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Ovarian Dysfunction is a Condition Characterized by a Decrease In Residual Follicles in the Ovaries

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Ovarian dysfunction is a condition characterized by a decrease in residual follicles in the ovaries, classified into POI (premature ovarian insufficiency) and DOR (Diminished ovarian reserve). POI is characterized by amenorrhea before the age of 40, whereas DOR shows hormonal abnormalities but does not necessarily involve menstrual irregularities or ovulation disorders. Previously, POI was considered to affect1% of women, but recent studies indicate an increased prevalence of 3.7%. Infertility treatment for ovarian dysfunction using patients' own genetic eggs is challenging. The only established method is embryo transfer to POI patients using eggs obtained from young healthy donors fertilized with the partner's sperm. However, this method is not ideal due to ethical issues and potential immunological abnormalities from carrying a non-genetically related pregnancy. It is also prohibited in some countries and regions for religious or other reasons.

In POI, activation of dormant primordial follicles arrests, and recruitment of developing follicles does not occur, resulting in the absence of FSH-responsible antral follicles, leading to anovulation and infertility. In DOR, the number of developing follicles decreases due to reduced ovarian reserve, resulting in fewer FSH-responsive antral follicles and minimal oocyte retrieval even with aggressive controlled ovarian stimulation. The speaker has developed in vitro activation (IVA) treatment to induce activation of dormant primordial follicles and growth of early follicles in the FSH-independent phase, enabling POI/DOR patients to conceive with their own genetic eggs. IVA involves laparoscopic removal of ovaries or ovarian tissues, followed by in vitro ovarian tissue culture for follicle activation, and subsequent grafting into and around the residual ovary. The initial method required two laparoscopic surgeries due to 48-hour in vitro ovarian tissue culture. To reduce the invasiveness, a method that can be completed in a single surgery has been implemented, known as drug-free IVA. Further research is ongoing to develop less invasive methods, some of which will be introduced in this lecture.