



US-DIAGNOSTICS FOR INFERTILITY

Rustamov Umar Khaidarovich

Samarkand State Medical Institute, FPE Department of Medical Radiology,
Republic of Uzbekistan, Samarkand

Shodieva Nodira Egamberdievna

Samarkand State Medical Institute, FPE Department of Medical Radiology,
Republic of Uzbekistan, Samarkand

Ametova Alie Servetovna

Samarkand State Medical Institute, FPE Department of Medical Radiology,
Republic of Uzbekistan, Samarkand

Alieva Umida Zairovna

Samarkand State Medical Institute, FPE Department of Medical Radiology,
Republic of Uzbekistan, Samarkand

Rabbimova Maftuna Ulugbek kizi

Samarkand State Medical Institute, FPE Department of Medical Radiology,
Republic of Uzbekistan, Samarkand

Abstract

The article reflects the modern concepts of ultrasound diagnostics in infertility. Summarized data on modern techniques are presented. Topical issues of the most common causes of infertility are considered.

Keywords: 3D, 4D, ultrasound, anovulation, persistence, luteinization, hysterosonography.

Infertility is one of the most common gynecological problems. In Uzbekistan, 1.5 million out of 12 million women of reproductive age suffer from infertility.

The frequency of infertile marriages, according to data from foreign and domestic authors, is 8-17% and has no tendency to decrease. Every year, 2-2.5 million new cases of male and female infertility are registered in the world.

Infertile marriage, having a significant impact on demographic indicators, acquires not only medical and biological, but also social significance. The nature of changes in demographic indicators makes the problem of infertile marriage one of the most important in modern medicine practically throughout the entire territory of RUZ.





Distinguish between primary infertility, when from the very beginning of sexual activity there has never been a pregnancy, and secondary infertility, when, after the previous one or more pregnancies (childbirth, abortion, ectopic pregnancy), subsequent pregnancy does not occur. It is also customary to distinguish absolute female infertility associated with irreversible pathological changes in the genitals, excluding any possibility of conception, and relative, when the cause that caused it can be eliminated. Infertility can also be a sign of a number of common diseases and diseases of the genital organs.

Ultrasound is a must in diagnosing the causes of female infertility. Currently, the capabilities of the method have significantly expanded, which is associated with the introduction into clinical practice of the 3D ultrasound technique, which provides a multifaceted volumetric image of the object under study and its layer-by-layer study. Anovulation is one of the most common causes of infertility. The use of 3D ultrasound can identify the ovarian follicular apparatus, conduct accurate monitoring of the growth and maturation of the dominant follicle in a stimulated cycle in patients with infertility. The lack of growth and formation of a dominant follicle during dynamic observation indicates the insufficiency of the follicular phase of the menstrual cycle. Follicle persistence is characterized by anovulation with prolonged functioning of the dominant follicle and its transformation into a follicular cyst.

Non-ovulatory follicle luteinization syndrome occurs in 12-31% of cases of infertility. When monitoring folliculogenesis in the second phase of the cycle, a gradual decrease in the size of the dominant follicle without rupture is noted, secretory transformation occurs in the endometrium, i.e. there is an imitation of a two-phase cycle in the absence of ovulation.

Insufficiency of the luteal phase is a dysfunction of the ovaries, characterized by hypofunction of the corpus luteum of the ovary. The incidence of luteal phase failure is 3-25%. At the same time, ovulation occurs, the corpus luteum is formed.

In case of insufficiency of the luteal phase, the peripheral vascular rim is not expressed or is poorly expressed, which makes it possible to fix a 3D-angiography. This situation leads to an inadequate secretory transformation of the endometrium, a change in the function of the fallopian tubes, a violation of the implantation of a fertilized egg, which is clinically manifested by infertility, or spontaneous miscarriage in the first trimester of pregnancy.

For the onset of pregnancy, in addition to successful fertilization, it is necessary to create conditions from the endometrium for the purpose of further implantation. It is known that one of the factors of infertility can be a violation of nidation and blastocyst implantation.





30 ultrasound allows you to more accurately assess the state of the endometrium in different phases of the menstrual cycle, identify characteristic signs with incomplete secretory transformation and determine pathological changes in its structure. In the phase of secretion in women with full secretory transformation and the absence of focal disorders, the endometrium is homogeneous, hyperechoic. Additional echo structures in the uterine cavity are not detected.

Inadequate secretory transformation of the endometrium is observed in women with endocrine infertility. The structure of the endometrium is significantly different from the norm. Insufficient echogenicity of the endometrium and the severity of the hypoechoic rim surrounding the endometrium are revealed. Also, the characteristic signs include the inconsistency of the volume of the endometrium with the phase of the menstrual cycle, the heterogeneity of the echogenicity of the endometrium and the lack of smoothness of the contour of the tubal corners of the uterus.

To ensure a full secretory transformation of the endometrium and its proliferation, an adequate blood supply to the myometrium is necessary. Violations of uterine vascularization lead to various structural and functional changes in the endometrium. 30 Ultrasound angiography can provide an assessment of the vascularization of the myometrium and endometrium in general. Anovulatory cycles are characterized by a constant increase in peripheral resistance indices in the uterine arteries, which leads to a decrease in uterine perfusion due to vasoconstriction.

