

## ROLE OF TUBAL SURGERY IN THE ERA OF ASSISTED REPRODUCTIVE TECHNOLOGY (ART)



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**T**ubal factor accounts for 25%-35% of female factor infertility with more than half being due to salpingitis. (1) There are also a considerable percentage of women who regret having a tubal ligation (2,3). There is great desire to determine the optimal mode of treatment for couples with tubal factor infertility and there are also well established surgical methods for achieving patency in obstructed fallopian tubes. The success of the surgical intervention is based on the location of the blockage and the cause. However with the advancement in ART, we must consider a few factors prior to taking the decision between surgical repair and in vitro fertilization (IVF).

Laparoscopy is considered the gold standard test for tubal patency. Hysterosalpingogram and Saline infusion sonography have their own merits and demerits. The choice of tubal patency depends upon the clinician's judgment and also on the clinical factors of the patient. When considering an infertile couple with tubal factor we have to consider a few factors when counseling the couples regarding the mode of treatment either 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 other infertility factors, experience of the surgeon, semen analysis and success rate of IVF program. Other indirect factors are patient preference, religious beliefs, cost and insurance reimbursement.

Live birth rates for tubal factor infertility from Society for Assisted Reproductive Technology (SART) in 2012, was 32.2% (4) per initiated cycle across all ages. Success rates



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with various tubal surgical procedures are largely lacking. This is mainly because most of the published data is from surgeons with great expertise. Their data cannot be translated to the success rates of less skilled or less experienced surgeons. Statistically also both the success rates of IVF and surgery cannot be compared as IVF expresses the success rates per cycle and surgical success is reported as pregnancy per patient.

### PROXIMAL TUBAL BLOCKAGE

The common causes of proximal tubal blockage are obstruction from mucus plugs and amorphous debris, spasm of the uterotubal ostium, occlusion from fibrosis due to salpingitis isthmica nodosa (SIN) or PID or endometriosis. Procedure for Proximal tubal blockage is mainly tubal cannulation. (Figure 1)

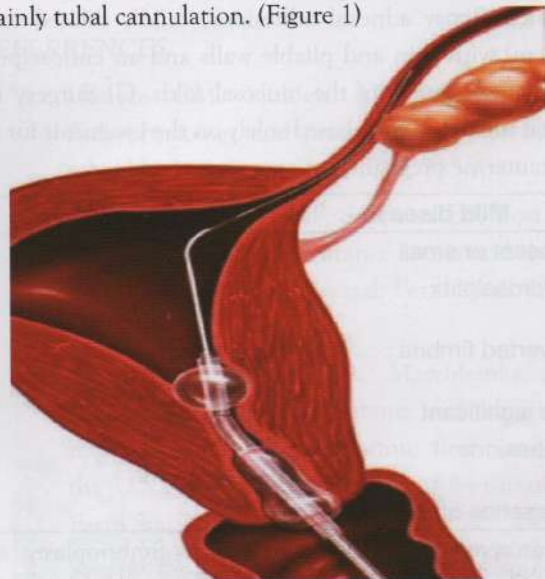


Figure 1: Hysteroscopic cannulation



Tubal cannulation is performed using a coaxial catheter system under fluoroscopic guidance or via hysteroscopy with laparoscopic confirmation. 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. In these cases IVF is preferred to resection and microsurgical anastomosis as a majority of these cases revealed SIN, chronic salpingitis or obliterative fibrosis (5). **Tubal implantation has been relegated to historic importance only**, as it is associated with very low success rates and risk of cornual rupture in pregnancy. Approximately one-third of the opened tubes subsequently reocclude. (1,6) The incidence of tubal perforation during tubal cannulation has been reported to be 3%-11%. Since tubal cannulation is a minor procedure with results comparable to microsurgical resection and anastomosis, it should be the treatment of choice. In the setting of failed tubal cannulation IVF is the option.

