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Morbidity in Polycystic Ovary Syndrome

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ABSTRACT

POLYCYSTIC OVARIAN SYNDROME is a reproductive disorder from women reproductive age. This disease is a complex endocrine and metabolite disorder, characterized by anovulation, infertility, obesity and polycystic ovaries.

PCOS is a prevalent endocrine condition that affects 8–13% of women globally who are of reproductive age. PCOS, which is characterized by polycystic ovarian morphology, hyperandrogenism, and chronic anovulation, has a wide range of metabolic, reproductive, and psychological effects. PCOS is a complex etiology that includes environmental, hormonal, and genetic factors. Its pathogenesis is centered on insulin resistance and high testosterone levels, which frequently contribute to long-term health hazards such infertility, cardiovascular disease, and type 2 diabetes. The Rotterdam criteria, which demand for the presence of at least two of the three primary characteristics, are usually used to make the diagnosis.

Women suffering from PCODs they also show symtoms associated with the menstrual dysfunction and excess of androgen.This syndrome is heterogenous in nature.

They maybe increase the risk factors:

Hormonal imbalance

Diabetes mellitus

Insulin resisitance

Family history

Genetic factor

Inflammation

Lifestyle factor

Processed foods

Stress

Environmental pollution, etc.

These disease switch the more common sign and symtoms of the hyperandrogenism or anovulation.

KEY WORDS: Increase the rate of secretion of androgen hormone (Androgenism), PCOS, PCOD.

1.INTRODUCTION:-

The World Health Organization (WHO) estimates that 116 million women worldwide suffered with PCOS in 2012. Long-term complications of this illness, such as cardiovascular disease, are more common in the postmenopausal stage.

One aspect of the condition is the unchecked ovarian steriodogenesis that results in hyperandrogenism. PCOS affects people who are between the ages of 18 and 44.

Endometrial cancer, dyslipidemia, Type 2 diabetes, and other conditions are more common in women with PCOS. A biological characteristic of PCOS, hyperandrogenism can result in menstrual irregularities and ovarian suppression.

Patients with PCOS who experience oligomenorrhea and severe phenotypes have high levels of androgens. Overproduction of androgens results from abnormal ovarian and adrenal function. One telltale symptom of ovarian abnormalities is follicular maturation.

Primordial follicle growth is promoted by excess androgens during the early stages of gonadotropin. Increase the ovarian Theca cells' GnRH stimulation, which causes them to create more androgens. This condition is the main flaw in young girls starting puberty. to increase the ovarian Theca cells' production of androgen. The LH receptor is activated by leutinizing hormone (LH).

Follicle Stimulating Hormone (FSH) simultaneously stimulates the ovulation gronulosa cells' FSH receptor. These cells promote the formation of follicles and transform androgen into estrogen. Abnormal steriogenesis is combined with a number of hereditary factors. The synthesis of androgen is significantly influenced by CYP genes involved in steroidogenesis.

The etiology of PCOS is unknown, however women with a family history of type-2 diabetes or PCOS are more likely to experience hormonal imbalance, irregular periods, and difficulty ovulating.

Endometrial cancer in women with PCOS. Excessive levels of luteinizing hormone (LH) interfere with healthy ovarian function. Because environmental pollution affects human health and reproduction and contains heavy metals, pesticides, and endocrine-stimulating substances, it is also a risk factor for PCOS.

PCOS is a polygenic disorder. The development of PCOS has been demonstrated to be influenced by both environmental variables and gene-gene interactions. A single nucleotide polymorphism or mutation has been linked by numerous genetic studies to a variety of potential genes and various PCOS symptoms. All of the genes linked to PCOS have an indirect or direct impact on the ovaries.

A condition may meet four of the three different sets of diagnostic criteria. Sub-phenotypic types

Phenotype-B is the type-A (HA+OD+PCOM) phenotype.

PCOM, OD, and HA stand for Polysystic Ovary Morphology, Ovalatory Dysfunction, and Hyperandrogenism, respectively, in Phenotype-D (OD+PCOM), which is the C phenotype. PCOS, the leading cause of female subfertility, is primarily caused by endocrine problems in women of reproductive age.

