Key Summary of Conference Abstract

Trisomy 7 Identified by Prenatal cfDNA Screening: Clinical Management Implications

Background

- Prenatal cell-free (cfDNA) screening via massively parallel shotgun sequencing (MPSS) can detect trisomy 7.[1]
- Detection by this method can be caused by conditions that are managed differently: 1) a fetus with trisomy 7, which is not viable, and 2) a condition referred to as confined placental mosaicism (CPM).
- As the name suggests, CPM occurs when trisomy is confined to the placenta; it is caused by trisomy rescue in the fetus. When trisomy rescue results in the presence of 2 copies of a chromosome from the same parent instead of a single copy from each parent, it is known as uniparental disomy (UPD).
- Maternal UPD of chromosome 7 is one cause of Russell-Silver syndrome (RSS), a rare genetic disorder characterized by, among other symptoms, growth deficiency before and after birth.[2]
- **Objective:** The investigators of this study describe how detection of trisomy 7 with prenatal cfDNA screening followed by cytogenetic testing can identify fetuses at risk for RSS.

Methods

- A total of 43,093 consecutive specimens from pregnant women were screened for fetal chromosome anomalies using the QNatal® Advanced test at Quest Diagnostics. This test uses MPSS (as opposed to a single nucleotide polymorphism [SNP]-based screening approach).
- Nine (0.02%) samples were positive for trisomy 7.
- Karyotype and microarray analyses were performed for 2 of the 9 samples (A and B below) from women with fetal growth deficiency. After delivery, placental microarray analyses were also performed.

Results

- Patient A was 24 years old and at 29 weeks' gestation at the time of prenatal cfDNA screening. The z score for chromosome 7 was highly elevated (>100), indicative of trisomy 7.
- Patient B was 26 years old and at 26 weeks' gestation at the time of cfDNA screening. The z scores were 64 for chromosome 7 and 55 for chromosome 13, indicative of trisomy 7 and 13.
- Follow-up fetal and maternal karyotype and microarray analyses showed normal findings in both women.
- After delivery, placental microarray analysis confirmed CPM in both women: for trisomy 7 in patient A and for both trisomy 7 and 13 in patient B.

Conclusions

- For pregnant women with persistent fetal growth deficiency and at increased risk of trisomy 7 identified by prenatal cfDNA screening, cytogenetic studies may help confirm CPM.
- As CPM for trisomy 7 is consistent with an increased risk of RSS in the fetus, this information is important for guiding quality care throughout pregnancy and after delivery.
- These findings suggest that prenatal cfDNA screening by MPSS can contribute to the successful management of pregnancies at risk for syndromes caused by UPD.

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References

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2. Marczal-Halupka A, Kalina MA, Tanska A, et al. *Pediatr Endocrinol Diabetes Metab*. 2015;20:101-106.

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