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Efficacy of Preimplantation Genetic Screening in Women with a Spontaneous Abortion History with Eukaryotic or Aneuploidy Abortus

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Abstract : Most spontaneous miscarriage is believed to be a consequence of embryo aneuploidies. Transferring eukaryotic embryos selected by PGS is expected to decrease the miscarriage rate. Current PGS indications include advanced maternal age, recurrent pregnancy loss, repeated implantation failure. Recently, use of PGS for healthy women without above indications for the purpose of improving in vitro fertilization (IVF) outcomes is on the rise. However, it is still controversy about the beneficial effect of PGS in this population, especially, in women with a history of no more than 2 miscarriages or miscarriage of eukaryotic abortus. This study aimed to investigate if karyotyping result of abortus is a good indicator of preimplantation genetic screening (PGS) in subsequent IVF cycle in women with a history of spontaneous abortion. A single-center retrospective cohort study was performed. Women who had spontaneous abortion(s) (less than 3) and dilatation and evacuation, and subsequent IVF from January 2016 to November 2016 were included. Their medical information was extracted from the charts. Clinical pregnancy was defined as presence of a gestational sac with fetal heart beat detected on ultrasound in week 7. Statistical analysis was performed using SPSS software. Total 234 women were included. 121 out of 234 (51.7%) underwent karyotyping of the abortus, and 113 did not have the abortus karyotyped. Embryo biopsy was performed on 3 or 5 days after oocyte retrieval, followed by embryo transfer (ET) on a fresh or frozen cycle. The biopsied materials were subjected to microarray comparative genomic hybridization. Clinical pregnancy rate per ET was compared between PGS and non-PGS group in each study group. Patients were grouped by two criteria: karyotype of the abortus from previous miscarriage (unknown fetal karyotype (n=89, Group 1), eukaryotic abortus (n=36, Group 2) or aneuploidy abortus (n=67, Group 3)), and pursuing PGS in subsequent IVF cycle (pursuing PGS (PGS group, n=105) or not pursuing PGS (non-PGS group, n=87)). The PGS group was significantly older and had higher number of retrieved oocytes and prior miscarriages compared to non-PGS group. There were no differences in BMI and AMH level between those two groups. In PGS group, the mean number of transferable embryos (eukaryotic embryo) was 1.3 ± 0.7, 1.5 ± 0.5 and 1.4 ± 0.5, respectively (p = 0.049). In 42 cases, ET was cancelled because all embryos biopsied turned out to be abnormal. In all three groups (group 1, 2, and 3), clinical pregnancy rates were not statistically different between PGS and non-PGS group (Group 1: 48.8% vs. 52.2% (p=0.858), Group 2: 70% vs. 73.1% (p=0.730), Group 3: 42.3% vs. 46.7% (p=0.640), in PGS and non-PGS group, respectively). In both groups who had miscarriage with eukaryotic and aneuploidy abortus, the clinical pregnancy rate between IVF cycles with and without PGS was not different. When we compare miscarriage and ongoing pregnancy rate, there were no significant differences between PGS and non-PGS group in all three groups. Our results show that the routine application of PGS in women who had less than 3 miscarriages would not be beneficial, even in cases that previous miscarriage had been caused by fetal aneuploidy.

Keywords : preimplantation genetic diagnosis, miscarriage, kpryotyping, in vitro fertilization
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