Male and female sterilization

Catriona Melville

Alison Bigrigg

Abstract

Male and female sterilization is used in many countries worldwide as a permanent method of contraception. Failure rates for female sterilization are affected by age at sterilization and by the method of tubal occlusion. Laparoscopic sterilization has low complication rates but is not available in parts of the developing world due to the lack of facilities, equipment and expertise. Less invasive techniques are being developed, such as hysteroscopic tubal occlusion and administration of intrauterine agents. Failure rates for vasectomy are 10 times lower than those for female sterilization. Complications such as pain, haematoma and granuloma formation may occur. Nursing staff and doctors can provide counselling prior to sterilization. Failure rates, irreversibility, complications and alternative methods of contraception should be discussed and documented. Counselling should allow men and women to provide informed consent for sterilization and reduce the incidence of regret and requests for reversal.

Keywords counselling; failure rates; female sterilization; vasectomy

Worldwide, sterilization is used by more people than any other method of contraception, with around 190 million couples relying on tubal occlusion and 42 million couples on vasectomy. Although vasectomy is safer, more effective and less expensive, female sterilization still accounts for more than two-thirds of sterilization procedures performed worldwide. In many developing countries, vasectomy is infrequently used as a method of birth control. This is partly due to lack of awareness. Advertising campaigns have sought to inform both men and women of this method.

In the UK in recent years the incidence of tubal occlusion has decreased, perhaps reflecting better information provision on the available alternatives. When counselling men and women about their contraceptive choices it is important that alternative contraceptive options are offered. Information and provision of the long-acting reversible contraceptive (LARC) methods should be available to all women requesting contraception. Sterilization does not provide any proven positive health benefits but should allow men and women to make informed choices with regard to their fertility and reproductive health. Couples should be advised that vasectomy carries a lower risk of failure and less risk associated with the procedure than female sterilization.

This review aims to provide a summary of the available types of sterilization procedures, including their failure and complication rates. Counselling and consent for sterilization, and regret after sterilization will also be explored.

Female sterilization

Female sterilization involves occlusion of the Fallopian tubes, impeding sperm transport to the ampulla of the tube, where fertilization of the ovum occurs. Data from the 2008 Scottish Key Clinical Indicators (KCI) for Sexual Health Report (2007 data) shows that the number of female sterilizations in Scotland has decreased by more than 60% since 2000, whereas the data for LARC shows that uptake is increasing.

The Fallopian tubes may be accessed abdominally or by a transvaginal approach. Laparoscopic female sterilization is most commonly used in the UK and US, however in the developing world, due to lack of equipment, facilities and expertise in laparoscopic surgery, most sterilization procedures are carried out using a mini-laparotomy. A Cochrane review has shown that minor morbidity is significantly less with laparoscopic sterilization compared to mini-laparotomy. Most studies comparing the two methods, however, were of limited power and were unable to demonstrate significant differences in rarer but serious complications.

Laparoscopic female sterilization

Techniques

The tubes may be occluded with a mechanical device such as a clip or silicone rubber band, or may be interrupted using diathermy (electrocautery) or ligation and excision. One of the most commonly used methods of laparoscopic tubal occlusion is the Filshie clip, which comprises a titanium clip with an inner rubber band, which is applied to the Fallopian tubes at the end of the procedure. Using this method, laparoscopic sterilization has low complication rates but is not available in parts of the developing world due to the lack of facilities, equipment and expertise in laparoscopic sterilization.

Anaesthesia and pain relief

The majority of laparoscopic female sterilization procedures are carried out as day cases under general anaesthesia. Sterilization has been carried out in carefully selected women under local anaesthesia. The procedure is carried out using a local anaesthetic, lignocaine with adrenaline (epinephrine), which is infiltrated from the skin down to the peritoneum at subumbilical and suprapubic sites. Intravenous sedation is used if required. Local anaesthetic, without adrenaline, is applied to the Fallopian tubes at the end of the procedure. Using this method, laparoscopic sterilization without general anaesthesia is well tolerated.

Pain following sterilization is thought to be a result of tubal ischaemia. Randomized controlled trials have shown that topical application of local anaesthesia to the Fallopian tube either prior to or after tubal occlusion significantly reduces postoperative pain.

Complications

Laparoscopic surgery is associated with a risk of bowel damage (0.4 in 1000) and major vessel damage (0.2 in 1000) necessitating laparotomy. Intraperitoneal carbon dioxide has been

Counselling should allow men and women to provide informed consent for sterilization and reduce the incidence of regret and requests for reversal.

