Section 1 Pre-conception and conception

Chapter 1

Assisted conception

Infertility affects about one in seven couples, with a small increase in infertility and the number of couples seeking help over the past 10 years. The treatment of infertility has developed rapidly, and the anaesthetist may be involved in many aspects of the patient's treatment, which may be complex. The harvesting of oocytes needs to take place within a defined period of time, or ovulation may have occurred and oocytes will be lost. Couples presenting for infertility treatment are generally anxious, and women are often emotional at the time of oocyte retrieval. It is therefore particularly important for the anaesthetist to understand the couple's anxieties, and to be able to explain the effects of the anaesthetic technique that is to be used.

Problems and special considerations

All of the methods of assisted fertility techniques involve extraction of oocytes from the follicles, either laparoscopically or, with the development of transvaginal ultrasonography, via the transvaginal route (ultrasound-directed oocyte retrieval, UDOR). The techniques differ in the site of fertilisation and/or replacement of the gamete/zygote:

- **In-vitro fertilisation (IVF).** This term is often (incorrectly) used to encompass all aspects of infertility treatment. IVF involves either UDOR or laparoscopic oocyte retrieval, fertilisation in the laboratory and transfer of the developing embryo into the uterus via the cervix, 48 hours later. UDOR may be painful so may require analgesia, sedation or anaesthesia. Embryo transfer is performed with the patient awake, although there are occasions when the anaesthetist may be requested to provide sedation. The success rate is approximately 15–25%.
- **Gamete intrafallopian transfer (GIFT).** This involves retrieval of oocytes which are placed together with sperm into the fallopian tube It is performed laparoscopically in the majority of cases and has not been shown to have a higher success rate than IVF, so is used less commonly.
- **Zygote intrafallopian tube transfer (ZIFT) or pronuclear stage transfer.** This process involves oocyte retrieval and IVF, with the zygote then being placed in the fallopian tube as for GIFT. It has no significant difference in pregnancy rates to IVF, but has a trend towards increased ectopic pregnancy rates.
- **Intracytoplasmic sperm injection (ICSI).** Fertilisation occurs in the laboratory via injection of sperm into the oocytes, and the developing embryo is transferred into the uterus as for IVF. This technique is used for male infertility. The success rate is approximately 30%.

Management options

Most women who present for assisted conception techniques are healthy and in their thirties or forties. However, it is now recognised that some women may also have a number of comorbidities associated with increasing age. Therefore, a multidisciplinary approach is necessary. It would be logical to minimise drug use and use sedation or regional anaesthesia whenever possible, although this is not suited for laparoscopy (see Chapter 3, *Anaesthesia before confirmation of pregnancy*).

For UDOR, which has become the most common method used for oocyte retrieval, the main anaesthetic techniques are intravenous sedation and regional anaesthesia. It is important to remember that patients requiring UDOR are day cases, and the basic principles of day-case anaesthesia apply. There has been a considerable amount of work to date on the use of propofol with alfentanil, and this combination of drugs would appear to be the technique of choice for intravenous sedation. Propofol may be administered by intermittent boluses or by continuous infusion, with the patient breathing oxygen via a Hudson mask. Many anaesthetists find that they are using levels of sedation close to anaesthesia. There does not seem to be a difference in patient satisfaction or pregnancy rate if sedation or general anaesthesia is used. It is essential that the sedation is administered in a suitable environment with resuscitation facilities and anaesthetic monitoring. Often the assisted conception unit is some distance from the main theatre suite; therefore it may be difficult for the staff working in an isolated environment to maintain their skills in resuscitation.

The desire to minimise the drugs administered to women undergoing ultrasound-guided techniques has led to the use of regional anaesthesia, although there is limited evidence supporting its association with increased pregnancy rates. Careful administration is required to allow same-day discharge; the low-dose spinal that is used for labour analgesia or the short-acting agents used for cervical cerclage can give good operating conditions while satisfying the criteria needed for day-case anaesthesia.

The main considerations for laparoscopy are the type of anaesthesia, the pneumoperitoneum and the effects of the anaesthetic agents on fertilisation and cell cleavage. The length of exposure to the drugs is also important. The effects of nitrous oxide and volatile anaesthetic agents on fertilisation and cleavage rates have been extensively examined. It is generally recognised that all volatile agents and nitrous oxide have a deleterious effect, although opinion is divided as to the extent of the problem. It is also recognised that the carbon dioxide used for the pneumoperitoneum causes a similar effect, and it is difficult to separate the effects of the anaesthetic agents from those of the carbon dioxide.

Of the intravenous agents, the effect of propofol on fertilisation and cleavage appears to be minimal. Propofol accumulates in the follicular fluid, and the amount in the follicular fluid may become significant if there are a large number of oocytes to retrieve. Propofol decreases the fertilisation rates, but there is no significant effect on the cell division rates. This has led to the increased use of propofol as the main agent in total intravenous anaesthesia.

Analgesia following the procedure may be provided with a combination of codeine and paracetamol. Non-steroidal anti-inflammatory drugs such as diclofenac are considered less suitable, as these are thought to interfere with embryo implantation, owing to a disruption in prostaglandin levels. All assisted conception techniques carry the risk of ovarian

hyperstimulation (see Chapter 2, *Ovarian hyperstimulation syndrome*), and multiple or ectopic pregnancy.

Key points

- Oocyte retrieval may involve laparoscopy requiring general anaesthesia, although intravenous sedation and regional anaesthesia are suitable for transvaginal ultrasound-directed techniques.
- Couples are usually very anxious and require constant reassurance.

Further reading

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