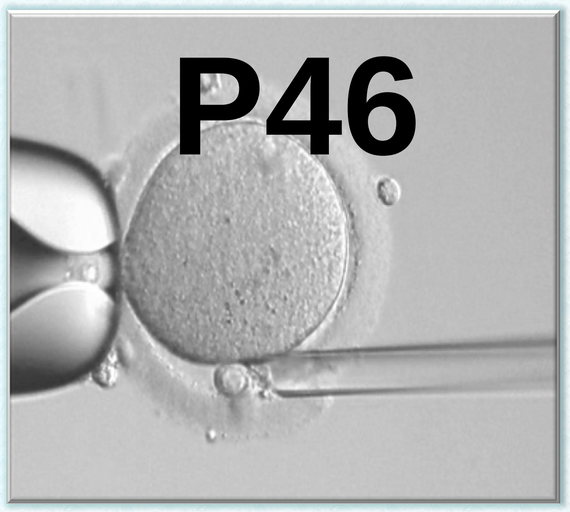
Chromosome Research
December 2014, Volume 22, Issue 4, page 639

13th Annual Preimplantation Genetic Diagnosis International Society (PGDIS) Meeting Abstracts



First birth in Switzerland after array comparative genomic hybridization for chromosomal analysis in polar bodies followed by zygote vitrification and warming

Xie M[1], Oneda B[2], Rauch A[2], Imthurn B[1]

[1]Division of Reproductive Endocrinology, University Hospital of Zurich and
[2]Institute of Medical Genetics, University of Zurich, Switzerland

Introduction:
Array comparative genomic hybridization (aCGH) has increasingly become a reliable tool in pre-implantation genetic screening (PGS) for chromosomal analysis in human oocytes and embryos. Patients who have suffered unexplained recurrent miscarriage, multiple implantation failure, or who are in an advanced maternal age, can particularly benefit from this. Recent randomized clinical trials have favored blastocyst compared to eight cell stage biopsy, as more cells can be taken from trophectoderm for analysis with improved implantation rates both in fresh and in subsequent frozen embryo transfer cycles. However, in Switzerland PGS on embryos is prohibited by the Reproductive Medicine Act. The only option of PGS is polar body (PB) biopsy in oocytes. To increase the time and consequently the accuracy of the genetic analysis we developed a strategy of vitrifying all fertilized oocytes after sequential PB1 and PB2 biopsy. We present a retrospective observational report of our results of PGS in polar bodies and clinical outcomes after embryo transfer.

Materials and Methods:
Since 2012, PB biopsy followed by PGS using aCGH (24sure, BlueGenome, UK) has been carried out for seven patients in eight stimulated cycles in our unit. In three patients, indication was aneuploidy screening following unexplained recurrent miscarriage and/or advanced maternal age (37-43 years at the time of PGS). Four women were carriers of balanced reciprocal and Robertsonian translocations (age range 31 and 38). First polar body biopsy (PBB) was performed 2 hours after ICSI which was followed by second PBB 14-16 hours after insemination. All biopsied oocytes were vitrified using the Cryotop method. Transfer of embryos derived from euploid oocytes was scheduled in a natural or a hormonal replacement cycle on day 1 or day 2 after warming.

Results:
In total, genetic analysis was successful for PB1 and PB2 in 42 out of 44 oocytes (95%). Only 28.57% of the tested oocytes (12/42) were considered chromosomally normal, including two oocytes with balanced combinations of chromatid gain/loss in PB1/PB2. As shown in Table 1, all patients except one (with balanced reciprocal translocation between chromosomes 11 and 22) had at least one euploid oocyte available (between 1 and 3). Five patients have received single embryo transfer and two resulted in clinical pregnancies: one patient (age 42 years) with three previous spontaneous miscarriages and an induced abortion due to trisomy 21 gave birth to a healthy child in 2013. The second pregnancy (patient age 43 years) ended with a miscarriage at the 12 week of gestation.

Table 1

Patient	Age (at time of PBB)	Indication for aCGH	Oocytes retrieved	No. 2PN analysed	No. euploid oocytes (%)	Embryo transferred	Clinical pregnancy
1	43	Advanced maternal age	9	6	1 (16.7%)	1	+ (miscarriage at 12 week of gestation)
2	33	Translocation (11;22)	23	10	0	No normal embryo for transfer	
3	42	Unexplained recurrent miscarriage	9	4	2 (50%)	1	+ (live birth)
4	31	Translocation (13;14)	8	7	3 (43%)	1	-
5	37	Advanced maternal age	19	7	2 (28%)	1	-
6	38	Translocation der(15)t(Y;15) (q12;p13)	7	6	3 (50%)	1	-
7	37	Translocation (14;21)	14	4	1 (25%)	To be transferred	

Conclusions:
By selecting chromosomally normal oocytes using polar body biopsy in combination with aCGH, more patients might achieve pregnancy and delivery.