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Oocyte and embryo cleavage kinetics in polycystic ovary syndrome

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Polycystic Ovarian Syndrome (PCOS) is very common cause of female infertility associated with obesity. Factors other than anovulation, such as low embryo quality have been suggested to contribute to the infertility in this group. The follicular microenvironment previously found to be altered in PCOS women might influence oocyte maturation and oocyte developmental competence. This excessive follicle number is linked to disturbances in folliculogenesis, which are thought to be the consequence of intraovarian hyperandrogenism. In addition, the number and quality of mature oocytes has been proposed as being poor; and recent data suggested that oocyte competence could be impaired in PCO patients owing to an inadequate dialogue between the cumulus cells and oocyte. In PCOS patient's embryo development it is observed few important differences in some embryo kinetic parameters. Notably, times to 2PN breakdown, and up to 7 cells stage are significantly longer in hyperandrogenic PCOS patients than healthy population. Time to 4 cells is significantly longer for embryos from hyperandrogenic PCOS group than healthy population and even normoandrogenic PCOS group. After the seventh cell stage, no significant difference between normal and PCOS group can be observed up to blastocyst stage of development. The maternal influence on early embryo kinetics could be caused by the embryo's dependence on maternal RNA transcripts until the embryo genome is activated primarily from the 4-cell stage and completed at the eighth cell stage. This might explain why the observed delay in the hyperandrogenic group was most significant at stages earlier than 5 cell stage, began to level out after 5 cell stage and became undetectable after 7 cell stage. The mitochondria of the preimplantation embryo only from the mother because paternal side mitochondria do not survive post fertilization. Therefore, the slower development in early embryos from hyperandrogenic PCOS women might in part relate to some sort of mitochondrial functional anomaly in their oocytes. The only study led by Wissing et al, in 2014 has nicely documented this kinetics of PCOS embryos though it is yet to establish that, why is impaired oocyte developmental capability not a general finding in PCOS patients undergoing ovarian stimulation for ART.

Biography

Parag Nandi has completed his Ph.D in University of Calcutta and MSc in Biotechnology. He is a Scientific Director & Chief Embryologist, Cradle Fertility Centre, Joka, Kolkata and Founder Member, Academy of Clinical Embryologists, India. Organising & Scientific Committee Member, ISAR 2018, Kolkata. Trained in embryology from CREST Bangalore & CREST Singapore, trained in embryology from CREST Bangalore & CREST Singapore, published his research papers in high impact factor scientific journals. Authored number of chapters in books. Current research interests include various ways of air quality management indifferent levels of clean room, effect of VOC in embryo culture condition, reproductive toxicology, effect of heavy metals in male & female infertility & sub-fertility.

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