9th Yazd International Congress and Student Award on Reproductive Medicine with 4th Congress of Reproductive Genetics

Key Lectures

K-63
Evaluating ovarian impairments in implantation failure

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Recurrent implantation failure (RIF) can be defined as a failure to achieve a clinical pregnancy after transfer of at least four embryo of good quality in a minimum of three fresh or frozen cycles in women under the age of 40.RIF is often a complex problem with a wide variety of etiologies and mechanisms as well as treatment option.

Recurrent miscarriage (RM) is defined as two or more consecutive pregnancy before the 20st week of pregnancy or a fetal weight of less than 500 grams that affect approximately 5% of conceived women worldwide.

RIF and RM are multifactorial disorders with three main causes including gamete and embryo factors, factors affecting endometrial receptivity and ovarian factors affect gamete and embryo factors and include premature ovarian failure (POF) and polycystic ovarian syndrome. Primary ovarian insufficiency (POI) is a heterogeneous disease caused by a variety of mechanisms that affects ~1-2% of under-forty years old women. The etiology of POI has been found to be genetic mutations, chromosomal, and autoimmune.

About 10% of cases of POI are related to genetic diseases and over 50 genes are known to be causally related to POI. The most frequent conditions associated with POI are Turner syndrome and fragile X pre-mutation; mutation of BRCA 1-2 genes and several other mutations and genetic syndromes that have recently been highlighted, although they rarely occur.

Fragile X mental retardation type 1 gene pre mutation has been frequently found in POF or POI. Tet (Ten-eleven translocation) Tet1 deficiency leads to POF by influencing the quality of oocytes and reduces expression of X-chromosome-linked genes, such as Fragile X mental retardation type 1. ATG7 (autophagy-related genes) and ATG9A variants have also a functional link with POI. If a diagnosis of genetic-based POI is determined before the onset of POI, counseling on currently available fertility preservation techniques is advisable.

Advanced maternal age, high follicle-stimulating hormone, low antral follicle count, and low Anti-Mullerian Hormone result in fewer number of oocytes retrieved, high number of immature oocytes, reduced fertilization and embryo utilization rate. Advanced age also cause aneuploidy, increase mitochondrial damage and decrease in mitochondrial membrane potential. Its impact on zona hardening and subsequent defective hatching as a cause for RIF has been suggested by a few studies. PCOS is the most common cause of anovulatory infertility in the developed countries and also the most commonly identified abnormality among women with recurrent miscarriage. Spontaneous loss of fetus occurs in 40% of women with PCOS and the possible causes may include obesity, hyperinsulinemia, insulin resistance, hyperandrogenemia, hyperhomocysteinemia, high levels of plasminogen activator inhibitor-1 factor, poor endometrial receptivity, and elevated levels of luteinizing hormone. Subacute Cd (cadmium) exposure disrupt the Hypothalamic–pituitary–gonadal axis function, leading to PCOS and POF features and other abnormalities in female rats.Chromosomal abnormalities of the male or female partner (deletions and duplications-dicentric and ring chromosomes-balanced and unbalanced translocation-single gene defect) and Maternal cytoplasmic factors or mutations in cell cycle control gene also can cause RIF and RM.