Role of tubal surgery in the era of assisted reproductive technology: a committee opinion

The Practice Committee of the American Society for Reproductive Medicine

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This document reviews surgical options for achieving patency in obstructed fallopian tubes and the factors that must be considered when deciding between surgical repair and IVF. This document replaces the document of the same name, last published in 2012 (Fertil Steril 2012;97:539–45). (Fertil Steril® 2015;■:■–■. ©2015 by American Society for Reproductive Medicine.)

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Tubal disease accounts for 25%–35% of female factor infertility, with more than half of the cases due to salpingitis (1). In addition, large studies report that up to 20%–30% of women regret having a tubal ligation (2–4). Thus, there is a need to determine the optimal treatment methods for patients with tubal factor infertility. There are several surgical options for achieving patency in obstructed fallopian tubes, depending on the location of the blockage. This document reviews these procedures and the factors that must be considered when deciding between surgical repair and in vitro fertilization (IVF).

DIAGNOSIS

A history of ectopic pregnancy, pelvic inflammatory disease (PID), endometriosis, or prior pelvic surgery raises the index of suspicion for tubal factor infertility. For patients with no risk factors, a negative chlamydia antibody test indicates that there is less than a 15% likelihood of tubal pathology (5). However, chlamydia antibody testing is limited by false positives from cross-reactivity with *Chlamydia pneumoniae* IgG and does not distinguish between remote and persistent infection, nor does it indicate whether the infection resulted in tubal damage (5). Therefore, hysterosalpingography (HSG) is the standard first-line test to evaluate tubal patency (6).

If HSG suggests patent tubes, tubal blockage is highly unlikely (7). However, in 60% of patients in whom HSG showed proximal tubal blockage, repeat HSG 1 month later showed tubal patency (8). A similar percentage of patients shown by HSG to have proximal tubal occlusion were found to have patent tubes on subsequent laparoscopy (7). In addition, 11 of 18 proximal tubes excised for blockage were found to be patent (9). Laparoscopy, considered the gold standard for determining tubal patency, is not perfect: one study showed that 3% of patients with bilateral tubal occlusion subsequently conceived spontaneously (10). Hysterosalpingography also has a therapeutic effect, with higher fecundity rates reported for several months after the procedure (11). Sonohysterosalpingography and transvaginal hydrolaparoscopy with chromotubation are alternative methods for assessing tubal patency (12–14).

GENERAL CONSIDERATIONS

Many variables need to be taken into consideration when counseling patients with tubal infertility regarding corrective surgery or IVF. The age of the patient, ovarian reserve, prior fertility, number of children desired, site and extent of the tubal disease, presence of other infertility factors, experience of the surgeon, and success rates of the IVF program are the most important. Patient preference, religious beliefs, cost, and insurance reimbursement also figure into the equation. In addition, a semen analysis should be performed early in the infertility investigation as the results may influence the management decision between tubal surgery and IVF.

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The most recent national assisted reproductive technology (ART) registry data from 2012 noted a 32.2% live-birth rate per cycle initiated in patients across all ages with tubal infertility, similar to the 29.4% rate overall (15). Meaningful success rates with the various tubal surgical procedures are largely lacking. Most of the published literature is from surgeons with the greatest expertise. Their results may not be generalizable to less skilled or experienced surgeons. Furthermore, the results of tubal surgery and IVF are not directly comparable because surgical success is reported as pregnancy rate per patient, whereas IVF success rates are per cycle. As a result, there are no adequate trials comparing pregnancy rates with tubal surgery vs. IVF (16).

The advantages and disadvantages of IVF and tubal surgery need to be reviewed with the patient to provide assistance in her decision making. The main advantages of IVF are good per-cycle success rates and the fact that it is less surgically invasive. Its disadvantages include cost (especially if more than one cycle is required), the need for frequent injections and monitoring for several weeks, and, most significantly, the risks of multiple pregnancy and ovarian hyperstimulation syndrome. Although perhaps not directly applicable to tubal factor infertility, IVF alone has been associated with a higher incidence of adverse perinatal outcomes in singleton infants, such as perinatal mortality, preterm delivery, low and very low birth weights, intrauterine growth restriction and congenital malformations (17–21).

