



INCREASED IMPLANTATION RATES WITH TARGETED NEXT GENERATION SEQUENCING (TNGS) COMPARED TO QPCR-BASED COMPREHENSIVE CHROMOSOME SCREENING

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OBJECTIVE: NGS-based technologies for comprehensive chromosome screening (CCS) are progressively displacing other platforms due to higher sensitivity for additional chromosomal abnormalities and lower cost per sample. This study aims to compare the clinical performance between a tNGS and a qPCR-based CCS platform after frozen single embryo transfers (SET).

DESIGN: Retrospective cohort study.

MATERIALS AND METHODS: A validated tNGS platform for CCS (NexCCS) was clinically implemented in August of 2016 at an IVF center where CCS was routinely performed with a qPCR-based platform (SelectCCS). All frozen SETs performed between August 2016 and February 2017 were included in the study. SETs of euploid embryos were divided into qPCR and tNGS based on which platform was used for the analysis. For comparison, a third group without genetic screening (no CCS) was also evaluated. Sustained implantation rates (ongoing gestation after 8 weeks) and oocyte age were compared between all 3 groups. Relative risk (RR) was calculated for group comparison.

RESULTS: 1279 frozen SETs were included in the analysis, from which 538 were in the tNGS group, 420 in qPCR and 321 in no CCS. Maternal age was significantly lower in the no CCS group (Table 1). The sustained implantation rate was considerably higher when selection was done with tNGS compared to qPCR-based CCS (RR: 1.13, CI 95% 1.02-1.25). Moreover, compared to SETs without genetic screening, SETs of euploid blastocysts resulted in significantly higher implantation rates, either after tNGS (RR: 1.39, CI 95% 1.23-1.59) or qPCR-based CCS analysis (RR: 1.56, CI 95% 1.08-1.42) (Table 1).

CONCLUSIONS: TNGS-based CCS outperforms qPCR in terms of sustained implantation after SET of euploid blastocysts. By analyzing more loci for each chromosome tNGS may detect more abnormalities such as segmental aneuploidy and mosaicism, providing improved criteria for selection of embryos with higher reproductive potential. In addition, SETs with either CCS platform resulted in significantly higher sustained implantation than when no CCS was performed despite having a significantly higher maternal age.

Table 1. Sustained implantation after frozen SETs

	TNGS	qPCR	No CCS	p-value
Maternal age \pm SD	34.47 \pm 4.37	34.99 \pm 4.50	32.57 \pm 4.64	<0.0001
Sustained implantation rate %	66.9 (360/538)	59.3 (249/420)	48.0 (154/321)	<0.0001