Tubal Factor Infertility

Dr.Mozhga vahabi
Fellowship of Infertility

- INTRODUCTION
- The fallopian tubes named after Gabriele Falloppio (also spelled Falloppia), a 16th-century physician and surgeon, are appendages of the uterus located on either side at the superior portion of the uterine cavity.

They are 10 cm long muscular tubes originating at the uterine cornua and opening distally into the peritoneal cavity.

Parts of a Fallopian Tube (Fig. 22.1)

- Parts of a fallopian tube are isthmus, ampulla, infundibulum, and fimbriae.

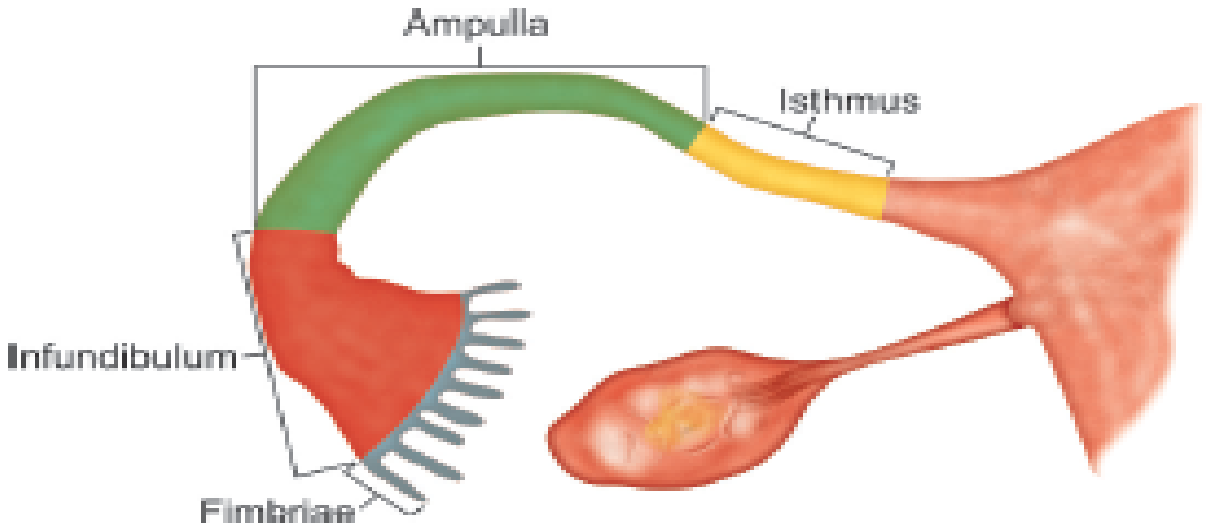


Fig. 22.1: Parts of the fallopian tube.

- Each tube is divisible into four parts and run laterally within the mesosalpinx.
- The proximal narrowest segment comprises the **interstitium** (1.25 cm long, 1 mm wide) and the **isthmus** (2.5 cm long, 2.5 cm wide). The **ampulla**, the middle segment (5 cm long, 2.5–5 mm wide) gradually widens and merges with the distal segment, the broad funnel-like **infundibulum** (1.25 cm long, 6 mm wide) of the tubes that lie in close proximity to the ipsilateral ovary.
- Infundibulum has fimbriae that help in capturing the cumulus oophoruscomplex at ovulation.

Functions of a Fallopian Tube

- Fallopian tubes work as the connecting link between the male and female gametes (sperm and the ova) inside. For pregnancy to happen naturally, we need to have normal parameters of both male and female along with the functional and dynamic fallopian tubes:
- • Dynamic conduit and not a passive channel
- • Role in sperm transport and capacitation
- • Ova retrieval and transport
- • Fertilization
- • Embryo storage, nourishment, and transport.

- Tubal disease contributes to **25–35% of female factor** infertility and 11–30% of infertility in general depending on the population characteristics

- **The main cause for tubal infertility is salpingitis**, which accounts for more than 50% of the cases as well as tubal surgery.

