I. Introduction

When a cfDNA sample submitted for MaterniT® 21 PLUS testing is identified as having an overrepresentation of chromosome material suggestive of aneuploidy, a 'mosaicism ratio' (MR) is calculated. As previously described, the MR is derived by dividing the fetal fraction estimated for the aberrant chromosome or chromosomal segment over the fetal fraction estimated for all chromosomes. For singleton gestations MR is used to identify samples for which the results are suggestive of mosaicism, which may translate to a reduced positive predictive value.

For multifetal gestations, MR could be used predict: (1) whether one vs. multiple fetuses are affected with aneuploidy, and (2) the anticipated sex of the fetuses.

A series of cases that illustrate the potential clinical application of MR for multifetal gestations are presented here.

II. Description of Cases

The six cases presented in Table 1 were submitted for MaterniT® 21 PLUS testing due to advanced maternal age and results were positive for trisomy 21 in at least one fetus. Karyotypes from CVS or amniocentesis were available to confirm the predicted cfDNA results in all cases.

The cases presented here demonstrate that MR has potential clinical utility for individuals carrying twins or higher order multiples. These cases also support the need for additional studies comparing the mean and standard deviation of MR in multifetal gestations with one vs. multiple fetuses affected, as well as studies of how MR is impacted by other aneuploidies that are more commonly seen in mosaic form (e.g. trisomy 13 and trisomy 18).

III. Discussion

Mosaicism ratio is a metric already used in the analysis of MaterniT® 21 PLUS data to identify abnormal results that may be impacted by mosaicism, either because of placental/fetal mosaicism or the demise of a co-twin. This same metric has potential to be applied to pregnancies involving multifetal gestations to: (1) predict when one vs. more than one fetus is affected with aneuploidy, and (2) provide information about the anticipated sex of the fetuses.

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IV. References