Keywords counselling; failure rates; female sterilization; vasectomy

Worldwide, sterilization is used by more people than any other method of contraception, with around 190 million couples relying on tubal occlusion and 42 million couples on vasectomy. Although vasectomy is safer, more effective and less expensive, female sterilization still accounts for more than two-thirds of sterilization procedures performed worldwide. In many developing countries, vasectomy is infrequently used as a method of birth control. This is partly due to lack of awareness. Advertising campaigns have sought to inform both men and women of this method.

In the UK in recent years the incidence of tubal occlusion has decreased, perhaps reflecting better information provision on the available alternatives. When counselling men and women about their contraceptive choices it is important that alternative contraceptive options are offered. Information and provision of the long-acting reversible contraceptive (LARC) methods should be available to all women requesting contraception. Sterilization does not provide any proven positive health benefits but should allow men and women to make informed choices with regard to their fertility and reproductive health. Couples should be advised that vasectomy carries a lower risk of failure and less risk associated with the procedure than female sterilization.

This review aims to provide a summary of the available types of sterilization procedures, including their failure and complication rates. Counselling and consent for sterilization, and regret after sterilization will also be explored.

Female sterilization

Female sterilization involves occlusion of the Fallopian tubes, impeding sperm transport to the ampulla of the tube, where fertilization of the ovum occurs. Data from the 2008 Scottish Key Clinical Indicators (KCI) for Sexual Health Report (2007 data) shows that the number of female sterilizations in Scotland has decreased by more than 60% since 2000, whereas the data for LARC shows that uptake is increasing.

The Fallopian tubes may be accessed abdominally or by a transvaginal approach. Laparoscopic female sterilization is most commonly used in the UK and US, however in the developing world, due to lack of equipment, facilities and expertise in laparoscopic surgery, most sterilization procedures are carried out using a mini-laparotomy. A Cochrane review has shown that minor morbidity is significantly less with laparoscopic sterilization compared to mini-laparotomy. Most studies comparing the two methods, however, were of limited power and were unable to demonstrate significant differences in rarer but serious complications.

Laparoscopic female sterilization

Techniques

The tubes may be occluded with a mechanical device such as a clip or silicone rubber band, or may be interrupted using diathermy (electrocautery) or ligation and excision. One of the most commonly used methods of laparoscopic tubal occlusion is the Filshie clip, which comprises a titanium clip with an inner rubber band, which is applied to the Fallopian tubes at the end of the procedure. Using this method, laparoscopic sterilization has low complication rates but is not available in parts of the developing world due to the lack of facilities, equipment and expertise in laparoscopic sterilization.

Anaesthesia and pain relief

The majority of laparoscopic female sterilization procedures are carried out as day cases under general anaesthesia. Sterilization has been carried out in carefully selected women under local anaesthesia. The procedure is carried out using a local anaesthetic, lignocaine with adrenaline (epinephrine), which is infiltrated from the skin down to the peritoneum at subumbilical and suprapubic sites. Intravenous sedation is used if required. Local anaesthetic, without adrenaline, is applied to the Fallopian tubes at the end of the procedure. Using this method, laparoscopic sterilization without general anaesthesia is well tolerated.

Pain following sterilization is thought to be a result of tubal ischaemia. Randomized controlled trials have shown that topical application of local anaesthesia to the Fallopian tube either prior to or after tubal occlusion significantly reduces postoperative pain.

Complications

Laparoscopic surgery is associated with a risk of bowel damage (0.4 in 1000) and major vessel damage (0.2 in 1000) necessitating laparotomy. Intraperitoneal carbon dioxide has been
used to reduce the risk of injury; however, during laparoscopic procedures as many as 39% of injuries are due to insertion of the trochar. Injuries are, therefore, just as likely to occur during laparoscopic sterilization as during more complex laparoscopic surgery.

**Transcervical sterilization**

**Hysteroscopic**

As hysteroscopic techniques have evolved, female sterilization via this route is now becoming an accepted outpatient procedure. Various substances ranging from silicone plugs (Ovabloc) to micro-inserts (Essure®) are being inserted. Essure® (Conceptus Europe) is the only licensed product available in the UK. It was approved by the Food and Drug Administration (FDA) in the US in 2002 and more than 50 000 procedures have now been performed worldwide. The Essure® device consists of a stainless-steel inner coil with a dynamic expanding outer coil made from a nickel–titanium alloy. Running along and through the inner coil is a layer of polyethylene terephthalate (PET) fibres. The device is delivered via a 5-French gauge hysteroscope. The outer coil attaches itself to the Fallopian tubes. The PET fibres produce an inflammatory response that extends to cause tubal occlusion. Additional contraception is advised for 3 months post-procedure at which time an imaging procedure, such as a hysterosalpingogram, should be performed to confirm bilateral tubal occlusion. It is estimated that Essure® is 99.8% effective in pregnancy prevention at 2-year follow-up.

