SUBENDOMETRIAL EMBRYO DELIVERY

Seed

Placement of the blastocyst stage embryo at optimum zone(s) of transfer under direct visual placement used to minimize risks of in vitro fertilization

About SubEndometrial Embryo Delivery

The endoscopic Sub endometrial embryo delivery (SEED) is placement of the blastocyst stage embryo (embryo 5 - 6 days after fertilisation) under direct visualization. Once implanted within the endometrium (Pic. 1), it will be fixed in place and there will be no further migration of the embryo into the fallopian tube nor will it grow over the internal OS (placenta previa which is when placenta attaches inside the uterus but near or over the cervical opening that exposes the mother and the baby to increased morbidity and mortality and no further lost embryo(s)).

Allowing the embryos to reach the blastocyst stage prior to transfer (Pic. 2) is gaining more acceptance. It allows both for more normal embryos to be naturally selected and for a more accurate selection of more viable, healthier embryo(s). Thus a less number of embryos can be selected for transfer with more certainty for a successful singleton pregnancy.

During the procedure, a hysteroscope is used. A hysteroscope is an endoscope that carries optical and light channels or fibers. It is introduced in a sheath that provides an inflow and outflow channel for insufflation of the uterine cavity. In addition, an operative channel may be present to introduce scissors, graspers or biopsy instruments. Using the flexible mini-hysteroscope affords an objective and accurate confirmation of the placement of the embryo that should make the procedure replicable, and thus more reliable with more consistent and improved results. In addition, the uterine cavity is allowed to be distended during introduction of the hysteroscope into the uterus by slow passage through the endocervical canal. This would allow the hysteroscope to move in a gaseous space and not in direct contact with the endometrium as is the case with the blind procedure (without direct visualisation). Increased cost is another drawback, however utilizing a hysteroscope with an objective replicable procedure that improves results will decrease the costs from multiple failed embryo transfers attempts and improve patient satisfaction.

Likewise, visualizing implantation allows for the physician to avoid losing embryos due to intrinsic uterine contractions or those brought on by the transfer, enabling the physician to defer the procedure until the enhanced activity has subsided. Furthermore, visualization allows one to place the embryo at a different location if trauma (any failure) ensues. Also, the catheter used is semi-rigid to prevent kinking as it passes through the endoscope yet with enough flexibility to bend with the endoscope however bend and become kinked to prevent inadvertent passage into the myometrium (uterine muscle layer).

Success or failure factors

SEED technique could be a technique of option for those patients with repeated implantation failure. In patients undergoing in vitro fertilization (IVF) procedures one major set of hurdles, which often prevents healthy embryos from resulting in pregnancies, are problems associated with endometrial receptivity and implantation. Various techniques for embryo transfer (ET) have been advocated to increase pregnancy rates while reducing side effects from the procedure, such as lost embryos and ectopic pregnancies. These methods, however, use a "blind" technique of catheter introduction into the uterus. Since the embryo(s), having the zona pellucida
(glycoprotein layer surrounding the plasma membrane of oocytes) at time of transfer, floats in the uterine cavity between one to three days from the time of transfer, the problems of “lost embryos” and the occurrence of ectopic pregnancies persist. Thus, **the mechanical insertion of the blastocyst into the endometrium under direct visualization would increase the implantation and clinical pregnancy rate of IVF.**

The endoscopic embryo delivery will help minimize risks and side effects from IVF, such as multiple pregnancy, ectopic pregnancy, and placenta previa. This is accomplished by direct visualization of the uterine cavity during the replacement of the embryo onto (HEED) or into (SEED) specific zone(s) of transfer. In addition, it will allow for direct embryo implantation of the embryo into the endometrium.

### Complications

SEED could be associated with possible injury to the endometrium. However, this is minimized as the uterine cavity is expanded prior to entry of the flexible mini hysteroscopic scope into the uterus as opposed to no expansion with the current “blind” method of catheter entry. Furthermore, if an injury is identified by direct visualization, embryo delivery can be made in another area while under direct visualization which is not possible with the current “blind” procedure.

### Prognosis

Using a targeted single embryo delivery whether by HEED or SEED will standardize embryo transfers by allowing a visually confirmed placement of the embryo. In addition, they allow for gentle placement of the embryo at optimum zone(s) of transfer under direct visual placement. Embryo delivery by HEED is used for embryo transfers at cleavage and more advanced stages of embryo development whereas SEED is strictly for blastocyst implantation. SEED will help alleviate problems with embryo implantation and minimize ectopic pregnancies and lost embryos. It will also minimize occurrence of placenta previas from IVF.

Embryo delivery whether by HEED or SEED will be deferred if uterine contractions are observed during the hysteroscopy part of the procedures. Embryo is then frozen and Embryo delivery will be performed in a subsequent un-stimulated cycle when the uterus is quiescent as confirmed by hysteroscopy. These techniques will also open the door toward further progress to understanding of the fate of the implanted embryo(s) and its interactions with the endometrial environment and take us a step further beyond the enigma of embryo implantation.
During implantation, the conceptus is called a blastocyst. It is by this adhesion that the fetus receives oxygen and nutrients from the mother to be able to grow.

Sources

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