



AMERICAN SOCIETY FOR
REPRODUCTIVE MEDICINE



American Society for Reproductive Medicine 2020 Virtual Congress

October 17-21, 2020

PREDICTORS AND CLINICAL SIGNIFICANCE OF RETAINED SINGLE EUPLOID EMBRYOS

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OBJECTIVE:

In approximately 1-4% of embryo transfers, upon flushing the catheter to verify expulsion, a retained embryo is noted.¹⁻³ Limited data exist regarding the characteristics of euploid embryos that increase the likelihood of retention in the catheter, and on the impact of repeat transfer of retained embryos on pregnancy outcomes.¹⁻³ The objective of this study is to determine the characteristics of euploid single blastocyst transfer that are associated with retention in the catheter, and to determine the prognosis of repeat ET of retained euploid blastocysts.

DESIGN:

Retrospective cohort study

MATERIALS AND METHODS:

Patients who underwent a euploid FET from 2016-2018 were included in the study. Preimplantation genetic testing for aneuploidy (PGT-A) was performed using Next Generation Sequencing. Euploid FET cycles were separated into groups: Group 1 consisted of cases in which embryo retention was noted upon catheter inspection, and Group 2 consisted of controls in which the embryo was successfully expelled in a single attempt. Baseline demographics, cycle



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characteristics, and pregnancy outcomes were assessed using comparative statistics and adjusted logistic regression.

RESULTS:

A total of 6,703 single euploid FET were identified and included in the analysis, including 76 cycles in Group 1 (1.1%) and 6,627 in Group 2. The groups were similar in terms of age, oocyte age, AMH, BMI, and endometrial thickness. Embryo expansion, inner cell mass grade, trophoctoderm grade, and day of trophoctoderm biopsy were not associated with the probability of retention within the catheter. Embryo retention was significantly associated with presence of mucus ($p=0.044$) or a mucus plug ($p=0.002$) noted upon inspection of the catheter following embryo transfer. Mucus aspiration, type of catheter used, difficult transfer, cervical dilation, and the quality of the fluid squirt were not associated with embryo retention. Implantation and ongoing pregnancy rates were significantly decreased in Group 1 compared to Group 2 (44.02% vs. 61.3%, OR 0.49, 95% CI 0.31-0.78, $p=0.002$; 37.3% vs. 51.6%, OR 0.56, 95% CI 0.35-0.90, $p=0.014$). A decrease in odds of live birth was seen but this was not statistically significant (37.0% vs. 49.7%, OR 0.59, 95% CI 0.34-1.04, $p=0.06$). Embryo retention was not associated with pregnancy loss or with monozygotic splitting. When controlling for age, oocyte age, AMH, BMI, endometrial thickness, presence of mucus in the catheter and mucus plug, embryo retention was still significantly associated with a decline in implantation rate (OR=0.54, 95% CI=0.32-0.91, $p=0.02$) and ongoing pregnancy rate (OR=0.56, 95% CI=0.33-0.96, $p=0.035$). Live birth rate did not differ significantly between the groups (OR=0.61, 95% CI=0.32-1.14, $p=0.12$).

CONCLUSIONS:

Retention was associated with mechanisms indicating difficulty of the transfer rather than embryo characteristics such as expansion or grade. Our data indicates that while a retained euploid frozen-thawed embryo may have a decreased ability to implant, once ongoing pregnancy is established, live birth outcomes are similar.

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