The volume of the endometrium is an important prognostic factor of conception and is normally 2 cm³ or more. The calculation of the volume of the endometrium is carried out in patients in the middle of the menstrual cycle, on the days when the embryo is transferred to the uterus using ART.

In the structure of female infertility, the tubal-peritoneal factor is 60-70%. Organic lesions of the fallopian tubes include: obstruction, adhesions, torsion. Their reasons may be: inflammatory diseases, pelvic or general peritonitis, surgery on the internal genital organs, postpartum complications, polyps and endometriosis of the fallopian tubes, as well as other factors of external endometriosis.

Hysterosonography (HSG) is one of the main diagnostic methods for suspected obstruction of the fallopian tubes. With its help, you can also get information about the adhesion process in the small pelvis. However, the frequency of false negative GHA results is 13-17%.

A conventional transvaginal ultrasound is preliminary performed. Then the cervix is exposed using mirrors and, after the vagina has been treated with an antiseptic solution, a catheter is inserted into the cervical canal behind the internal pharynx. A balloon intrauterine catheter for the HSG is used. The expansion of the cervical canal



is not required. When the catheter is installed, the speculum is carefully removed and the probe is inserted into the vagina, according to the position of the uterus in the anterior or posterior fornix. Then, physiological solution is injected through the catheter, achieving adequate expansion of the uterine cavity (5-30 ml). The ingress of air bubbles into the uterine cavity significantly complicates the study due to the appearance of artifacts. With the HSG, information on the passage of fluid through the fallopian tube can be obtained with energy Doppler mapping of the fallopian tube. 3D-mode allows you to avoid the disadvantages of the usual 2D ultrasound of the fallopian tubes, when there is one segment of the fallopian tube in the scanning plane or

only one fallopian tube, providing the ability to simultaneously visualize the uterine cavity and fallopian tubes while collecting the entire amount of data.

In terms of sensitivity and specificity, transvaginal echohysterosalpingography is not inferior to hysteroigraphy, and in some cases even surpasses it.

4th-hysterosonography refers to modern diagnostic methods and allows in real time in a three-dimensional spatial structure to obtain an image of the uterine cavity to identify foci of endometriosis, to assess the condition of existing myometrial scars, and to study the bases of subserous and submucous uterine nodes using a contrast agent. According to the sonometric parameters, the volume of the uterine cavity is calculated and the required amount of contrast agent for injection into the cavity is calculated, then, after the bolus injection of the calculated volume of hydrogen peroxide, the absence of reverse flow of contrast is ensured and the rate of appearance and the nature of propagation of the sonocontrast agent in the area of myometrial scars is assessed in real time. in the myometrium, along the parietal and visceral peritoneum.

Unlike routine methods of visualization of the uterine cavity using X-ray contrast agents, this method is not allergenic, does not cause anaphylactic reactions, in addition, X-ray contrast agents do not have an antiseptic effect and the patient is exposed to radiation at the time of the study. Unlike other substances used to visualize the uterine cavity during sonographic studies, the contrast agent used provides greater informational content due to interaction with biological fluids (contents of endometrioid passages), stability of the compound, which determines an extended time interval for the study.

Among the known methods of ultrasound diagnostics of endometriosis, endometrial scars, subserous and submucous nodes, the proposed method is distinguished by high diagnostic reliability, increasing the accuracy of the ultrasound examination of the uterus.





One of the new and promising techniques is 3-contrast magnetic resonance hysterosalpingography, which allows visualizing the uterine cavity, obtaining direct visualization of the fallopian tubes, assessing their patency and examining the extra-tube factor of infertility.

In case of obstruction of the fallopian tubes, the effect of sactosalpinx occurs - the accumulation of contrast agent in the lumen of the sealed fallopian tube, which makes it possible to accurately diagnose the level and degree of obstruction.

With the help of ultrasound, it is possible to identify adhesions in the presence of fluid or enclosed cavities in the small pelvis. Signs of the adhesive process are: shortening of the vaginal vaults, incorrect position of the fallopian tubes, a change in the position of the uterus in the small pelvis, displacement of the uterus, uneven distribution of free fluid in the postovulatory phase of the cycle.

The presence of free fluid in the posterior space facilitates visualization of adhesions and deformations of the contours of the posterior fornix. In the presence of adhesions and adhesions, the contours of the posterior fornix d malformed, there are asymmetries, retractions and irregularities with the formation of asymmetric cavities. Free fluid around the ovaries in the lateral vaults in the postovulatory phase contributes to the identification of the adhesive process around the ampulla of the fallopian tubes.

Conclusion

A complete echographic picture of cyclic transformations is achieved by dynamic research, but a single ultrasound scan at the first visit of a patient to an ultrasound office for infertility gives a fairly detailed picture of the anatomical and morphofunctional state of the reproductive sphere, sufficient for clinicians to develop a further plan for a comprehensive examination and the first steps in organizing treatment.

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