

## **Non-Invasive Ultrasound Image-Based Scoring System Improves IVF Pregnancy Rates.**

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### **Introduction:**

Creation of embryos for IVF is technically challenging, expensive, and an emotionally taxing experience for patients. Improvements have been made in pregnancy outcomes following embryo transfer (ET); however, the contribution of endometrial receptivity has not been fully elucidated. Endometrial status is currently evaluated by simple thickness and pattern assessments. Thus, many high-quality embryos are placed in sub-optimal endometrial environments, leading to poor outcomes.

A non-invasive ultrasound based endometrial diagnostic test (usER) (Matris™, Synergyne Imaging Technology, Inc, Saskatoon, SK) is designed to assess endometrial health and receptivity using a virtual histology approach prior to ET. The usER is based on multi-factorial quantitative assessment of endometrial attributes including echotexture, morphology, glandular differentiation and endometrial anomalies. usER is designed to assist clinicians in selecting optimal cycles for transferring embryos and is a novel method for predicting endometrial receptivity.

Our objective was to perform a real-world clinical proof of concept study to examine the hypothesis that usER technology would improve pregnancy rates.

### **Materials and Methods:**

We evaluated the use of usER in a tertiary care ART clinic during routine practice in this retrospective analysis. The usER report provided scores ranging from 0 (poor receptivity) to 10 (optimal receptivity). In 2018, usER was utilized for all IVF cycles performed by a single clinician. ET were completed only on cycles with a usER score of 7 or higher. Monthly average pregnancy rates for usER selected cycles were compared to monthly average pregnancy rates for the rest of the clinic (7 physicians) who used standard endometrial assessment for cycle selection. Data were combined for fresh and frozen ET cycles. The same embryology laboratory was used by all clinicians.

### **Results:**

usER was used on 316 cycles; 246 of the 316 (78%) usER selected cycles had a score of  $\geq 7.0$  and received ET. The annual pregnancy rate for usER cycles was 128 of 246 (52%). The rest of the clinic's pregnancy rate was 475 of 1205 (39.4%). Comparison of the change in monthly pregnancy rates between usER cycles and standard of care cycles results in a 14.6 % ( $p=0.00025$ ) advantage in the usER group.

### **Conclusions:**

usER technology may be used to improve pregnancy rates significantly. Utilization of usER resulted in conservation of 70 cryo-preserved embryos for use in higher probability usER selected cycles.