Despite not being harmful, cysts can lead to irregular periods, hormonal problems, and trouble becoming pregnant. Insulin resistance and hyperinsulinemia are common in women with PCOS. Hormonal abnormalities are common in women with PCOS.

Elevated testosterone levels that disrupt regular ovarian function by increasing leutinizing hormone (LH) levels are the cause of hyperandrogenism. Globulin that binds to low sex hormone facilitates hyperandrogenesis. A tiny minority of patients have higher prolactin levels, which encourage milk production during pregnancy.

The main source of excess androgens is the ovary. One of the strongest substances is the plasticizer and monomer bisphenyl-A (BPA). It is used in the production of plastic and polycarbonate, which are components of many consumer products. It is the reason behind PCOS.

The psychological condition is the cause of PCOS. Stress levels in life are elevated, which disrupts the regular menstrual cycle, causes a hormonal imbalance, raises cortisol levels, and delays the menstrual cycle.

SYMPTOMS:

i. Irregular menstrual cycle

ii. Hairloss

iii. Abnormal weightgain

iv. Causing infertility

v. Acne

vi. Abnormal hair growth on the body and face

vii. Diabetes

PCOS-related complications may include:

- Infertility.
- Endometrial carcinoma is a type of cancer of the uterine lining.

- Fat accumulation in the liver causes nonalcoholic steatohepatitis, a severe liver inflammation.
- The metabolic syndrome is a collection of disorders that raises your risk of heart and blood vessel (cardiovascular) illness. These problems include high blood pressure, excessive blood sugar, and dangerous levels of cholesterol or triglycerides.
- Gestational diabetes or hypertension brought on by pregnancy.
- Early birth or miscarriage.
- Prediabetes or type 2 diabetes
- Sleep deprivation
- Depression, anxiety, and issues with eating.

2.ETIOLOGY:-

PCOS is caused by three main factors: insulin resistance, ovarian and adrenal hyperandrogenism, and aberrant gonadotropin discharges. Unchecked GnRH regulation can lead to a number of negative effects, including follicle arrest, increased anti-Mullerian hormone (AMH), decreased FSH, increased luteinizing hormone (LH), and increased synthesis of testosterone, estradiol, and dehydroepiandrosterone. By disrupting the production of ovarian steroid hormones, these disorders raise the level of androgens in the blood. Hyperinsulinism and hypogonadism are important risk factors for PCOS because they cause mature follicles to grow and blood aromatase levels to decrease. Excess androgens in PCOS, which are triggered by excess abdominal fat, result in dyslipidemia and hyperinsulinemia.When hyperinsulinemia and increased cell androgen synthesis occur, sex hormone binding globulin (SHBG) is decreased, increasing blood testosterone levels and perhaps hastening the course of the disease.

Genetics' influence in PCOS is emphasized in the present literature. Numerous genes have been implicated in the disease's pathogenesis, either directly or indirectly. However, no penetrant gene has been found as of yet. Research including several families demonstrates limited penetrance associated with environmental, hormonal, or other covariants. Numerous studies have indicated that PCOS is a complex, polygenic condition. It has been documented that the disease develops as a result of interactions between genes, between genes, and between genes and the environment. The present genetic understanding of the disease and some of the environmental factors that will be discussed later in the essay will be reviewed in this section.

A better understanding of these genes' functions aids in examining the ovaries, hormonal metabolism, and some facets of PCOS pathogenesis. The main reproductive organ that releases eggs for sperm fertilization is the ovaries. They also create little amounts of testosterone, one of the five types of androgen, a male hormone, as well as estrogen and progesterone, which aid in controlling the monthly menstrual cycle. The hypothalamus secretes gonadotropin-releasing hormone (GnRH), which causes the pituitary gland to release two gonadotropin hormones: luteinizing hormone (LH) and follicle-stimulating hormone (FSH). Ovulation is regulated by these two hormones; FSH mainly promotes the development of follicles into viable eggs, whereas LH causes these eggs to be released.

