The impact of genetic variations and gene expression of FSH receptor on ovarian reserve

Mohseni Meybodi Anahita (IR) [1], Ghezelayagh Zeinab (IR) [2], Totonchi Mehdi (IR) [3], Zari Moradi Shabnam (IR) [4], Bazregar Moasoud (IR) [5], Maroufizadeh Saman (IR) [6], Eftekhari Yazdi Poopak (IR) [7], Gourabi Hamid (IR) [8]

Context: Ovarian reserve is the capacity of the ovary to provide fertile oocytes. The loss of ovarian function before age of 40 results in an infertility condition called Premature Ovarian Failure (POF). Diminished Ovarian Reserve (DOR) is another infertility disorder in which women's ovaries are prone to go through early menopause. Throughout folliculogenesis FSH receptor starts a signaling cascade in the granulosa cells after its activation by FSH. Inactivating of this receptor may arrest follicle maturation and therefore result in ovarian reserve.

Objective: We investigated the association of polymorphisms and inactivating mutations of FSH Receptor (FSHR) gene with POF and DOR patients. The mRNA expression of FSHR gene was also studied in granulosa cells of DOR and control patients, each 8 samples, by real time-PCR.

Patients and Methods: The study was comprised of 84 POF, 52 DOR and 80 fertile Iranian women. For determining the presence of 566C>T mutation in exon 7 and -29G>A polymorphism of the promoter PCR-RFLP was done. SSCP-Sequencing method was used to identify any allelic variants in exon 10.

Results: 566C>T mutation was not seen in any of the patient or control groups. Different genotypes of -29G>A polymorphism was seen in the mentioned groups, which the differences was statistically significant between the studied groups (P value=0.04). Although the frequency of 919G>A polymorphism in exon 10 was significantly different between the studied groups (P value=0.007), no other inactivating mutations or polymorphisms were detected in the considered regions. The results showed a decrease in the mRNA expression of DOR patients’ granulosa cells compared to the control group but it was not statistically significant (P value >=0.05).

Conclusions: Our results showed that -29G>A and 919G>A polymorphism in the FSHR are associated with POF and DOR disorders.