As hysteroscopic sterilization techniques are still under evaluation, the Royal College of Obstetricians and Gynaecologists (RCOG) recommends that these methods of tubal occlusion should only be used within the present guidance system for new surgical interventions. The National Institute for Clinical Excellence (NICE) in the UK has highlighted the lack of long-term data on failure rates following hysteroscopic sterilization. No randomized controlled trials have compared hysteroscopic and laparoscopic sterilization. A cost comparison analysis was undertaken in Canada to assess the cost of the Essure® hysteroscopic procedure compared to laparoscopic sterilization: laparoscopic tubal ligation costs $3449 and the Essure® sterilization costs $1374.

**Blind transcervical methods**

Other methods of tubal occlusion have been used in developing countries but are not licensed in the UK. Reviews of the use of quinacrine hydrochloride pellets inserted into the uterine cavity in the proliferative phase of the menstrual cycle (days 6–14) and repeated the following cycle have been performed. Quinacrine causes fibrosis of the endothelial lining of the proximal part of the Fallopian tubes. The endometrium is spared because high levels of zinc are present there, which prevent quinacrine–DNA complexes from forming and hence prevent subsequent fibrosis. The contraceptive injection, depot medroxyprogesterone acetate 150 mg, is given intramuscularly along with the first treatment of quinacrine. This is firstly to provide adequate contraception until the method is effective and, secondly, to relax tubal musculature to allow quinacrine solution into the tubes. Studies in developing countries have shown failure rates of between 1% and 2%.

This method has been used in over 50 000 women in Vietnam, India and other regions with no case fatalities reported. Common side effects included abdominal pain, headache and mild fever, and ibuprofen or other antiprostaglandins are used routinely. In developing countries, where mortality from surgical sterilization is high and where major complication rates vary between 2% and 6%, this method of quinacrine sterilization, which can be carried out at low cost and by non-medical personnel, may have a place.

**Failure of sterilization**

The RCOG quotes a lifetime failure rate of female sterilization of 1 in 200, with a 10-year failure rate of 2–3 in 1000 procedures. The main causes of failure of sterilization are an unidentified luteal phase pregnancy, spontaneous recanalization of the end of the Fallopian tubes, incorrect placement of mechanical devices and development of a tubo-peritoneal fistula.

The US Collaborative Review of Sterilization (CREST) study, a multicentre, prospective cohort study of 10 685 women undergoing sterilization, found that risk of failure was related to both the method of sterilization used and the age of the patient. A variety of methods of tubal occlusion were used throughout the CREST study. The efficacy of the Filshie clip was not assessed in this study. The failure rate for tubal occlusion was 1.3% (143 failures). This is higher than the 0.5% rate usually quoted. The 10-year cumulative lifetime risk of sterilization failure, at all ages and for all types of sterilization, was found to be 16.6 in 1000 [95% confidence interval (CI), 13.5–19.7]. The highest probability of failure, 36.5 pregnancies in 1000 procedures, was found with spring clip application. The younger a woman is at the time of sterilization, the greater is her likelihood of sterilization failure. Since the average age of menopause is around 50 years, a woman sterilized at the age of 25 will potentially be fertile for a further 25 years, during which time sterilization may fail. A woman sterilized at the age of 45 may only have 5 years in which failure could result in pregnancy. Failure rates were lowest, at 18.5 in 1000, in women over the age of 40.

Early failures may also occur as a result of the woman being pregnant at the time of sterilization. A prospective study of 802 consecutive women attending for sterilization identified 21 women (2.6%) with a positive pregnancy test on the day of the scheduled sterilization. The majority of these women (81%) had a recent history of amenorrhoea or menstrual irregularity. This highlights the importance of adequate history taking and pregnancy testing, where appropriate, prior to sterilization.