In a nutshell, PCOS is a syndrome (or collection of symptoms) that affects the ovaries and ovulation. The three main characteristics of PCOS are irregular or absent periods, elevated testosterone levels, and ovarian cysts, which are fluid-filled sacs. In essence, these sacs are immature follicles that do not experience ovulation. Therefore, the body's hormonal balance is upset when ovulation is absent. Furthermore, the monthly cycles are disturbed by elevated testosterone levels. Genetic changes, environmental factors, and epistatic changes have been suggested as the underlying explanation for disrupting hormonal homeostasis.

3.PATHOPHYSIOLOGY:-

Pathophysiology of polycystic Ovary Syndrome

Hyperandrogenism is the main characteristic and has a synergistic effect with insulin resistance to induce development of PCOS.

Hyperandrogenism and ovulatory dysfunction, irregularity of gonadotropin-releasing Hormone pulsation and resulting uncontrolled gonadotropin secretion and insulin resistance comprise the villainous cycle that is the pathophysiology of PCOS.

The aberration in the ovarian function of women with PCOS include the hypersecretion of androgen level and ovulatory and ovulatory dysfunction which causes PCOM (Polycystic Ovarian Morphology).Hyperandrogenism is caused by intrinsic dysfunction of theca cells.

It is also called the GnRH pulsation and gonadotropin secretion through the aberrant negative and positive result of the progesterone and estrogen.

4. PERILS RELATED TO PCOS :-

Type 2 diabetes mellitus (T2D), impaired glucose tolerance (IGT), pregnancy-related problems, gestational diabetes, venous thromboembolism, endometrial cancer, and cardiovascular and cerebrovascular events have all been linked to PCOS. One Insulin resistance (IR), a fundamental characteristic of PCOS, is the cause of many of these metabolic and reproductive disorders.

4.1 Heart-metabolic processes

The insulin-resistant feature of PCOS is the main cause of dysglycemia, which is associated with the cardiometabolic effects of PCOS discussed below. In consequence, the hyperandrogenic mechanism of PCOS pathophysiology has a significant impact on insulin resistance or the resulting hyperinsulinemia. Although there are few studies comparing the risk factors for cardiovascular disease (CVD) with and without PCOS, it is important to note that PCOS is associated with a high prevalence of cardiometabolic conditions, which increase the risk of developing CVDs. PCOS women who exhibit cardiometabolic risk factors like impaired glucose tolerance (IGT), dyslipidemia, hypertension, smoking, obesity, other metabolic syndromes, and a sedentary lifestyle are classified as vulnerable, per the clinical consensus recommendation of the PCOS guideline group .

4.2.Dyslipidemia

One recurrent CVD risk factor found in PCOS-afflicted women is dyslipidemia. A previous investigation found that dyslipidemia was present in a high number of women with PCOS (70%) as well. Additionally, women with PCOS (age <45 years) had increased levels of lipids, specifically high-density lipoprotein (HDL), low-density lipoprotein (LDL), non-HDL-C, LDL-C, and triglycerides (TG), according to a meta-analysis of 30 studies. Additionally, the obese stratum had significantly higher levels of TG and HDL-C, suggesting a potential association between PCOS and obesity. As a result, the most recent guidelines recommend that women of all ages get a lipid profile.

4.3.High arterial pressure

PCOS and hypertension have a complicated relationship that is impacted by numerous different factors. However, given the importance of hypertension in cardiovascular events, the most recent worldwide evidence-based guideline suggests taking blood pressure every year.

4.4.Obesity

Surprisingly, there isn't any conclusive proof that it causes PCOS, even though it is common in women with the condition. Nonetheless, several of the more severe PCOS symptoms, such as CVD, have been connected to obesity. Thus, the most recent guideline recommends routine body weight monitoring.

5.DIAGNOSIS OF PCOD'S DISEASE :-

Diagnosis of polysystic ovary disease involves a combination of clinical evaluation, blood tests and imaging studies.

Diagnostic Process:-

5.1.Medical History And Physical Examination:-

A healthcare provider will inquire about your menstrual cycle. Symptoms like irregular periods, excessive hair growth, acne and family history of PCOS. They will also perform a physical examination to asses for sigha of hyperandrogenism, suach as excessive hair growth, acne and skin tags.

