

# Committee opinion: role of tubal surgery in the era of assisted reproductive technology

The Practice Committee of the American Society for Reproductive Medicine

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There is a need to determine the optimal treatment methods for patients with tubal factor infertility. This document reviews the available treatments and discusses factors that must be considered when deciding between surgical repair versus in vitro fertilization. This document replaces the 2008 document of the same name. (Fertil Steril® 2012;97:539–45. ©2012 by American Society for Reproductive Medicine.)

**T**ubal 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 IVF.

## REVIEW METHODS

To evaluate the effectiveness and safety of tubal surgery for infertility and sterilization reversal, the MEDLINE database, Cochrane Library, and American Society for Reproductive Medicine's own internal resources and documents were searched to locate relevant articles published up to December 2010. We used combinations of the medical subject headings "fallopian tube," "surgery," "pregnancy," "complications," "pathology," "tubal disease," "fertility," "diagnosis," "in vitro

fertilization versus surgery for tubal," "tubal cannulation," "microsurgical tubal anastomosis," "laparoscopic fimbrioplasty neosalpingostomy," "laparoscopic salpingectomy," "tubal occlusion," "hydrosalpinx," "salpingectomy," "hydrosalpinges," and "sterilization reversal." Only English language articles were selected, and the search was restricted to published articles. The reference lists of relevant articles were reviewed for further reports. Priority was given to articles reporting original research, although review articles were included; abstracts of research presented at meetings or symposia were excluded. When reliable research was not available, expert opinions from specialists in reproductive medicine were used. Because the majority of the studies were case series, methods of aggregation and analysis were limited to tabulation and summarization. Studies were reviewed and categorized by type according to the method outlined by the U.S. Preventive Services Task Force (5). On the basis of the highest levels of evidence ascertained from the data, the overall strength of the evidence was assessed from the quality, quantity, and consistency of the qualifying studies. On the basis of the strength of evidence, recommendations are provided and graded.

The document was revised by the Practice Committee on two separate occasions after discussion of additions and deletions.

## 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 (6). 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 (6). Therefore, hysterosalpingography (HSG) is the standard first-line test to evaluate tubal patency (7).

If HSG suggests patent tubes, tubal blockage is highly unlikely (8). However, in 60% of patients in whom HSG showed proximal tubal blockage, repeat HSG 1 month later showed tubal patency (9). A similar percentage of patients shown by HSG to have proximal tubal occlusion were found to have patent tubes on subsequent laparoscopy (8). In addition, 11 of 18 proximal tubes excised for blockage were found to be patent (10). Laparoscopy, considered

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the gold standard for determining tubal patency, is not perfect: one study showed that 3% of patients with bilateral tubal occlusion subsequently conceived spontaneously (11). HSG also has a therapeutic effect, with higher fecundity rates reported for several months after the procedure (12). Sonohysterosalpingography and transvaginal hydrolaparoscopy with chromotubation are alternative methods for assessing tubal patency (13–15).

## 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.

The most recent national assisted reproductive technology (ART) registry data from 2009 noted a 32.4% live-birth rate per cycle initiated in patients with tubal infertility, similar to the 30.1% rate overall (16). 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 versus IVF (17).

The advantages and disadvantages of tubal surgery and IVF 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 are generalizable to surgeons with less skill and experience and 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. While 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 retardation, and congenital malformations (18–22).

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 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. While the risk of ectopic pregnancy is increased in

patients having IVF for tubal disease, it is higher after tubal surgery. To optimize pregnancy rates and reduce the risks, only those facile and experienced in laparoscopic and/or microsurgical techniques should attempt to perform corrective tubal surgery. The ideal 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 (23). In these cases, IVF is preferred to resection and microsurgical anastomosis. IVF 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 about 85% of the tubes with tubal cannulation and that about half of the patients conceive (1). Approximately a third of the opened tubes subsequently reocclude (1, 24). 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 hyperstimulation and IUI in patients with untreated unilateral proximal tubal occlusion and in those with unexplained infertility (25).

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

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