There is a lack of evidence on failure rates of sterilization procedures carried out at the time of induced abortion, during a caesarean section or in the immediate postpartum period. The RCOG recommends that sterilization should be performed at an appropriate interval after pregnancy wherever possible. If requested in association with pregnancy (postpartum or post-abortal), the woman should be made aware of the increased regret rate and possibly an increased failure rate. If sterilization is to be performed at the time of caesarean section, counselling and agreement should have been obtained at least 1 week prior to the procedure.

Sterilization failures may result in intra- or extra-uterine pregnancies. In the CREST study, one-third of all pregnancies occurring following sterilization were ectopic. When a woman who has been sterilized presents with pregnancy, it is important actively to exclude an ectopic pregnancy. The risk of ectopic pregnancy, for all methods of tubal occlusion, was 7.3 in 1000
procedures. Bipolar diathermy procedures in women under the age of 30 were associated with a 31.9 in 1000 risk of ectopic pregnancy, whilst postpartum partial salpingectomy was associated with a risk of only 1.2 in 1000.

Long-term complications

Menstrual disturbance

Many myths have surrounded the risk of menstrual abnormalities following sterilization and the existence of a ‘post-tubal sterilization syndrome’; however, this debate is now largely resolved. A systematic review and a subsequent 5-year follow-up study of a sub-cohort of women recruited to the CREST study found that, although there is an association between tubal occlusion and subsequent hysterectomy, there is no evidence to suggest that the procedure plays a causative role in subsequent menstrual disorder or uterine problems. Compared to women who had not been sterilized, women who had been sterilized were found to have fewer days bleeding (odds ratio (OR), 2.4; 95% CI, 1.1–5.2), lower volume of blood loss (OR, 1.5; 95% CI, 1.1–2.0), less dysmenorrhoea (OR, 1.3; 95% CI, 1.0–1.8), more cycle irregularity (OR, 1.6; 95% CI, 1.1–2.3), but no difference in cycle length. However, despite this, women who had been sterilized were found to be four times more likely to have a hysterectomy than women whose husbands had had a vasectomy. Women opting for sterilization, following many years on the combined oral contraceptive pill, may not welcome the return to ovulatory menstrual cycles and should be warned of the possibility of cycle irregularity, dysmenorrhoea and menorrhagia.

Taking a gynaecological history is essential to allow a method of contraception to be chosen that may perhaps offer an improvement in bleeding patterns as well as effective contraception. Objectively measured menstrual blood loss can be reduced by up to 90% with the gestogen-releasing intrauterine contraceptive system (IUS) and by 40–46% with the combined oral contraceptive pill. Amenorrhoea can be achieved in over 60% of women using the contraceptive injection medroxyprogesterone acetate.

Ovarian carcinoma

There is some evidence that tubal occlusion may reduce the risk of developing ovarian cancer in women with the BRCA1 gene mutation. A strong inverse relationship has been suggested between sterilization and ovarian cancer (OR, 0.33; 95% CI, 0.16–0.64), although the biological mechanism for this is unclear.

Regret and reversal

Regret following female sterilization is estimated to affect at least 14% of women and may be due to number of psychosocial factors. Analysis of CREST data has suggested that regret was more commonly expressed by women who were sterilized under the age of 30. One in five women under the age of 30 expressed regret up to 14 years following sterilization, whereas only one in six women over the age of 30 expressed regret. Additionally, women of low or nulliparity, and those sterilized immediately postpartum are at increased risk of regret. Regret in young women appeared less likely if nulliparous. The RCOG recommends that additional care must be taken when counselling people under 30 years of age or without children who request sterilization.

Women requesting sterilization should be advised that the procedure is intended to be permanent, but information about availability and the success rate of reversal should be given.

Successful pregnancy following sterilization reversal may vary with the type of tubal occlusive method used, with the use of microsurgery and with the age of the woman. Successful re-anastomosis following reversal procedures varies between 30% and 70%, but the successful pregnancy rates are lower (approximately 50%).

Male sterilization (vasectomy)

Vasectomy involves the occlusion or division of the vas deferens (vas), blocking the passage of spermatozoa from the epididymis. Currently, 5% of the world’s married couples rely on vasectomy. A review of the General Practice Research Database identified that, in the UK, vasectomy rates were unchanged between 1992 and 1999, a time during which the incidence of female sterilization decreased.

Vasectomy is traditionally performed using either two skin incisions (one on either side of the scrotum), or one midline incision. The exposed fascial sheath is then opened longitudinally and the vas divided and ligated with sutures. Variations in technique include vas occlusion with unipolar diathermy, or the application of clips. In addition, the fascial sheath can be interposed between the cut ends of the vas.