**DISTAL TUBAL BLOCKAGE**

It includes hydrosalpinges and fimbrial agglutination. Both conditions are due to PID but may also result from peritonitis and previous surgery. Good prognosis is associated with patients who have no more than limited filmy adnexal adhesions, mildly dilated tube (<3cm) with thin and pliable walls and an endosalpinx with preservation of the mucosal folds. (7) Surgery for distal tubal disease is based solely on the prognosis for an intrauterine pregnancy.

| Mild disease                 | Severe disease             |
|------------------------------|----------------------------|
| Absent or small hydrosalpinx | Large hydrosalpinx (>30mm) |
| Inverted fimbria             | No fimbria                 |
| No significant adhesions     | Dense adhesions            |
| Presence of rugae            | Frozen pelvis              |

Laparoscopic neosalpingostomy and fimbrioplasty are carried out by opening a hydrosalpinx or increasing the

opening for fimbrial phimosis respectively. The fimbria are then everted and secured to the tubal serosa with sutures or electrocautery. (Bruhat procedure) (Figure 2). Intrauterine pregnancy rates after neosalpingostomy for mild hydrosalpinges range from 58-77% while the ectopic pregnancy rates are from 2-8%. (8) For severe disease the intrauterine pregnancy rates are 0-22% and ectopic pregnancy rates are 0-17%. (8) Although IVF is preferred over salpingostomy for mild hydrosalpinges in older women and for those with male factor, salpingostomy before IVF may improve the subsequent likelihood of success of IVF while still giving the patient the option to attempt spontaneous conception. Tuboplasty is not recommended for severe disease and patients having both proximal and distal occlusion. Patients with poor prognosis are better served with salpingectomy prior to IVF. Post tuboplasty, reocclusion may occur, necessitating an additional surgical procedure to perform a salpingectomy or proximal tubal occlusion.

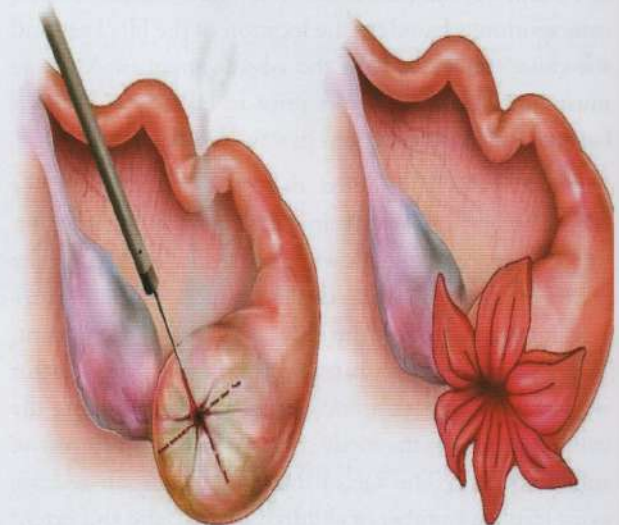


Figure 2: Bruhat procedure

Patients with poor prognosis may have extensive dense peritubal adhesions, massively dilated tubes with thick fibrotic walls, and/or sparse or absent luminal mucosa. Laparoscopic salpingectomy is indicated when the fallopian tube is damaged beyond repair by infection, endometriosis or ectopic pregnancy. Numerous studies have shown that hydrosalpinx have a detrimental effect on IVF success rates. Two meta-analyses noted



that pregnancy rates, implantation rates and delivery rates were approximately 50% lower in the presence of hydrosalpinges. (9) This has been postulated that it may be due to mechanical flushing of the embryos from the uterine cavity, decreased endometrial receptivity or a direct embryo toxic effect. (10) Patients with hydrosalpinges visible on USG may be more affected (10). A Cochrane review concluded that laparoscopic salpingectomy or occlusion should be considered before IVF for women with communicating hydrosalpinges (11). Unilateral salpingectomy resulted in a significant improvement in IVF pregnancy rates in patients with unilateral hydrosalpinges. There is a small concern that proximal occlusion may lead to an increase in the size of hydrosalpinx, as the fluid can no longer drain through the uterus.

Hysteroscopic proximal tubal occlusion was attempted with ESSURE coil inserts, however it is presently not available in India. ESSURE coils have been withdrawn from the markets in Canada, UK, Netherlands and USA.

### TUBAL STERILIZATION REVERSAL

Surgery for sterilization reversal must take into consideration the pros and cons of anastomosis. These patients are usually otherwise fertile and have a good prognosis with IVF and with surgical anastomosis. Recently laparoscopic tubal anastomosis has become quite popular compared to the conventional mini-laparotomy. (12) The laparotomy macro-surgical procedure resulted in pregnancy rates of 42%. The laparotomy microsurgical technique resulted in a higher pooled pregnancy rate of 68%. Laparotomy macro-surgical sterilization reversal is associated with a risk of ectopic pregnancies of 8.4%, while the corresponding risk from laparotomy microsurgical techniques was higher at 10.4%. Pregnancy rates after laparoscopic reversal ranged with a pooled pregnancy rate of 65%. The ectopic pregnancy rate was 5.6%. (12) When considering tubal anastomosis women's age is the most important prognostic factor (13,14). Isthmic-isthmic repairs and longer final tubal lengths generally bring about a higher success rate. The rate of ectopic pregnancy after tubal anastomosis is 2-10% compared to 2% for IVF. Tubal anastomosis should not be considered when the