The advantages of tubal surgery are that it is a one-time, usually minimally invasive outpatient procedure, and patients may attempt conception every month without further intervention and may conceive more than once. They also avoid the risks associated with IVF. The disadvantages are generalizable to surgeons with less skill and experience and include the risks for surgical complications, such as bleeding, infection, organ damage, and reaction to anesthesia. There is also postoperative discomfort during the short recovery phase. Although the risk of ectopic pregnancy is increased in patients having IVF for tubal disease, it is higher after tubal surgery. In addition, for some patients the success following tubal surgery may be significantly lower than for IVF. All of these factors need to be considered when choosing the appropriate treatment strategy. To optimize pregnancy rates and reduce the risks, only those surgeons facile and experienced in laparoscopic and/or microsurgical techniques should attempt to perform corrective tubal surgery. The ideal patient candidate for tubal surgery is young, has no other significant infertility factors, and has tubal anatomy that is amenable to repair.

PROCEDURES FOR PROXIMAL TUBAL BLOCKAGE

Proximal tubal blockage accounts for 10%–25% of tubal disease (1). It may be due to obstruction resulting from plugs of mucus and amorphous debris, to spasm of the uterotubal ostium, or to occlusion, which is a true anatomic blockage from fibrosis due to salpingitis isthmica nodosa (SIN), PID, or endometriosis. Unless the proximal blockage on HSG is clearly due to SIN, selective salpingography or tubal cannulation can be attempted.

Tubal cannulation is accomplished using a coaxial catheter system under fluoroscopic guidance or via hysteroscopy with laparoscopic confirmation. An outer catheter is directed to the uterotubal ostium, and a selective salpingogram is performed. If tubal blockage is confirmed, a small inner catheter with a flexible guide wire is advanced through the proximal tube. Before performing this procedure, there should be confirmation of normal distal tubal anatomy.

If the obstruction is not overcome by tubal cannulation with gentle pressure, a true anatomic occlusion is assumed and the procedure is terminated. Excision of the proximal tubes in cases of failed tubal cannulation revealed SIN, chronic salpingitis, or obliterative fibrosis in 93% of patients (22). In these cases, IVF is preferred to resection and microsurgical anastomosis. In vitro fertilization would also be the preferred treatment for proximal tubal blockage in older women and in the presence of a significant male factor. However, microsurgery may be considered after failed tubal cannulation if IVF is not an option for the patient, but it should be attempted only by those with appropriate training. Tubal implantation has been relegated to historic interest only, as it is associated with very low success rates and risk of cornual rupture in pregnancy.

A meta-analysis of studies treating patients with bilateral proximal tubal occlusion showed that the obstruction is relieved in approximately 85% of the tubes with tubal cannulation and that approximately half of the patients conceive (1). Approximately one-third of the opened tubes subsequently reocclude (1, 23). The incidence of tubal perforation during tubal cannulation has been reported to be 3%–11%, without any clinical consequences (1). The optimal treatment of unilateral proximal tubal occlusion has not been determined. One study reported similar pregnancy rates with controlled ovarian stimulation and IUI in patients with untreated unilateral proximal tubal occlusion and in those with unexplained infertility (24).

Although tubal patency rates are similar with both fluoroscopic and hysteroscopic techniques, a meta-analysis found that ongoing pregnancy rates are higher with hysteroscopic cannulation (Table 1). This finding may be due to the opportunity to diagnose and treat another pelvic pathology during laparoscopy or to the fact that cannulation under direct vision may be less traumatic. Because tubal cannulation is a minor procedure with results comparable to those of microsurgical resection and anastomosis, it should be the treatment of choice. In the setting of failed tubal cannulation, microsurgery may be considered if IVF is not an option.

SURGERY FOR DISTAL TUBAL DISEASE—GOOD PROGNOSIS

The decision to repair or remove fallopian tubes with distal disease is usually made intraoperatively based on the prognosis for an intrauterine pregnancy. Distal tubal disease includes hydrosalpinges and fimbrial phimosis. Hydrosalpinges are completely occluded, whereas fimbrial agglutination by adhesions results in a narrow phimotic tubal