- Therefore prevention, diagnosis, and management of tubal factor-dependent subfertility are important in reproductive medicine.

CAUSES FOR TUBAL SUBFERTILITY

- **Congenital**
- Developmental or inherent anomalies of the fallopian tubes **are rare and most do not require treatment**. Absence of one or both tubes is almost always associated with absence of the uterus as well as other anomalies.
  Rudimentary oviducts infantile ones, duplication of ostia, and accessory tubes are some other uncommon developmental anomalies.

- **Acquired**
- Pelvic inflammatory disease **(PID) is the most frequent** cause for tubal disease of which the single largest cause is **Chlamydia trachomatis** infection.

Bulk of tubal disease is acquired and may be categorized into—proximal, mid, and distal tubal disease.

Proximal and Mid-tubal Disease

- Pathology and blockage of proximal tube account for 10–25% of tubal disease. Proximal block may be due to pseudo-obstruction or true anatomic blockage of the fallopian tubes (Table 1).

Table 1: Causes of proximal tubal disease.	
Pseudo-obstruction	*True anatomic blockage*
Plugs of mucus and amorphous debris	Salpingitis isthmica nodosa
Mucosal agglutination and viscous secretions	Pelvic inflammatory disease
Cornual spasm	Endometriosis
	Cornual polyps
	Intrauterine synechiae

- *Salpingitis isthmica nodosa (SIN)* is thought to arise from tubal inflammation of unspecified origin and affects the proximal tube prominently.
- Involvement of the distal tube and adhesions in pelvis and perihepatic areas, similar to PID, are also noted. Laparoscopy shows fibrosed tubal segments.
- Myosalpingeal hypertrophy encasing endosalpingeal diverticula is noted on histopathological examination.

- Pelvic inflammatory disease and endometriosis can
- cause anatomic tubal occlusion by direct involvement
- or secondary to adhesions.

- Mid-tubal disease is commonly caused by PID, endometriosis or prior surgery-related inflammations and adhesions that cause steno-occlusions, bulbous termination, scarring and fibrosis of tubes.

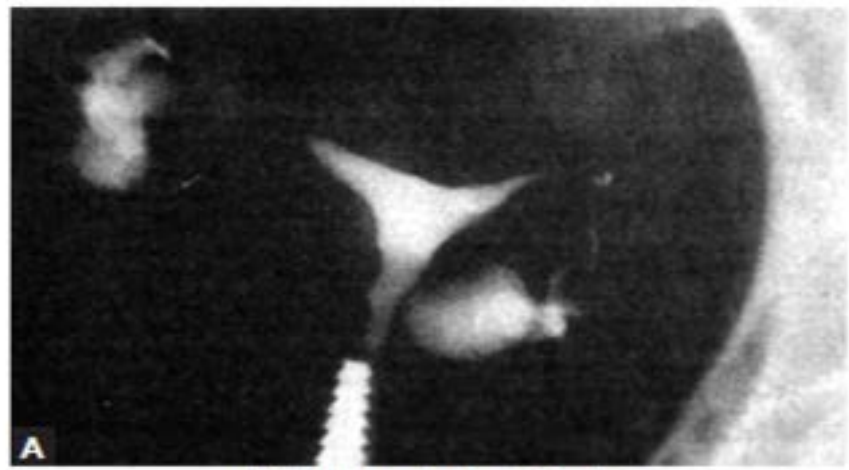
Distal Tubal Disease

- **Eighty five percent of tubal infertility is due to distal tubal disease.**
- Distal tubal disease includes *hydrosalpinges* and fimbrial phimosis.