The evidence base for different techniques is not predominantly derived from randomized controlled trials. A Cochrane review concluded that fascial interposition reduced vasectomy failure, and this is recommended by the RCOG. Clips should not be used for occluding the vas as failure rates are unacceptably high.

The no-scalpel technique, developed in China, is now widely used and allows the vasectomy to be performed through a single puncture into the scrotum, avoiding a skin incision. The RCOG recommends that this technique should be employed where appropriate to reduce the risk of early complications. Supervised training is required to develop the skill to use this technique.

Anaesthesia

Vasectomy should be carried out under local anaesthesia, when possible. General anaesthesia may be required, however, when difficulties with the procedure are anticipated, e.g. the vasa are difficult to palpate, following previous surgery or after a previous failed procedure.

Time to achieve azoospermia

Traditionally, in the UK, two samples were obtained, no less than 4 weeks apart and both should be clear of sperm. There is little evidence to support the need for two samples and indeed men may fail to comply with this. Testing should not take place within 8 weeks of vasectomy. This will allow time for expulsion of sperm but this will vary with the frequency of ejaculation. Adequate contraception needs to be used following the procedure until azoospermia is confirmed. If non-motile sperm persist in the ejaculate following this, a fresh sample may need to be examined by the regional laboratory to ensure that there are no motile sperm. If motile sperm persist following vasectomy the procedure has failed and needs to be repeated.
In a small number of men non-motile sperm persist after vasectomy. When less than 10 000 non-motile sperm/ml are found in a fresh sample examined at least 7 months after vasectomy, ‘special clearance’ to stop contraception can be given.

In some countries, post-vasectomy testing is not available. The International Planned Parenthood Federation (IPPF) suggested at least 20 ejaculations are required to clear sperm before other contraceptive methods should be discontinued.

Vasectomy failure rates
Up to 2% of men fail to achieve azoospermia (early failures). The overall failure rate is 1 in 2000 after clearance has been given. Recanalization can occur up to 10 years following the procedure.

Complications
Complications such as haematoma, wound infection, epididymitis and sperm granuloma are not uncommon and are said to occur in 1–6% of men. Scrotal bruising is very common, with 1–2% of men having haematoma formation. Local scrotal support and analgesia are usually adequate for treatment, but occasionally admission to hospital for drainage is required.

Chronic testicular pain (post-vasectomy syndrome) is a recognized problem following vasectomy and has been found to be the most common late complication. Men should be informed of the possibility of this complication during preoperative counselling. The quoted incidence ranges from 12–52%, however, the true incidence of chronic post-vasectomy pain is difficult to establish as most studies have been questionnaire surveys. One study compared testicular pain in controls and vasectomized men and found that severe testicular pain was reported in 6% of cases and 2% of controls. None of the vasectomized men expressed regret.

Sperm granuloma consists of a mass of degenerating spermatooza surrounded by macrophages. The epididymal duct is distended and this pressure effect can lead to pain. A granuloma is a site of sperm phagocytosis and of presentation of spermatoozoal autoantigens to the immune system, and may be responsible for the antisperm antibody production that is seen in up to 60% of men after vasectomy.

Cancer risk
A link between vasectomy and prostatic cancer is likely to be non-causative. A recent large population-based case-control study in New Zealand found no association between prostate cancer and vasectomy [relative risk (RR), 0.92; 95% CI, 0.75–1.14], even after 25 or more years post sterilization.

Testicular cancer is no more common in men who have been vasectomized than in other men. A large Danish population cohort study, looking at over 73 000 men who had had a vasectomy, showed that cancer rates for testicular cancer and other cancers were similar to those expected nationally.

Cardiovascular disease
Concerns regarding an increase in atherosclerosis following vasectomy were raised in the 1980s following studies in monkeys who had undergone the procedure. Subsequent research has failed to show an increase in cardiovascular disease in humans and several large studies have suggested that vasectomy is associated with a lower death rate.

Regret and reversal
Regret following vasectomy is rare, but requests for reversal do occur and are often related to new partnerships. Regret is more common when vasectomy is performed at a young age. Counseling for sterilization should include information on the success rates associated with reversal.

With the use of microsurgical vasovasotomy, sperm patency rates of up to 90% are reported, but pregnancy rates are approximately 60%. The successful reversal and subsequent pregnancy rates decrease with time since vasectomy, with much lower success rates after 10 years. Prior to reversal of any sterilization procedure it is important to assess the reproductive function of both partners, luteal phase progestogen to assess ovulation and seminal analysis to assess sperm function.

