

# Female subfertility- an imaging insight

## Abstract

In this era of modern medicine, we are encountering more and more cases of male and female subfertility partly due to increasing health awareness and partly due to different pathology conditions. With advancements in the field of imaging, it is now possible to precisely diagnose multiple medical conditions responsible for subfertility. These imaging techniques may also play a pivotal role in guiding treatment and management of many of these conditions. Hence, this article focuses on utilizing an imaging armamentarium in cases of female sub fertility.

**Keywords:** sub fertility, imaging, female, uterus, cervix, endometritis, salpingitis, hydrosalpinx/pyosalpinx, oophoritis, pelvic abscesses, hysterosalpingography

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## Introduction

Subfertility is defined as the inability of the couple to achieve a desired conception after six months of unprotected intercourse. Its prevalence is nearly equal in both males and females. Variety of pathological conditions is responsible for male and female subfertility with majority of them having characteristic imaging features even if nonspecific. As this article focuses on female subfertility, we will be discussing in short, the different groups of pathological conditions that can be objectively evaluated by utilizing various imaging techniques in sub fertile female patients.<sup>1</sup>

## Discussion

The pathologies affecting female genital tract can be broadly categorized in to congenital and acquired conditions. Latter can be further subdivided in to infectious, inflammatory or tumoral and according to the organ of origin viz. uterus & cervix, tubes & ligaments and ovaries. The functional pathology of the different organs except ovaries cannot be evaluated optimally by imaging. The common congenital anomalies leading to subfertility are those affecting the uterus (uterine agenesis, uterus didelphys, bicornuate uterus & septate uterus) and ovaries (Turner's syndrome). Pelvic inflammatory disease (endometritis, salpingitis, hydrosalpinx/pyosalpinx, oophoritis, pelvic abscesses/collections), endometriosis, submucosal fibroid, large intramural/broad ligament fibroid, etc. are the other causes. In the ovaries, imaging evaluation may range from follicular formation to rupture. Among the imaging modalities, most commonly used ones are ultrasonography (USG) [especially transvaginal/endovaginal-TVS/EVS alone or in combination with transabdominal-TAS] and magnetic resonance imaging (MRI); latter serving as a problem solving tool because of its cost, limited availability of machine & expertise and prolonged time of scan. Hysterosalpingography and computed tomography are not preferred imaging techniques nowadays not only due to involved x-ray irradiation to the genital organs but also due to limited information achieved by them when compared with USG & MRI.<sup>2</sup>

## Ultrasonography

EVS is usually the first screening tool in subfertile females

allowing us to know the basic condition of the uterus, tubes, ovaries as well as pelvic cavity. This modality provides significant information & serves as a road-map for further course of investigation or management, besides being cost-effective, reproducible, widely available & radiation-free except for being operator dependence. USG helps us in knowing the state of uterus including its size, endometrial thickness & presence of focal/diffuse disease. When combined with color & power Doppler, uterine as well as endometrial vascularity can be well-studied. Combination with 3D USG allows detection of uterine anomalies and volume calculation of fibroids. EVS allows fair detection of tubal abnormalities including salpingitis and hydrosalpinx/pyosalpinx. Saline infusion hysterosonosalingography allows evaluation of tubal patency besides determining the site of block in cases of tubal blockage and allowing determination of uterine synechiae, endometrial polyps & sub mucosal fibroids. EVS is a very good modality for performing functional evaluation of ovaries. It not only helps in detecting polycystic ovaries but also aids in determining antral follicular count, follicular maturation, follicular rupture and dysfunctional/unruptured residual cysts of the previous menstrual cycles. USG is also useful in guiding aspirations of pelvic abscesses & cysts as well as in oocyte retrieval and embryo transfer in assisted reproductive techniques.

## Magnetic resonance imaging

Due to limited availability and non-repeatability, MRI is usually reserved as a problem solving tool in subfertile patients. The commonest indication is confirmation of uterine anomalies and exact delineation of the number, location & volume of fibroids. It is also useful in conservative management or MR-guided treatment of uterine fibroids.<sup>3</sup> MRI is very useful in accurate diagnosis of endometriosis, adenomyosis and pelvic adhesions, besides being useful in diagnosing pelvic inflammatory disease especially tubal disease. MRI is especially indicated when USG findings are equivocal or when the USG findings are discordant with clinical findings. However, it may sometimes require intravenous administration of Gadolinium-based MR contrast agents for complete diagnosis, leading not only to an increase in cost but also increased risk of invasion including allergy & other contrast-related side-effects. MRI is also useful in monitoring the conservative treatment of PID and fibroid.<sup>4</sup> Recently, MRI is

being used for preoperative evaluation of pelvic floor abnormalities including utilization of diffusion tensor tractography in patients with sub fertility as well.<sup>5</sup>

### Conclusion

Among the large gamut of imaging modalities available to us, USG and MRI plays a pivotal role in evaluation of subfertile females. Usually, USG serves as a first and primary screening imaging tool sufficing majority of the cases. MRI however, serves as secondary & problem-solving imaging tool in selected conditions.

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### Conflict of interest

The author declares no conflict of interest.

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