Increasing aneuploidy detection in products of conception (POC) by molecular analysis and multisdissection of fetal tissue

Jose Antonio Martinez-Conejero[1], Nasser Al-Asmar[2], Sandra García-Herrero[1], Inmaculada Campos-Galindo[1], Adedoyin Akinwole[2], Cengiz Cinnioglu[2], Carlos Simon[1], Carmen Rubio[1]
[1]*Preimplantational Genetic Screening, iGenomix SL, Spain*
[2]*Preimplantational Genetic Screening, Ivigen, USA*

Objective: Maternal cell contamination (MCC) has been reported in about 25-30% of the cases when conventional karyotyping is used to analyze the POC. The aim of the study was to design a strategy to improve the aneuploidy detection in POC by multidissection and analysis of several tissue pieces from each specimen using aCGH in order to avoid MCC.

Materials and Methods: 274 DNA samples from POC and blood of gestational carrier were obtained. Samples were analyzed using STR analysis (AmpFlSTR Identifiler Plus Kit PCR Protocol (Life Technologies, CA, USA)) to discard MCC, UPD or polyploidies followed by aCGH. DNA from samples in which MCC was ruled out, were labeled and run into aCGH (Illumina, San Diego, CA, USA). In samples where first dissection was MCC, two more dissections were performed to see if we are able to rule out MCC.

Results: The total percentage of POC samples with Non-conclusive results after first dissection was 27% (n=73). After two more dissections up to a total of four, we reduced this MCC rate to 15% (n=41), being able to provide results (either normal or abnormal) in 85% of all the cases.

	N	(%)
No. Cases	274	
Maternal age (SD)	35.4 (5.0)	
Gestational age (SD)	7.8 (1.7)	
Normal results	106	38%
Abnormal results	126	46%
Trisomies	107	85%
Monosomy 21	2	2%
Sex Chromosome monosomy	11	9%
Segmental aneuploidy	5	4%
UPD	1	1%
*MCC 1st Dissection (%)	73	27%
**MCC Multi sampling (%)	41	15%

*Non-conclusive results after 1 dissection (MCC)
**Non-conclusive results after 3 dissections (MCC)

Conclusions: Multi-sampling increases the chances to avoid misdiagnosis due to MCC leading to increase the percentage of POC samples with results (from 73% to 85%). Notably, in this study the cut off about the number of samples to dissect was 4. Large number will be needed in order to stablish the final cut off.