GENETIC PREDISPOSITION TO PCOS

Predisposition to developing polycystic ovary syndrome (PCOS).

⚠️ Risk factor ♂ Female

About Genetic predisposition to PCOS

Genetic predisposition occupies almost the most important place in the causes of polycystic ovary syndrome (PCOS).

The genetic component appears to be inherited in an autosomal dominant fashion. This means that each child has a 50% chance of inheriting. The genetic variant(s) can be inherited from either the father or the mother, and can be passed along to both sons and daughters. Current understanding of the pathogenesis of the syndrome suggests, that it is a complex multigenic disorder (a genetic problem caused by more abnormalities in the genetic information - DNA).

It is also possible that a particular gene in a given family may have a predominant effect, influencing the phenotypic manifestations (a unique set of characteristics based on your genetic makeup and influence of environmental factors) of the syndrome. The main candidate genes are those encoding for factors involved in the synthesis, transport, regulation and effects of androgens (a group of hormones that play a role in male traits and reproductive activity). Other candidate genes are those encoding for factors involved in insulin metabolism, such as insulin receptors, signalling cascade proteins responsible for binding of insulin to its receptor, the insulin-like growth factor (IGF) system, other growth factors and the gene encoding for Calpain-10 enzyme, responsible for insulin secretion and action.

An association has also been found between “pro-inflammatory” genotypes and PCOS, linked to polymorphism of genes (the branching of the genetic tree. Genes involved in folliculogenesis (the maturation of the ovarian follicle) may also be candidates in the etiopathogenesis of this syndrome.

Symptoms

Sons who may be asymptomatic carriers or may have symptoms such as early baldness and/or excessive hair and daughters, who will show signs of PCOS (such as menstrual disorders, infertility, acne and so on).

Genetic predisposition to PCOS may interact with postpartum weight reduction on long-term glycemic changes.

Associated diseases

- polycystic ovary syndrome (PCOS)
- obesity
- diabetes

Complications

Women with PCOS are at an increased risk for ovarian hyperstimulation syndrome (OHSS). Ovarian hyperstimulation syndrome (OHSS) is encountered in practice as an iatrogenic complication (a condition in a patient resulting from treatment by a physician) of controlled ovarian stimulation (COS). COS is aimed at producing multiple ovarian follicles during assisted conception cycles in hope of increasing the number of oocytes available for collection. The incidence of moderate to severe OHSS is between 3.1 and 8% of in vitro fertilization (IVF) cycles but can be as high as 20% in high risk women.
Risk factors

The high prevalence of women with PCOS and the wide range of phenotypes can be explained by the interaction of key genes with environmental factors.

Prevention

Determining the risk of malformation of the fetus allows biochemical screening. A genetic screen is an experimental technique used to identify and select for individuals who possess a phenotype of interest in a mutagenized population. Hence a genetic screen is a type of phenotypic screen.

How it can affect fertility

The interaction with gene may be a key point of the pathogenesis in PCOS.

Polycystic ovary disease is one of the leading causes of female infertility. Polycystic ovary syndrome causes more than 75% of cases of anovulatory infertility. An anovulatory cycle is a menstrual cycle during which the ovaries do not release an oocyte. Therefore, ovulation does not take place. If no oocyte is produced, no oocyte may go through fallopian tubes and fertilization cannot happen.

Hyperandrogenism (a medical condition characterized by excessive levels of androgens in the body) and insulin resistance are the metabolic hallmark of PCOS women. There is an increased risk of pregnancy complications in PCOS women. Nowadays a growing body of evidence points to a high prevalence of pregnancy complications in PCOS women. PCOS was strongly associated increased risk of early pregnancy loss, gestational diabetes (GDM), pregnancy-induced hypertension, preterm birth, small for gestational age, large for gestational age, caesarean section and operative vaginal delivery.

It should be noted that there were the close link between PCOS and obesity and the association of obesity with poor pregnancy outcome, so, it might be possible that possible confounding effect of body mass index (BMI) play a role in adverse effect of PCOS on pregnancies.

Prognosis

Genetic prognosis consists in determining the likelihood of like waiting or planned child is considered handicapped or healthy sign. As described above, in this case, each child has a 50% chance of inheriting.

When a woman is anovulatory, she can’t get pregnant because there is no egg to be fertilized. This is common in women from their mid-thirties, but research has found that increasingly younger women are also suffering from these cycles. In fact, about 40 % of infertility in women is related to cycles that don’t ovulate.

Ovulation induction in the sense of reversing anovulation is indicated for women who do not ovulate on their own regularly such as those with Polycystic ovary syndrome (PCOS). The medication which is most commonly used to treat anovulation is clomifene citrate (or clomid), which is a selective estrogen receptor modulator (SERM) that increases production of gonadotropins by inhibiting negative feedback from estrogen on the hypothalamus.

Lifestyle management should be used as the primary therapy for the treatment of improvement in ovulatory function and pregnancy.

Find more about related issues

Diagnoses
Polycystic ovary syndrome
A condition in which a woman has an imbalance of female sex hormones. This may lead to changes in the menstrual cycle, cysts in the ovaries, trouble g
Learn more at: www.fertilitypedia.org/therapy/diag/polycystic-ovary-syndrome

Sources
“Polycystic Ovary Syndrome: The Genetic Aspect” —by Sinawat licensed under CC BY 3.0
“Genetic Markers of Polycystic Ovary Syndrome: Emphasis on Insulin Resistance” —by Shaikh et al. licensed under CC BY 3.0
“Polycystic ovary syndrome” —sourced from World Heritage Encyclopedia licensed under CC BY-SA 3.0
“Genetic, hormonal and metabolic aspects of PCOS: an update” —by De Leo et al. licensed under CC BY 4.0
“Genetic Predisposition to Polycystic Ovary Syndrome, Postpartum Weight Reduction, and Glycemic Changes: A Longitudinal Study in Women With Prior Gestational Diabetes.” —by Wang et al. licensed under CC0 1.0
“Prevention of Ovarian Hyperstimulation Syndrome: A Review” —by Smith et al. licensed under CC BY 3.0
“Polycystic Ovary Syndrome” —by Tehrani and Behboudi-Gandevani licensed under CC BY 3.0
“Genetic screen” —sourced from Wikipedia licensed under CC BY-SA 3.0
“Infertility in polycystic ovary syndrome” —sourced from Wikipedia licensed under CC BY-SA 3.0
“Anovulation” —sourced from Wikipedia licensed under CC BY-SA 3.0
“Anovulation” —sourced from Fertilitypedia licensed under CC BY-SA 4.0
“Androgen Excess and Genetic Instabilities in Anovulatory Infertility” —by Arun et al. licensed under CC BY-SA 3.0