

CHAPTER 22

ULTRASONOGRAPHIC EVALUATION OF ENDOMETRIAL RECEPTIVITY

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What is endometrial receptivity?

The quality of oocyte, sperm and embryo as well as the suitability of the endometrial bed are important for healthy pregnancy formation. In parallel with the development of a healthy embryo, the preparation of the endometrium and the formation of a good niche for implantation is seen as the most important step in the formation and continuation of a pregnancy. During pregnancy, because of the hormonal effect on the uterus; the glands and blood vessels in the endometrium further increase in size and number. It means that the endometrium is ready to act as a bed for the blastocyst, which is transferred in the cavity. Thus, the blastocyst can adhere to the endometrium and implantation can occur. Endometrial receptivity means the acceptance of the blastocyst by the endometrium (1).

How can we evaluate endometrial receptivity in IVF cycles?

The success rate of implantation in assisted reproductive methods is lower than the natural cycle. The embryo implantation rate is in the 25-30% range (2). Uterine receptivity is responsible for approximately 2/3 of the failed implantation and the embryo is responsible for 1/3 of the failure (3). In unexplained implantation failures; although good hormonal induction, good quality embryos, good endometrial development and no endometrial pathology have been detected insufficiency of the endometrium receptivity is responsible for the failure of embryo implantation (4). Following a blastocyst development on day 6, implantation occurs between 19-24 days of the normal menstrual cycle. This period is called as the “implantation window” and it is used to describe the time during which the optimal morphological and functional changes of the human endometrium for the attachment of the blastocyst take place. As we known, the endometrium is affected by estrogen and progesterone levels. Abnormal estrogen and progesterone levels secondary to ovarian hyperstimulation during IVF treatment may affect endometrial morphology and disrupt the receptivity (5). Hence, to evaluate the endometrial receptivity correctly is an important step. In IVF cycles, the implantation window can be evaluated histologically by endometrial biopsy or by examining endometrial proteins and fluids or noninvasively by ultrasonographic examination.

Applebaum (1995) described the zones of vascularity as follows:

- zone 1 power Doppler shows vascularity only in the myometrium;
- zone 2 the vessels enter the hyperechogenic endometrial zone;
- zone 3 the vessels reach the inner hypoechogenic zone;
- zone 4 when vessels are observed in the endometrial cavity.

There is a relationship between endometrial vascularity and endometrial growth, the higher the endometrial perfusion, the higher the endometrial thickness. Sonographic endometrial/subendometrial blood flow does not appear when resistance increases in uterine artery (17).

What is ultrasound-guided embryo transfer (UGET)?

The most important and last step in IVF cycles is embryo transfer (ET). During this step the physician can ruin everything by careless embryo transfer. The success of IVF cycle depends on the placement of embryos with minimal trauma and manipulation in the optimal location of the endometrial space. Hence, ultrasound-guided embryo transfer has become an indispensable technique in IVF clinics. With the advantages of this technique we can visualize the uterocervical angle, the distance of the catheter from the fundus, also visualize embryo transfer and unpredictable uterine abnormalities prior to transfer (18).

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