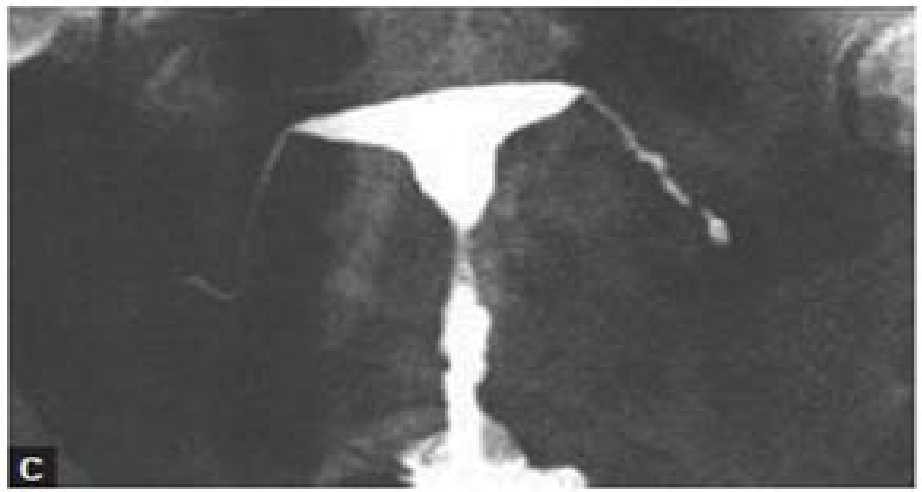
  Hydrosalpinx is an end stage of distal tubal disease where the distal is completely occluded, whereas a stenosed fimbrial opening due to adhesions results in fimbrial phimosis.

- Causes of distal tubal disease are numerated in Table 2.

Table 2: Causes of distal tubal disease.	
Pelvic inflammatory disease	85% sexually-transmitted diseases • *Neisseria gonorrhoeae* • *Chlamydia trachomatis* • *Mycoplasma hominis* 15% iatrogenic
Tuberculosis	
Peritonitis of any cause	
Tubal damage from previous surgery	
Endometriosis	



Tubal blockage, hydrosalpinx (HSG)



Tuberculosis fallopian tube

- Iatrogenic
- Tubal Sterilization:

  Tubal sterilization causes irreversible infertility unless tubal patency restored. As many as 30% women regret their decision for sterilization. Thus, tubal sterilization is an iatrogenic cause of tubal infertility that needs to be addressed.

- Salpingectomy

- Women who have had to have bilateral salpingectomy for ectopic gestations, tubal or tubo-ovarian pathology often need assisted reproductive techniques (ART) to conceive.

- EVALUATION FOR THE TUBAL FACTOR INFERTILITY—GUIDELINES AND RECOMMENDATIONS
- When?
- Evaluation of the fallopian tube function and patency is a component of the initial triad of diagnostic investigations for infertile couples and is the third in line after evaluation of semen and ovulation.
- Tests for tubal patency and function are recommended initially when the woman's history, examinations, and ultrasound evaluation are suggestive of a high risk for tubal disease.
- Tubal infertility should be suspected and ruled out in women with history of **PID**, **endometriosis**, **prior pelvic surgery**, or **ectopic pregnancy**.

- If she is considered unlikely to have tubal pathology, then evaluation of tubes are done only if she does not conceive for at least 3 months in spite of satisfactory ovulation and natural or artificial insemination around ovulation.

Royal College of Obstetricians and Gynaecologists Guidelines for Investigation of Suspected Tubal and Uterine Abnormalities

- **Hysterosalpingography (HSG) should be offered to women with no suspicion of comorbidities (such as PID, previous ectopic pregnancy or endometriosis) to screen for tubal occlusion.**

- Where available, hysterosalpingo contrast-ultrasonography (HyCoSy) screening for tubal patency should be considered because it is an effective alternative to HSG for women who are not known to have comorbidities.

- *When comorbidities are suspected, laparoscopy and chromopertubation should be offered.*

- Do not offer hysteroscopy as part of the initial investigation unless clinically indicated

ASRM Recommendations

- American Society for Reproductive Medicine (ASRM)
- has suggested specific ruling out of tubal disease by tubal patency tests and chlamydia antibody testing.
- Hysterosalpingography, saline infusion sonography (SIS), laparoscopy and chromotubation, fluoroscopic or hysteroscopic selective tubal cannulation have all been put forward as complementary and not mutually exclusive methods for evaluating tubal patency.
- More than one technique is often required for accurate diagnosis and effective treatment of tubal obstruction tests for tubal function.

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