Cost-effectiveness of hysterosalpingography, laparoscopy, and chlamydia antibody testing in subfertile couples

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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
Hysterosalpingography (HSG), laparoscopy, and chlamydia antibody testing (CAT) in subfertile couples.

Type of intervention
Diagnosis and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population was 2,167 couples suspected of having tubal pathology who had been enrolled in the Canadian Infertility Treatment Evaluation Study.

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

Dates to which data relate
Effectiveness and resource use data were collected from studies published between 1994 and 1999. Cost data were taken from studies published between 1994 and 1997. The price year was not reported.

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

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

Outcomes assessed in the review
The review assessed results of CAT and CA-125 measurement, and fertility prospects.

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

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

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

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

Methods of combining primary studies
The narrative method was used to combine the results of studies.

Investigation of differences between primary studies
Not stated.

Results of the review
As soon as HSG or laparoscopy was performed, fertility prospects were assumed to increase by 30% compared with strategies in which patency tests were not performed. Treatment of grade I/II endometriosis during laparoscopy was assumed to increase fertility prospects by 80%. The probability of a twin pregnancy in IVF was assumed to be 25%.

Measure of benefits used in the economic analysis
The number of additional live births was used as the measure of benefits. The live birth of a child was discounted at 10% per year.

Direct costs
Direct costs were discounted at 5% per year because the time horizon was longer than 1 year. Quantities and costs were reported separately. Direct costs included costs of HSG, laparoscopy, CAT, and CA-125 measurement. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. Costs and quantities were obtained from published studies. The price year was not reported.

Statistical analysis of costs
No statistical analysis was reported.

Indirect Costs
Indirect costs were not included.

Currency
US dollars ($).

Sensitivity analysis
The cost-effectiveness was calculated for different categories of maternal age, different categories of duration of
subfertility, patients with and without a regular menstrual cycle, and patients with and without a previous pregnancy.

**Estimated benefits used in the economic analysis**
The "No treatment" strategy gave a live birth rate of 12.5 per 100 couples.

Immediate IVF in all couples resulted in a 3-year cumulative live birth rate of 49.1 per 100 couples, whereas delaying IVF for 2.5 years resulted in a live birth rate of 34.1 per 100 couples.

Expected live birth rates in the strategies that incorporated combinations of CAT, CA-125 measurement, HSG, and laparoscopy varied from 41.2 to 47.0 per 100 couples.

The expected number of IVF cycles per 100 couples was 241 if IVF was immediate in all couples and 165 if IVF was delayed for 2.5 years.

In strategies that incorporated combinations of CAT, CA-125 measurement, HSG, and laparoscopy, the expected number of IVF cycles varied from 192 to 206 per 100 couples. Immediate IVF resulted in 6.6 cycles per additional live birth, and delayed IVF resulted in 7.6 cycles per additional live birth.

**Cost results**
Total costs were $27,500 per couple if IVF were offered to all couples, $19,800 per couple if IVF were delayed for 3 years, and $22,600 to $23,400 per couple in strategies that incorporated combinations of CAT, CA-125 measurement, HSG, and laparoscopy.

**Synthesis of costs and benefits**
Immediate IVF would cost $75,100 per additional live birth, and delaying IVF in all patients would cost $91,700 per additional live birth. The strategy based on CAT, immediate or delayed laparoscopy, and IVF was the most cost-effective treatment, with $66,700 per additional live birth. The cost per additional live birth depended on the age of the woman. Each strategy was less cost-effective in couples with primary subfertility than in couples with secondary subfertility. Increasing the discount rate of costs made strategies in which IVF was delayed more cost-effective.

**Authors’ conclusions**
The use of CAT, HSG, and laparoscopy is cost-effective in most subfertile couples. The diagnostic work-up to detect tubal pathology in subfertile couples should start with CAT in couples with relatively good fertility prospects, whereas couples with relatively poor fertility prospects benefit from immediate HSG.

**CRD COMMENTARY - Selection of comparators**
A justification was given for the comparator used namely no diagnosis or treatment. You, as a user of the database, should decide if these health technologies are relevant to your setting.

**Validity of estimate of measure of effectiveness**
The authors undertook a literature review to derive estimates for the model. This approach seems appropriate, but they did not state that a systematic review of the literature had been undertaken. More information about the methods of the review could have been provided. The validity of the results was enhanced, however, by sensitivity analyses to account for variability in the estimates.

**Validity of estimate of measure of benefit**
The estimation of benefits was obtained directly from the effectiveness analysis through the modelling process adopted.
Validity of estimate of costs
Good features of the cost analysis were that all relevant direct cost categories were included, quantities and costs were reported separately, and direct costs were discounted. The validity of the cost results was enhanced by appropriate sensitivity analyses over plausible ranges. However, the price year was not reported. Moreover, cost estimates were collected from other countries and the authors did not discuss their generalisability. The costs of handicap care following preterm delivery were not taken into account.

Other issues
The authors made appropriate comparisons of their findings with those from other studies. The issue of generalisability to other settings was addressed. The authors did not present their results selectively and entered into wide and comprehensive discussions of the limitations and advantages of their methodology, including the difficulties various similar studies have had in validating results, particularly in relation to spontaneous conception or IVF, in other populations/settings. The study enrolled couples suspected of having tubal pathology and this was reflected in the authors’ conclusions. The authors noted that their model did not account for tubal surgery and that the analysis was limited to live birth of the first child. The desire for a second child was not taken into account. Areas to be addressed in future studies within the chosen patient domain were well covered in the discussion section of the paper.

Implications of the study
The authors suggest that the use of CAT, HSG, and laparoscopy is cost-effective in most subfertile couples. The diagnostic work-up to detect tubal pathology in subfertile couples should start with CAT in couples with relatively good fertility prospects, whereas couples with relatively poor fertility prospects benefit from immediate HSG.

Source of funding
None stated.

Bibliographic details

PubMedID
11239544

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Antibodies, Bacterial /blood; CA-125 Antigen /analysis; Chlamydia /immunology; Chlamydia Infections /complications /diagnosis; Cost-Benefit Analysis; Fallopian Tube Diseases /complications /diagnosis; Female; Fertilization in Vitro; Humans; Hysterosalpingography /economics; Infertility /economics /etiology; Laparoscopy /economics; Male; Pregnancy; Prognosis; Time Factors

AccessionNumber
22001000733

Date bibliographic record published
31/10/2001

Date abstract record published
31/10/2001