Cell-free DNA testing in ART pregnancies: pre-test and post-test genetic counseling

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Objective

Most of ART (IVF) patients have a high background risk of chromosomal abnormality (maternal age, family history, previous miscarriages) and need to be tested for fetal chromosomal defects. These patients have significant obstetric history and most of them feel strongly against invasive (CVS or amniocentesis) procedure due to the fear of post-invasive miscarriage. Over the last years, the CF DNA-testing has become a preferred choice for ART (IVF)-patients as it reduces the need for invasive testing. All cases need pre-test and post-test genetic counselling in order to explain and discuss the limitations and benefits of CF DNA.

Methods

From November 2013 through April 2015, we enrolled IVF-planned families and post-IVF pregnancies in fetal CF DNA examination. Multple pregnancies and patients receiving donor eggs were not enrolled for analysis. During the test period, most women have the test in the first trimester (72%). 53, 7% of women chose to undertake the CFDNA as the first step to test for fetal aneuploidies. We collected the outcomes for all participants.

Results

The first step of CFDNA -counseling should be done at pre–IVF time, before the pregnancy occurs. In our group 88, 6% of families have chosen the non-invasive algorithm for prenatal diagnosis for the future pregnancy. If the counseling was done at 8 – 12 weeks of pregnancy, 53, 7% of women chose to perform CFDNA as a first step in prenatal investigation of the fetal condition. 24% women decided to come back for CFDNA discussion after the 11-13 weeks ultrasound scan or a combination of first trimester risk assessment. In 48% of ART-pregnancies CFDNA was done in the first trimester. Two cases had a positive CFDNA results – extrasequences of chromosome 21 and other factors suggestive of a fetal chromosomal abnormality. Results should be interpreted by a geneticist in the context of all prenatal clinical data. After the post-test counselling, the parents decided to terminate these pregnancies. CF DNA test was carried out at 9 weeks. This allowed for termination of pregnancies up to 12 weeks without complications. In other cases (low risk of aneuploidy by CF DNA test) we recommended 12 and 20 weeks ultrasound scan without the analysis of biochemical markers. As usual, the IVF protocol includes the progesterone therapy in the first trimester. This practice increases the level of β-hCG and distorts the results of the screening by maternal serum biochemical testing hence routine serum analyses screening in post-IVF pregnancies is not recommended. From the results of the first trimester combined screening, 28, 4% women has been identified at high risk for trisomy 21. The standard way would be proceeding with an invasive test, however CF DNA could avoid this. In summary, the number of invasive prenatal tests decreased by 47. 4% in IVF pregnancies. A number of noninvasive tests will develop in our prenatal practice in ART (IVF) pregnancies.

Conclusion

Prenatal detection of chromosomal abnormalities plays an important role in the examination of IVF-pregnancies, most of them are at high risk of chromosomal anomalies. Clinical implementation of cfDNA testing is a more superior first step for the examination of in IVF pregnancies. The preconception genetic counselling allows us to exclude the more common fetal aneuploidy in this group of pregnant women without invasive procedures. An extensive pre-test and post-test NIPT genetic counseling play a key role in providing a family undergoing IVF with a healthy baby.