Intrauterine insemination or in-vitro fertilisation in idiopathic subfertility and male subfertility: a randomised trial and cost-effectiveness analysis


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
Intrauterine insemination or in-vitro fertilisation in idiopathic subfertility and male subfertility.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Couples with idiopathic subfertility or male subfertility. Couples were excluded if the woman had cycle disorders, untreated endometriosis, or bilateral occluded tubes or if a semen sample yielded less than 1 million progressively motile spermatozoa, if more than 20% of spermatozoa carried antibodies, or if more than 50% of spermatozoa had no acrosome.

Setting
Hospital. The study was carried out at the University Hospital Vrije Universiteit, the Netherlands.

Dates to which data relate
Effectiveness, resource use and cost data were collected from February 1992 until September 1995. The price year was 1995.

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

Link between effectiveness and cost data
The costing was carried out prospectively alongside the same patient sample as that used in the effectiveness study.

Study sample
181 couples who had been affected by idiopathic subfertility for at least 3 years and 77 couples who had been affected by male subfertility for at least 1 year took part in the study. 86 couples were assigned to IUI in spontaneous cycles: 85 to IUI in stimulated cycles and 87 couples to IVF. 74 couples withdrew from the treatment programme. Assuming that IUI treatment would have a pregnancy rate of 8% per cycle and 39% after 6 cycles, and that IVF would have a pregnancy rate of 17% per cycle and 67% after 6 cycles, a sample size of at least 80 couples per treatment was needed to obtain 90% power and a type I error of 0.05.
Study design
This was a prospective, randomised, parallel trial carried out at a single centre. Couples were allocated to treatment programmes by means of a computer-generated randomisation schedule, administered by numbered, masked and sealed envelopes. Randomisation was carried out within strata after stratification for the woman’s age, duration of infertility, diagnosis, category of infertility, and the presence of one or two ovaries. In the IUI spontaneous group 6 couples were censored (lost to follow-up) before treatment and 13 during treatment. In the IUI stimulated cycles group, 2 couples were censored before treatment and 14 during treatment and in the IVF group, 2 couples were censored before and 37 during treatment. Patients were followed up until 12 weeks after conception.

Analysis of effectiveness
The principal of analysis for the clinical study included censored patients who dropped out (as one possible outcome), and therefore more closely resembles intention to treat. The primary health outcome was the number of pregnancies resulting in at least one live birth after treatment. The authors reported baseline characteristics but did not show an analysis of differences.

Effectiveness results
The spontaneous delivery rate was 1.25% per month in idiopathic subfertility and 0.82% per month in male subfertility. Treatment resulted in 89 pregnancies and deliveries, and 107 children were born. 31% of couples who started treatment with IUI alone delivered, compared with 37% of those who started IUI with stimulation and 38% of those who started IVF. The multiple pregnancy rate was 29% of viable pregnancies with IUI plus stimulation, and 21% with IVF. In the group assigned IUI alone, there was one monozygotic twin pregnancy, but both twins were stillborn. 338 cycles of IUI alone were started. The pregnancy rate per started treatment cycle was 7.4%. 355 cycles of IUI with stimulation were started. The pregnancy rate per started treatment cycle was 8.7%. 270 cycles of IVF were started. The pregnancy rate per started treatment cycle was 12.2%.

Clinical conclusions
IUI treatment was as effective as IVF, and mild ovarian hyperstimulation of IUI cycles did not yield higher pregnancy rates.

Modelling
A Markov chain model was constructed to gain insight into cost-effectiveness based on real costs with respect to a couple’s course in a treatment programme that offered identical treatment cycles.

Measure of benefits used in the economic analysis
The number of pregnancies resulting in at least one live birth after treatment was used as the primary 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 included a hospital component (personnel, materials, equipment, overheads) and an ambulatory component (medication and luteinising-hormone-surge detection kits). The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. The price year was 1995.

Statistical analysis of costs
Not reported.
Indirect Costs
Not included.

Currency
Dutch guilders (Dfl), with 1 Dfl = 0.4791 US$ (Nov. 1 1999).

Sensitivity analysis
No sensitivity analysis was reported.

Estimated benefits used in the economic analysis
The spontaneous delivery rate was 1.25% per month in idiopathic subfertility and 0.82% per month in male subfertility. 31% of couples who started treatment with IUI alone delivered, compared with 37% of those who started IUI with stimulation and 38% of those who started IVF. The multiple pregnancy rate was 29% of viable pregnancies with IUI plus stimulation, and 21% with IVF. In the group assigned IUI alone, there was one monozygotic twin pregnancy, but both twins were stillborn. The pregnancy rate per started treatment cycle was 7.4% with IUI alone, 8.7% with IUI plus stimulation, and 12.2% with IVF. The woman's age was the most influential factor on the pregnancy rate per cycle in each treatment programme, (p=0.03). There was a small difference between pregnancy rate per cycle for either IUI treatment and both IUI treatments together and pregnancy rate per cycle for IVF, (p=0.09).

Cost results
One treatment cycle of IUI in a spontaneous cycle cost on average Dfl 623, compared to Dfl 931 for one cycle of IUI in a stimulated cycle, and Dfl 3,350 for one IVF cycle. The costs of one IVF treatment cycle were 3.5 higher than those of one IUI treatment in stimulated cycle and 5 times higher than a spontaneous cycle.

Synthesis of costs and benefits
The cost per pregnancy resulting in at least one live birth was Dfl 8,423 for IUI alone, compared with Dfl 10,661 for IUI in a stimulated cycle, and Dfl 27,409 for IVF.

Authors' conclusions
Couples with idiopathic or male subfertility should be counselled that IUI offers the same likelihood of successful pregnancy as IVF, and is a more cost-effective approach. IUI in the spontaneous cycle carries fewer health risks than IUI after mild hormonal stimulation and is therefore the first choice treatment.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparators was clear. You, as a user of this database, should verify whether these health technologies are relevant to your setting.

Validity of estimate of measure of benefit
A relevant measure of benefits was used. The authors considered the number of pregnancies resulting in at least one live birth and calculated the pregnancy rate per started cycle, rather than the clinical pregnancy rate per treatment cycle conducted. The authors also used "censored" (including patients who dropped out of the treatment) as one of the possibilities of treatment outcome. This approach increased the validity of the analysis and was somewhat different from the approach adopted in other studies cited by the authors.

Validity of estimate of costs
Only direct costs incurred by the hospital were considered. The costs of infertility work-up and the costs of antenatal
care once patients had left the clinic 12 weeks after conception were not included. Costs were derived from local sources and may not be generalisable to other settings. No sensitivity analysis was performed to test the robustness of the cost results.

Other issues
The authors noted that the cost-effectiveness of IUI in the spontaneous cycle would be even more favourable compared with that of IUI in the stimulated cycle and IVF if the costs of antenatal care were taken into account. Adequate comparisons with other relevant studies were made. The generalisability of the results to other settings or countries was not discussed. The authors do not appear to have presented their results selectively. The study enrolled couples with idiopathic subfertility or male subfertility and this was reflected in the authors' conclusions.

Implications of the study
The authors' findings suggest that in cases of idiopathic and male subfertility, IUI in the spontaneous cycle should be offered as first choice treatment.

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Bibliographic details

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
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