5.2.Blood Tests:-

Blood tests are used to measure hormone level including androgens like testosterone , Follicle Stimulating Hormone(FSH), Lutenizing Hormone(LH), estrogern and insulin.

These tests help to determine if you have hyperandrogenism or ovulatory dysfunction.

5.3.Imaging Studies:-

A pelvic ultrasound may be performed to visualize the ovaries and check for polycyctic ovaries, which are characterized by multiple small cysts.

5.4.Dignostic criteria:-

To diagnose PCOD, a healthcare provider will look for presence of at least two out of the following three criteria.

5.4.1.Oligovulation or Anovulation:-

Irregular and frequent menstrual periods or the absence of ovulation

5.4.2.Clinical or Biochemical Signs of hyperandrogenism:-

Excess facial or body hair, acne or the elevated androgen level in blood.

5.4.3.Polystic Ovaries:-

Multiple small cysts on the ovaries are detected by the ultrasounds

6.TREATMENT:-

Since the severity of this endocrinopathy was acknowledged, researchers have been searching for a cure. This specific illness does not currently have a permanent cure. To address the symptoms and enable the patient to lead a less burdensome life, treatment is tailored to each patient's needs. Some potential approaches recommended for PCOS patients are given below.

6.1. LIFESTYLE APPROACH --

Self-care such as physical exercise, weightloss, electrolysis.

Lifestyle changes including frequent exercise, a healthy weight, nutrition diet, and no cigarettes.

Diet should contain Low- Glycemic index, Ketogenic and Omega-3 fatty acids.

Medications includes of anti-diabetic, statins, hormone, hair growth inhibitor.

Vitamin-D, Inositol, Folate, B-group vitamins, Vitamin K & E for insulin sensitivity and hormonal balance.

Minerals like Chromium Picolinate, Calcium, Magnesium, Selenium and Zinc may also help.

6.2. CLINICAL APPROACHES AND CURRENT TREATMENTS--

Metformin, a medication mainly used to treat type 2 diabetes, has been shown to help women with PCOS improve their insulin sensitivity and control their menstrual cycles, but it is still unclear if it can help with infertility. Furthermore, metformin has little effect on live birth rates but may assist avoid ovarian hyperstimulation syndrome. Overall, more research is necessary to draw more definitive conclusions on the drug's effectiveness in treating infertility and its causes.

Spironolactone is generally used to treat hirsutism and acne by inhibiting testosterone levels and acting as a diuretic. It increases the levels of sex hormone-binding globulin by blocking androgen receptors and preventing the generation of adrenal steroids. In order to avoid difficulties, particularly during pregnancy, it is often advised to use it with an oral contraceptive. Menstrual abnormalities and hypokalemia are possible side effects.

6.3. HERBAL APPROACH --

Ayurvedic medicine employs a comprehensive approach to manage hormonal imbalance, combat obesity, prevent high cholesterol, and manage insulin resistance.

Some of them are:

6.3.1. ALOE VERA

Synonym- Aloe indica Royle.

Aloe barbadensis Mill.

Biological source- The biological source of aloe vera is the dried latex from the leaves of Aloe barbadensis miller.

Family- ASPHODELACEAE

It has antioxidant qualities and vitamins A, C, and E.

Water, minerals and nutrients, tannins, salicylic acids, enzymes, and a variety of polysaccharides.

Aloe vera seems to improve fertility and treat polycystic ovarian syndrome. Aloe vera gel prevented the development of the PCO Phenotype.

The aloe-vera gel formulation protects against PCOS Phenotype by restoring the ovarian steroid state and altering significant steriodogenic effect.

6.3.2. CINNAMON

Synonym-Cinnamomum zeylanicum.

Ceylon cinnamon.

Biological source-Cinnamon's biological source is the dried inner bark of trees belonging to the genus Cinnamomum.

Family- LAURACEAE

One of the greatest natural remedies for the symptoms of pcos.

Dalchini tree bark is used as a spice and has both traditional and modern therapeutic uses.

