A decision analysis of treatments for obstructive azoospermia
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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.

CRD summary
The objective was to compare the cost-effectiveness of assisted reproduction technologies in men for infertility due to obstructive azoospermia after a vasectomy. The authors concluded that vasectomy reversal appeared to be the most cost-effective treatment, when the impact of indirect costs was considered. There were a few limitations to the study and this conclusion should be considered with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to compare the cost-effectiveness of assisted reproduction treatments for infertility in men due to obstructive azoospermia after a vasectomy.

Interventions
Microsurgical vasectomy reversal was compared with microsurgical epididymal sperm aspiration (MESA) and percutaneous testicular sperm extraction (TESE) with in vitro fertilisation (IVF) or intracytoplasmic sperm injection (ICSI).

Location/setting
USA/secondary care.

Methods
Analytical approach:
A decision tree was used to determine the cost-effectiveness. The data for the model were from published sources. The authors stated that they considered both the direct and indirect costs of complications, lost productivity, and multiple gestation pregnancies.

Effectiveness data:
MEDLINE was searched for peer-reviewed articles on the patency rate of microsurgical vasectomy reversal and the live delivery rate associated with it and MESA. The search terms were listed and the review identified 15 studies on vasectomy reversal and 13 studies on sperm aspiration. The overall efficacy rates for vasectomy reversal and MESA were based on the weighted averages of these studies. The efficacy of TESE with IVF or ICSI and the probability of multiple gestation pregnancy after IVF (singles, twins and triplets) were from the Society for Assisted Reproductive Technologies registry for the years 2005 and 1999. IVF clinical pregnancy rates were adjusted by 11.6% to account for spontaneous abortion and to reflect delivery rates.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The key measure of benefit was live delivery.

Cost data:
The direct cost categories were office consultations and follow-ups for male and female infertility, diagnostic tests (follicle stimulating hormone and testosterone blood tests, two semen analyses, female hormonal evaluation, serial
ultrasounds, and pregnancy tests), IVF procedural costs, and procedural costs of vasectomy reversal, MESA or TESE (including professional, facility, and anaesthesia costs). IVF procedural costs were based on charges at the five highest volume IVF facilities in the USA. Other direct costs were based on a variety of published sources, including the Medicare Resource Based Relative Value Scale. The indirect cost categories included lost productivity due to recovery from male-related interventions, complications following vasectomy reversal, TESE, MESA and IVF, and the cost of multiple gestation pregnancies (neonatal complications and longer intensive care stays). The value of lost productivity was based on the 2005 median income rate for men and women from the US Census Bureau. The risk and cost of complications and cost of multiple gestation pregnancies were from published sources. All costs were reported in US dollars ($) and the price years were 1999 and 2005. Costs were inflated using the medical care component of the consumer price index as calculated by the US Department of Labor.

Analysis of uncertainty:
Two-way sensitivity analysis was conducted on the probability of unblocked vasectomy reversal (varied between 50% and 100%) and the probability of successful pregnancy from first IVF cycle (varied between 20% and 100%). One-way sensitivity analysis was also conducted on male procedural costs (based on five high-volume andrology centres) and income rates (based on the top quintile of household income).

Results
For vasectomy reversal, the weighted average of the patency rate was 81% and of the live delivery rate was 44%. For MESA, the weighted average of the live delivery rate was 44%. In the model, the probability of a successful delivery following vasectomy reversal was 42%, the probability of successful delivery following IVF was 44%, and the probability of successful sperm retrieval with percutaneous TESE was 100%.

In the 1999 model, the cost per live delivery was $25,321 for vasectomy reversal, $58,858 for percutaneous TESE, and $61,977 for MESA (converted to 2005 prices). In the 2005 model, the cost per live delivery was $20,903 for vasectomy reversal, $54,797 for percutaneous TESE, and $56,861 for MESA (2005 prices). The differences in cost-effectiveness were mainly due to improvements in IVF delivery and complication rates.

The sensitivity analysis revealed that vasectomy reversal was consistently favoured, compared with the other treatments, in all scenarios.

Authors’ conclusions
The authors concluded that vasectomy reversal appeared to be more cost-effective than percutaneous TESE and MESA for the treatment of obstructive azoospermia, when the impact of indirect costs was considered.

CRD commentary
Interventions:
The interventions were generally well described, but the acronyms IVF and ICSI were not defined. The interventions were relevant to the secondary health care setting.

Effectiveness/benefits:
A review was conducted for the estimates of the effectiveness of vasectomy reversal and MESA. The results of the review were clearly reported. The search was limited to one database, which means that it might not have identified all the relevant studies. A review was not conducted for percutaneous TESE. The conversion of the probabilities listed in the table to the parameters used in the decision tree was unclear. The authors acknowledged that the effectiveness of vasectomy reversal and IVF, with older women, was not considered. The authors did not state whether any discounting was performed.

Costs:
The costs were relevant to the perspective stated, but the authors acknowledged that the future costs of raising more children with chromosomal anomalies, prematurity, and low birth weights (as found more often in children conceived by assisted reproduction technologies) were not taken into account. The unit costs were well reported in a table. The use of high-volume centres to estimate the IVF procedural costs might have underestimated them due to economies of scale. The authors did not state whether discounting was performed.
Analysis and results:
The use of a decision tree was appropriate for the condition and the methods were generally well reported, with diagrams. A total figure for the live births per person treated and total costs per person were not reported and the costs were not split into direct versus indirect. This makes it difficult to determine the extent to which the results were driven by the indirect costs. The sensitivity analysis was limited. The results were reported as costs per live delivery, which was appropriate and might be generalisable to other settings, but not other disorders. The lack of transparency around the estimates used in the model means that the results might not be robust. The authors acknowledged some limitations to their study and highlighted some key questions to be addressed.

Concluding remarks:
There were a few limitations to the study and the authors’ conclusions should be considered with caution.

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