Clinical Algorithms

Infertility

T R VARMA

About one in ten couples experience difficulty in producing a child when they want to do so. More than 80% of such couples will conceive in the first two years, but over half of the remainder will remain infertile if no treatment is given. The investigation and management of infertility must be handled with care by both the general practitioner and the hospital doctor as it may have profound effects on psychosexual aspects of the marriage.

Assessment

Joint consultation and parallel investigations often save time and prevent a feeling of grievance by one partner against the other. The stability of the marriage should be assessed, and if it is thought that the advent of a child is being sought only to hold together a failing relationship then appropriate management of the relationship, perhaps by a marriage guidance counsellor, should precede treatment but not necessarily investigation of infertility.

For most patients the history is unhelpful in establishing the cause of infertility, but menstrual irregularity or previous gynaecological problems in the woman may be important. The man should be asked if he has children from any previous relationship, if he has had surgery to the groin or genitalia during childhood, mumps in adulthood, or trauma to his testis. It is also worth finding out if he has an excessive alcohol intake as this may reduce his sperm count.

Both partners should be given a general examination. Galactorrhoea and thyroid or adrenal disease should be looked for in the woman, and the breasts should be examined for lumps (as part of a routine screening procedure in all women). Pelvic examination should be performed and a cervical smear taken. Difficulty in performing the vaginal examination because of vaginismus may suggest a psychosexual problem (see algorithm on psychosexual problems).¹ The man should be examined for anatomical abnormality and for the size of the testes. Healthy young men should have testes of about 3 to 4 cm long; as most of the testis is concerned with the production of spermatozoa the size gives some idea of its potential. The epididymis should be checked for nodularity or thickening, and the patient should be examined for a varicocele while standing. Surgical ligation of a varicocele is controversial, but it may be worth considering in a man with a low sperm density, high ejaculate volume, and many morphologically abnormal sperm.

Investigations

All patients should be screened for syphilis, and the woman should have her rubella antibody concentrations measured early in the course of the investigations.

Initial investigation may be undertaken by the general practitioner. The patient should be told that the time of maximum fertility

is on the day of ovulation. This usually occurs 14 days before the first day of the next period—that is, day 14 of a 28 day cycle or day 18 of a 32 day cycle. She should be given a temperature chart and instructed on its use. She should take her temperature first thing in the morning before getting out of bed and record the value on the chart. A fall in temperature followed by a rise of more than 0.5°C indicates ovulation. Intercourse in the following cycles should be timed for the predicted day of ovulation.

Specimens of semen should be obtained on at least two occasions, preferably six weeks apart. The patient should be told to abstain from intercourse or masturbation for three days before the specimen is collected. The semen should be obtained by masturbation into a clean plastic pot and not by withdrawal after intercourse or by use of a condom. The sample should be kept at body temperature and taken to the hospital as soon as possible (within 1-2 hours). The patients should be reviewed after three months, and if the woman is not pregnant they should be referred for more detailed investigations. The table indicates normal values for semen analysis.

Normal values for semen analysis

Volume	2-6 ml
Density	20-250 million/ml
Motility	More than 60% with forward motion in 2 h
Morphology	More than 60% normal

Further tests to determine ovulation include measurement of luteal phase plasma progesterone concentration, a premenstrual endometrial biopsy (usually performed when the patient is admitted for laparoscopy), and, more recently, ultrasonographic monitoring of ovarian follicles. Management of anovulation is indicated in the algorithm. The patient is treated with clomiphene in incremental doses and the response monitored by means of the temperature chart, plasma progesterone concentrations, or ultrasound examination. If there is no evidence of ovulation in any one month the dose of clomiphene should be increased the next month up to a maximum of 150 mg. Doses beyond this produce changes in the cervical mucus, which may interfere with sperm penetration. Patients who fail to ovulate with clomiphene treatment should be referred to a regional centre, where gonadotrophin treatment may be given with appropriate monitoring.

Patency of the fallopian tubes is normally assessed by means of laparoscopy and dye perturbation. This has advantages over hysterosalpingography in that it allows the pelvis to be assessed for adhesions and the presence of endometriosis. If there is tubal damage then the feasibility of microsurgery can be assessed at the same time. If the laparoscopy is carried out before menstruation an endometrial biopsy sample may be obtained to determine whether the patient has ovulated in that cycle. In cases where tubal surgery is not possible or the patient has failed to conceive after tubal surgery the only treatment is in vitro fertilisation and embryo transfer. There is disagreement as to whether patients with tubal damage should be referred immediately for in vitro fertilisation and embryo

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transfer; the decision depends on the individual. A young patient with peritubal adhesions in whom fimbryolysis or salpingolysis, or both, is possible, should initially be offered tubal surgery. For a patient in her mid-30s who has extensive pelvic damage in vitro fertilisation and embryo transfer would probably be the treatment of choice.