final length is <4 cm, when there is severe tubo-ovarian adhesions or stage 3-4 endometriosis and/or there is more than a mild male factor. In the absence of another significant cause of infertility, women who are less than 35 years of age at the time of reversal can anticipate a cumulative intrauterine pregnancy rate of greater than 70%, with most pregnancies occurring within 18 months after. The pregnancy rate declines in adverse proportion to the age; those who are over 35 years of age can expect an intrauterine pregnancy rate of about 55%. (15) The decision regarding whether to have tubal anastomosis or IVF is left up to the patient, after reviewing the pros and cons of each treatment option.

### CONCLUSION

In an era where ART is easily available and with the various advancements in ART, it seems to be the easier way out for couples with tubal factor infertility. However looking at the affordability associated with IVF tubal surgeries still has its place in this day and age especially in a developing nation. Weighing in all the pros and cons of tubal surgeries and IVF, the decision finally lies with the couple as to which procedure they would prefer. Tubal surgery should be considered as an alternative to ART, given that the pregnancy and birth rates are encouraging and that the cost and burden of ART can be avoided.

### REFERENCES

1. Honore GM, Holden AE, Schenken RS. Pathophysiology and management of proximal tubal blockage *Fertil Steril* 1999; 78:5-95
2. Borrero SB, Reeves MF, Schwatz EB, Bost JE, Creinin MD, Race, insurance status and desire for tubal sterilization reversal. *Fertil Steril* 2008; 90:272-7.
3. Schmidt JE, Hillis SD, Marchbanks PA. Requesting information about and obtaining reversal after tubal sterilization: findings from the U.S. Collaborative Review of Sterilization. *Fertil Steril* 2000; 74:892-8.
4. Society for Assisted Reproductive Technology.



Clinic Summary Report. 2012

5. Letterie GS, Sakas EL. Histology of proximal tubal obstruction in cases of unsuccessful tubal canalization. *Fertil Steril* 1991; 56:831-5
6. Pinto AB, Hovsepian DM, Wattanakumtornkul S, Pillham TK. Pregnancy outcomes after fallopian tube recanalization: oil-based versus water soluble contrast agents. *J Vasc Intervene Radiol* 2003; 14:69-74.
7. American Fertility Society. The American Fertility Society classifications of adnexal adhesions, distal tubal occlusion, tubal occlusion secondary to tubal ligation, tubal pregnancies. *Fertil Steril* 1988; 49: 944-55.
8. Nackley AC, Muasher SJ. The significance of hydrosalpinx in in vitro fertilization. *Fertil Steril* 1998; 69:373-84
9. Camus E, Poncelet C, Goffinet F, Wainer B, Meriet F, Nisand I et al. Pregnancy rates after in-vitro fertilization in cases of tubal infertility with and without hydrosalpinx: a meta analysis of published comparative studies. *Hum Reprod* 1999;14: 1243-9.
10. Practice Committee of the American Society for reproductive Medicine. Salpingectomy for hydrosalpinx prior to in-vitro fertilization. *Fertil Steril* 2008;90:S66-8.
11. Johnson N, van Voorst S, Sowter MC, Strandell A, Mol BW. Surgical treatment for tubal disease in women due to undergo in vitro fertilization. *Cochrane database Syst Rev* 2010: CD002125
12. Jacoba A.H. van Seeters, Su Jen Chua, Ben W.J. Mol, Carolien A.M. Koks, Tubal anastomosis after previous sterilization: a systematic review, *Human Reproduction Update*, Volume 23, Issue 3, May-June 2017, Pages 358-370,
13. Cha SH, Lee MH, kim JH, Lee Cn, Yoon TK, Cha KY. Fertility outcome after tubal anastomosis by laparoscopy and laparotomy. *J Am Assoc gyn Laparosc* 2001;348-52
14. Grodts S, Campo R, Puttermans P, Grodts S. Clinical factor determining pregnancy outcome after microsurgical tubal reanastomosis. *Fertil Steril* 2009;92: 1198-202
15. Dr. Victor Gomel, Reversal of tubal sterilization versus IVF in the era of assisted reproductive technology: a clinical dilemma. *Reproductive BioMedicine Online* Vol 15 No.4 2007, 403-407

