the numbers of outpatient follow-ups for misoprostol treatment and expectant treatment.

The numbers of patients requiring surgical intervention (or additional D&C if the primary treatment was surgical evacuation) were also derived from the literature.

**Study designs and other criteria for inclusion in the review**
The authors used the following selection criteria for inclusion in the review:

- English language reports;

- trials including patients with miscarriage during the first 13 weeks of pregnancy with evidence of retained products of conception or with clinical diagnosis of incomplete miscarriage;

- treatment outcomes assessed within 14 days;

- paper reporting the number of patients requiring surgical intervention and the incidence of complications.

Eighteen studies were randomised clinical trials.

**Sources searched to identify primary studies**
MEDLINE was searched to identify primary studies.

**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**
Approximately 29 studies were reviewed.

**Methods of combining primary studies**
The primary studies were combined through pooled averages of complete abortion and complications for each treatment option. Patient acceptance rates of misoprostol treatment and expectant care were derived from the literature after adding weights dependent on the number of patients in each study.

**Investigation of differences between primary studies**
Differences between the primary studies were neither reported nor investigated.

**Results of the review**
The rate of patient acceptance of expectant care was 64% (range: 62 to 66).
The rate of patient acceptance of misoprostol was 86% (range: 83 to 89).

The rate of complete abortion with expectant care was 75% (range: 25 to 99).

The rate of complete abortion with misoprostol was 69% (range: 50 to 95).

The rate of surgical complications was 6% (range: 0 to 11).

The rate of complications was 1.7% (range: 0.7 to 2.6) with expectant care and 2.5% (range: 1.5 to 3.5) with misoprostol.

The percentage of serious complications or need for additional surgical evacuations was 50% with surgical evacuation, 27% with expectant care, and 24% with misoprostol.

The percentage of less serious complications was 50% with surgery, 73% with expectant care, and 76% with misoprostol.

**Measure of benefits used in the economic analysis**
The authors did not use a summary benefit measure since the primary objective of the study was a cost analysis. Effectiveness data were embedded into the decision tree as probabilities in order to determine the cost of each strategy.

**Direct costs**
The costs were estimated from the perspective of a public health organisation in Hong Kong. The costs for hospital services were derived from the Hong Kong Gazette, which represents costs including labour costs. The cost of misoprostol was estimated by averaging drug acquisition costs. Discounting was not carried out, but it was not relevant since the costs were incurred during less than 2 years. The total costs of major cost items were reported, but details of the unit costs and quantities of resources used were not. The price year was not stated.

**Statistical analysis of costs**
The costs were treated deterministically.

**Indirect Costs**
The indirect costs were not included.

**Currency**
US dollars ($). The conversion rate from Hong Kong dollars (HKD) was $1 = HKD 7.8.

**Sensitivity analysis**
A one-way sensitivity analysis was used to determine whether the results of the model were sensitive to variations in the rates of complete abortion in the two forms of nonsurgical interventions. A two-way sensitivity analysis was also conducted, in which the rates of complete abortion using misoprostol treatment and expectant care were varied in order to determine the threshold line at which both groups had the same cost per patient. A decision tree analysis and Monte Carlo simulation were used for the probabilistic uncertainty analysis. All parameters were examined over high and low values or 95% confidence intervals (CIs). A sensitivity analysis was performed using TreeAge Pro 2005 software and Microsoft Excel 2000.

**Estimated benefits used in the economic analysis**
See the 'Effectiveness Results' section.
Cost results
The base-case analysis showed that the misoprostol group was the least costly alternative at $1,000 per patient, followed by expectant care at $1,172 and D&C at $2,007 per patient.

The cost of complications was taken into consideration.

The Monte Carlo simulations showed that misoprostol was less costly than surgical evacuation 100% of the time, with a mean cost-saving of $1,028 (95% CI: 1,025 to 1,031), while expectant care was less costly than surgical evacuation 88% of the time, with a mean cost-saving of $286 (95% CI: 282 to 290).

The misoprostol group was less costly than the expectant group by $742 (95% CI: 737 to 747) per patient, 100% of the time.

Synthesis of costs and benefits
The costs and benefits were not combined, as the primary objective of the study was a cost analysis using effectiveness data as probabilities for the model.

Authors' conclusions
Misoprostol therapy would appear to be the least costly approach for the treatment of uncomplicated spontaneous abortion. Both expectant treatment and initial treatment with misoprostol are clinically acceptable alternatives to dilatation and curettage (D&C).

CRD COMMENTARY - Selection of comparators
An explicit justification was given for the comparators used. Newer approaches were compared with standard therapy. You should consider whether they represent widely used technologies in your own setting.

Validity of estimate of measure of effectiveness
The principal input parameters for the model were derived from a systematic review of the literature, which was appropriate for the study question. Most of the included studies were randomised controlled trials, thus the validity of the estimate of measure of effectiveness is likely to be high. Appropriate sensitivity analyses were undertaken by varying many of the input parameters, which again enhances the validity of the effectiveness estimates.

Validity of estimate of measure of benefit
No summary measure of benefit was used since the primary objective of the paper was a cost analysis. In order to derive costs for each strategy, the effectiveness estimates formed the inputs to the model. Please refer to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The perspective adopted in the study was explicitly stated, and all the categories of cost relevant to this perspective appear to have been included in the analysis. The unit costs and the resource quantities were not reported separately, but the costs for every treatment step in each study arm were reported. The authors stated that this approach allowed the model to be used in other settings after altering the costs according to local prices.

Other issues
The authors made appropriate comparisons of their findings with those from other studies. The issue of generalisability to other settings (after adjustment for local costs) was addressed. Although many studies were conducted abroad, several clinical trials with large sample sizes were conducted locally in Hong Kong. The results were not presented selectively. The authors' conclusions also covered clinical benefits, although these were not the main focus; the stated
Objective was to undertake a cost analysis. The authors reported a number of limitations to their study. In particular, the relatively short follow-up of 2 weeks, which did not capture costs and consequences such as future fertility and psychological problems.

**Implications of the study**
The authors made no recommendations for future research.

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**Other publications of related interest**
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**MeSH**
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