Its high fiber content helps to minimize sudden hunger and stabilize the monthly menstrual cycle.

Additionally, it improves insulin sensitivity and is useful in treating PCOS, among other health benefits. controls blood sugar levels and encourages weight loss.

6.3.3. FENNEL

Synonym-Foeniculum capillaceum.

Foeniculum officinale.

Biological source- The biological source of fennel is the dried ripe fruit of the plant Foeniculum vulgare Miller.

Family- UMBELLIFERA

It has diuretic, antipyretic, analegesic, and antioxidant properties.

The most important and common chemical constituent is transanethole, which raises estrogenic activity.

Other aromatic chemicals in fennel, such as estragole, fenchine, dianethole, photoanethole, and P-anisaldehyde, operate as physiologically active estrogenic substances.

6.3.4. TURMERIC-

Synonym-Curcumae Longae Rhizoma.

Turmeric.

Biological source-Turmeric is derived from the dried rhizome (underground stem) of the plant Curcuma longa.

Family-ZINGIBERACEA

Turmeric's bioactive ingredient, curcumin, has anti-inflammatory, antioxidant, and metabolic properties, among other possible health benefits.

Curcumin helps control blood sugar vessels and improves insulin sensitivity.

Anti-inflammatory, antioxidant, anti-hyperlipidemic, and hypoglycemic dietary additives.

6.3.5. GINGER-

Synonym-Rhizoma zingiberis.

Zingiber officinale Roscoe

Biological source-The biological source of ginger is the rhizomes (underground stems) of the plant Zingiber officinale Roscoe.

Family-ZINGIBERACEAE

B-carotene, b-coumarin acid, geranol, gingerol, curcumin, A-curcumene, gernial, neral, linalool, zingiberon, shagoal, and caffeic acid are among its constituents.

Flavonoids and phenols found in ginder are beneficial for PCOS.

It has been discovered that anti-oxidants have anti-prostaglandin properties.

Progesterone and estrogen balance is maintained by the flavanoids and phenolic components of ginger, which have their own pharmacological and physiological effects.

6.4. HOMOEOPATHIC APPROACH:-

Homoeopathic medicines generally prescribed are

- Pulsatilla
- Natrum Mur
- Sulphur
- Sepia

- Thuja
- Belladonna
- Euphrasia
- Rhus toxicodendron

Improvement has been seen around 75% approximately marked improvements.

7. CONCLUSION:-

Unusual menstrual periods, hyperandrogenism, and polycystic ovarian morphology are the hallmarks of PCOS, a prevalent endocrine condition that affects 8–13% of women globally who are of reproductive age. As of 2012, the World Health Organization estimates that 116 million women worldwide had PCOS. Numerous long-term health problems, such as infertility, cardiovascular disorders, and type 2 diabetes, are frequently brought on by this condition. The Rotterdam criteria, which demand for the presence of at least two of the three essential characteristics—polycystic ovaries, symptoms of hyperandrogenism, and irregular ovulation—are commonly used to diagnose PCOS.

PCOS is a complex etiology that includes environmental, hormonal, and genetic variables. A key factor in the pathophysiology is insulin resistance, which raises insulin and androgen levels and interferes with normal ovarian function. Hypertension and dyslipidemia are two metabolic diseases that can be brought on by this hormonal imbalance. Women who have a family history of type 2 diabetes or PCOS are more vulnerable. Weight gain, acne, hirsutism, and irregular menstruation are just a few of the many possible symptoms. The severity and appearance of the illness are also influenced by lifestyle factors like stress and food.

A mix of medicine, alternative therapy, and lifestyle changes is frequently used to treat PCOS. A balanced diet and regular exercise are two lifestyle modifications that can help control symptoms and enhance insulin sensitivity. In order to control menstrual cycles and treat hyperandrogenism, doctors frequently prescribe medications such as metformin and hormonal contraceptives. Turmeric and cinnamon are examples of herbal treatments that have demonstrated potential advantages. Although PCOS cannot be cured, customized treatments can greatly enhance quality of life and lower the chance of related health issues.

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