In 30-40% of couples factors in the man are responsible for the fertility problems. The algorithm shows the investigation and management, but the success rate of most treatments other than artificial insemination by donor and in vitro fertilisation and embryo transfer is poor. These cases should be handled with particular care as the man's ego is more vulnerable than the woman's in many situations, and suggesting that pregnancy can be achieved only by artificial insemination by donor requires tact.

A combination of factors are responsible in about 5-15% of couples with subfertility. The value of the postcoital test is controversial, but this is often the first indication that such factors are present. If the result of the postcoital test is abnormal—that is, less than five motile sperm per high power microscope field—and has been performed at the right time of the cycle—that is, the day of ovulation—the patient needs investigating further. Ovulation can be timed with the aid of the temperature chart, although results of the test will be positive in at least twice as many people if ovulation is timed by ultrasound. Antisperm antibodies should be sought in both partners. A cervical mucus sperm penetration test should be performed. Mucus from a woman of known fertility is paired with the sperm under investigation, and sperm from a man of known fertility is paired with the mucus under investigation. The results of the cross hostility test may indicate that the problem lies primarily with the cervical mucus. The concentration of antisperm antibodies may then be measured in the plasma of the woman, but this is of academic interest only as there is no effective treatment. If facilities are not available for gamete intrafallopian transfer or in vitro fertilisation and embryo transfer a trial of condom treatment may be considered. The couple are instructed to have intercourse with a condom except at midcycle. The value of condom treatment has not been proved.

If sperm fails to penetrate normal cervical mucus antisperm antibodies may be sought in both the serum and the seminal plasma

of the man. Again, this is of academic interest as no treatment is of proved value. High dose steroids may be tried for three months, however, before suggesting artificial insemination by donor or in vitro fertilisation and embryo transfer.

Finally, about 20% of couples will have no obvious cause of infertility as determined by the tests detailed above. Regional centres with a particular interest in fertility may go on to perform detailed monitoring of follicular growth to try to exclude luteinised unruptured follicle syndrome and daily hormonal investigations throughout the menstrual cycle (to try to exclude the inadequate luteal phase). If these facilities are not available then the choice lies between referring patients for in vitro fertilisation and embryo transfer or gamete intrafallopian transfer and offering no further treatment other than the reassurance that about 40% of such couples will eventually conceive.

Conclusions

Infertility is a major problem that affects 10% of all couples. It imposes both psychological and psychosexual strains on relationships and should therefore be investigated and treated as rapidly as possible. The recent advances of in vitro fertilisation and embryo transfer mean that pregnancy is now a possibility for many couples. The availability of such treatment is still limited, however, particularly in the National Health Service. Patients should be reviewed regularly while undergoing treatment for infertility and given encouragement and support. After a reasonable trial of treatment patients should be given a realistic estimate of their chances of achieving a pregnancy and should be referred to adoption agencies if appropriate or counselled for childlessness.

Useful address: National Association for the Childless, 318 Summer Lane, Birmingham B19 3RL.

References

- 1 Stanley E. Psychosexual problems. *Br Med J* 1987;294:39-41.
- 2 Franks S. Primary and secondary amenorrhoea. *Br Med J* (in press).

For Debate . . .

LMSSA: A back door entry into medicine?

RICHARD WAKEFORD

In December 1982, 10 final year clinical medical students at Cambridge failed their qualifying examinations. Eight immediately chose to sit the examination of the Society of Apothecaries of London, a body that does not run a medical course but which has the right to set qualifying medical examinations under a charter granted by King James I. Seven of the students passed the four parts of the examination straight away, including both students who failed more than one subject in the Cambridge examinations. The eighth student passed the society's exam three months later.

"Second rate qualification"

I reported these facts in the journal *World Medicine*,¹ together with the suggestions that they offered prima facie evidence of a "second rate qualification" and that the General Medical Council, which is responsible for overseeing examination standards, should take some action. The General Medical Council duly wrote and asked what evidence there was for these assertions, and I repeated the story. I remarked that the council, which collects the annual examination returns from licensing bodies—universities and non-university licensing bodies—was in an excellent position to collect further evidence. It could publish the figures for students who fail at their university and pass under one of the non-university licensing bodies (the Society of Apothecaries of London, the English Conjoint Board, and the Scottish Triple Qualification) and vice versa.

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