New techniques for vas occlusion are being developed which include chemical injections, injectable plugs and the use of styrene maleic anhydride (SMA). The SMA method is the only potentially reversible method being developed. The SMA polymer is injected in the vas, reducing the pH sufficiently to kill sperm as they pass through. Fertility can be restored quickly by flushing the SMA with dimethyl sulphoxide (DMSO) or more slowly by allowing the SMA to dissolve over a period of 3 months to 5 years, depending on the dose administered. Animal and limited human trials suggest it is safe.

Psychosexual issues of male and female sterilization
There is a lack of large-scale, methodologically sound research into the psychological impact of sterilization procedures on men and women. Studies often fail to take into account pre-existing psychosexual morbidity, which may be present prior to sterilization. The number of women reporting psychosexual problems following sterilization is difficult to estimate. Small retrospective studies have suggested that a woman’s post-sterilization psychological condition is significantly worse if sterilization is carried out immediately following delivery or termination of a pregnancy than following interval sterilization.

An estimated 1% of men report psychosexual problems following vasectomy. Research from India suggested no alteration in libido in men or women following sterilization. Men should be reassured that there is no evidence for any alteration in testosterone production following vasectomy.

Counselling and informed consent
The specific issues relating to male and female sterilization should be discussed during counselling, supported by the use of appropriate written information. Structured proformas can ensure consistent and correct advice is given. Information about alternative contraceptive methods, in particular the LARC methods, should be provided. The RCOG Standards for Gynaecology advise that facilities should be available for the provision of these alternative methods of contraception. Recent audits suggest that following informed counselling, approximately one-third of women will choose a reversible method of contraception instead of female sterilization, and that they will still be using this method 2 years later. Both vasectomy and tubal occlusion should be discussed with all men and women requesting sterilization.
It is important to discuss the lifetime failure rate for female sterilization and for vasectomy. Specifically, the risk of ectopic pregnancy following procedure failure should be outlined. The irreversibility of the procedure and probable success of reversal procedures should be discussed. Women should be informed of the operative risk of laparoscopy and the need for laparotomy. Men and women should be informed of the operative risks and possible postoperative complications. Men should be informed about the possibility of chronic testicular pain after vasectomy.

It is also prudent to discuss the myths associated with sterilization, such as menstrual disturbances, libido, cancer, regret and change in circumstance. Many men and women fear unintended pregnancy far more than sexually-transmitted infection, and they should be made aware of the need to practise safer sex if entering a new sexual relationship. Men and women who are unable to give informed consent for sterilization cannot be forced to undergo this procedure by their family or by healthcare professionals. The RCOG recommends that if there is any question of a person not having the mental capacity to consent to a procedure that will permanently remove their fertility, the case should be referred to the court for judgement. In the UK, government legislation allows adults with mental incapacity to have a guardian legally appointed, to ensure health and medical care. However, even these legally appointed guardians cannot give consent for sterilization procedures.

Training

The RCOG has three levels of training for laparoscopic surgery. Level 1 training includes laparoscopic sterilization and should be achieved by all specialist trainees during their structured training. Trainees should perform at least 25 supervised laparoscopic female sterilization procedures before operating without supervision.

A special skill module for training in vasectomy has been developed by the Faculty of Sexual & Reproductive Healthcare (FSRH) in conjunction with the Urological Special Advisory Committee of the Royal College of Surgeons. For doctors with no prior special surgical experience, the minimum number of supervised operating assessment sessions is three, or 15 vasectomy procedures. A minimum of eight supervised procedures or two operating assessment sessions is required for those with prior experience of vasectomy procedures.

Conclusion

Sterilization procedures continue to provide an effective but permanent method of contraception for many couples worldwide when other methods are either unacceptable or unavailable. Adequate counselling and the provision of information regarding alternative options will allow men and women to make informed choices regarding their fertility.

Practice points

- Men and women should be made aware of all the contraceptive options available, including their effectiveness and non-contraceptive benefits, before opting for sterilization
- Adequate contraception must be used until the procedure has been successfully performed to avoid unintended pregnancy. The requirement for negative semen analysis post-vasectomy should be emphasized
- Informed consent can only be given once all the benefits and risks of the procedure have been fully discussed
- Adequate training of medical personnel is essential in order to ensure sterilization procedures are performed safely and effectively