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A REVIEW ON PCOD IN RELATION TO HYPOTHYROIDISM

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Abstract: Hypothyroidism is caused by insufficient secretion of thyroid hormones by the complete loss of its function. Polycystic Ovary Syndrome is one of the most common endocrinopathy of women at the reproductive age. There is a significant overlap of symptoms between PCOS and Thyroid disease despite the fact that the two are different conditions. The aim of this study is to describe the complications associated with depression, anxiety, and reduced health related quality of life among women with PCOD. Ovaries are the reproductive organs of a female which controls the menstrual cycle and the production of hormones like estrogen, progesterone, Inhibin, relaxin etc. In PCOD, the hormones of a women go out of balance which creates various symptoms, including the absence of ovulation, irregular menstrual cycle, difficulty in conceiving, weight gain, acne, and hirsutism. PCOS has two phenotypes, overweight/ obese and lean. Currently, most therapy is centred on the patients primary complaint. Treatment focuses on reducing hyperandrogenism symptoms, restoring menstrual regularity, and achieving conception. Women with PCOS are at increased risk of developing cardiovascular diseases, dyslipidemia, hypertension and type 2 diabetes mellitus.

KEYWORDS: Hypothyroidism, PCOD, Hyperandrogenism, Dyslipidemia.

INTRODUCTION

HYPOTHYROIDISM

The thyroid gland either secretes inadequate amounts of thyroid hormones or ceases to function entirely, which results in hypothyroidism. Among other endocrine disorders, hypothyroidism is becoming more prevalent over time. Males experience it less frequently than females do. Women over 40 are more likely than men to get the idiopathic type of hypothyroidism. Typically, hypothyroidism is gradual and irreversible. However, treatment almost always has a 100 percent positive outcome and enables a patient to lead a perfectly normal life. (1,2,3)

CAUSES AND INCIDENCE

Many chronic or acute diseases can inhibit the release of thyroid hormones and result in hypothyroidism. About 95% of cases of hypothyroidism result from thyroid gland-related issues. The condition in these circumstances is known as primary hypothyroidism. Disorders of the pituitary gland and hypothalamus, respectively, are the causes of secondary and tertiary hypothyroidism. Only 5% of instances of hypothyroidism 4 A New Look at Hypothyroidism are secondary or tertiary in nature. Hashimoto's thyroiditis, an autoimmune disorder, and overtreatment of hyperthyroidism (an overactive thyroid), the two most frequent causes of primary hypothyroidism, are the two main contributing factors. Insufficient iodine absorption into the body can also result in primary hypothyroidism (endemic goiter). Between 1% and 2% of the population in iodine-rich areas suffer from spontaneous hypothyroidism, which is ten times more common in women than in males and more prevalent in elderly women. Hypothyroidism may result from radioiodine treatment. Primary hypothyroidism may also be caused by hereditary defects in the biosynthesis of thyroid hormones (due to defects in the accumulation of iodine by the thyroid gland or defects in the transformation of monoiodotyrosine and diiodotyrosine into triiodothyronine and thyroxine) or by hypoplasia and plasia of the thyroid gland due to defects in its embryonic development, degenerative changes, total or sub. The processes that promote the synthesis, secretion, and biological activity of thyroid-stimulating hormone (TSH) and TSH releasing hormone (TRH) fail in hypothalamic and pituitary hypothyroidism, also known as central hypothyroidism.

HYPOTHYROIDISM AND DEVELOPMENT

CONGENITAL HYPOTHYROIDISM:

Research on the function of thyroid hormones in the development of the brain has traditionally concentrated on the postnatal period and on detecting congenital hypothyroidism, which is the end result of the shortage experienced throughout the pregnancy. By administering iodated oil injections in the second part of pregnancy or in other supplemental forms, iodine deficiency during pregnancy can be prevented from increasing perinatal death and low birth weight. (4)

ENDEMIC CRETINISM:

An endemic form of cretinism brought on by an iodine deficit is the most severe neurologic condition brought on by a thyroid disorder. Iodine deficiency is, in fact, the largest avoidable cause of cerebral palsy and neurologic

disability in the world today. Since the dietary iodine shortage limits the production of healthy amounts of thyroid hormones, these people have hypothyroidism, which manifests from the moment of pregnancy. Due to the shortage occurring considerably earlier in development and resulting in decreased exposure to brain thyroid hormone both before and after the time the foetal thyroid gland develops, it is more severe than that found in congenital hypothyroidism (5).

PCOS

The most prevalent endocrine disease in women of reproductive age is polycystic ovarian syndrome (PCOS). It was originally described in 1935 by Stein and Leventhal. Depending on the used diagnostic criteria, the prevalence ranges between 5% and 15%. According to specialist society recommendations, the presence of at least two of the following three conditions—chronic anovulation, clinical or biological hyperandrogenism, and polycystic ovaries—is required for the diagnosis of PCOS. It is an exclusionary diagnosis, thus conditions that resemble the clinical characteristics of PCOS must be ruled out. These include non-classical congenital adrenal hyperplasia, hyperprolactinemia, and thyroid illness. If clinical signs point to other causes, certain individuals may require a more thorough workup.

Despite its high incidence, PCOS is underdiagnosed and generally requires many visits or diagnoses from various doctors, which typically take more than a year. For the patient, it is an extremely frustrating procedure. Delay in diagnosis can cause comorbidities to increase, making it more challenging to undertake lifestyle interventions, which are essential for improving the characteristics of PCOS and quality of life.

Infertility, metabolic syndrome, obesity, impaired glucose tolerance, type 2 diabetes mellitus (DM-2), cardiovascular risk, depression, obstructive sleep apnea (OSA), endometrial cancer, and non-alcoholic fatty liver disease/non-alcoholic steatohepatitis (NAFLD/NASH) are just a few of the numerous morbidities linked to PCOS.

ETIOLOGY

A multifactorial illness, PCOS. The pathogenesis of the illness has been linked to a number of vulnerable genes. These genes play distinct roles in androgenic pathways and degrees of steroidogenesis. According to twin studies, heritability is around 70%. The expression of these genes as well as the onset and course of the illness are both significantly influenced by the environment.

According to two well-known theories, PCOS characteristics are expressed in people who have a genetic predisposition when they are subjected to specific environmental conditions. The most prevalent environmental variables are insulin resistance and obesity. The exposure of the foetus to androgen is another theory.

Rotterdam criteria ESHRE/ASRM

Oligovulation or anovulation of PCOS: Oligovulation is defined as ovulation occurring irregularly orsporadically, and is typically associated with having 8 or fewer periods per year. A woman consistently produces an egg once a month, around halfway through her cycle, known as ovulation. (6)

Biochemical and clinical signs of hyperandrogenism Hirsutism, androgenic alopecia, and skin eruption are signs of excessive androgenism that can be clinically or biochemically detected. A clinical sign of hyperandrogenism may be hirsutism. The knowledge of how prevalent hirsutism is as a problem depends on social and ethnic groups. Upper lip, Chin, Chest, Upper back, Lower back, Upper belly, Upper arm, Forearm, Thigh, or Leg hair growth as a cause.

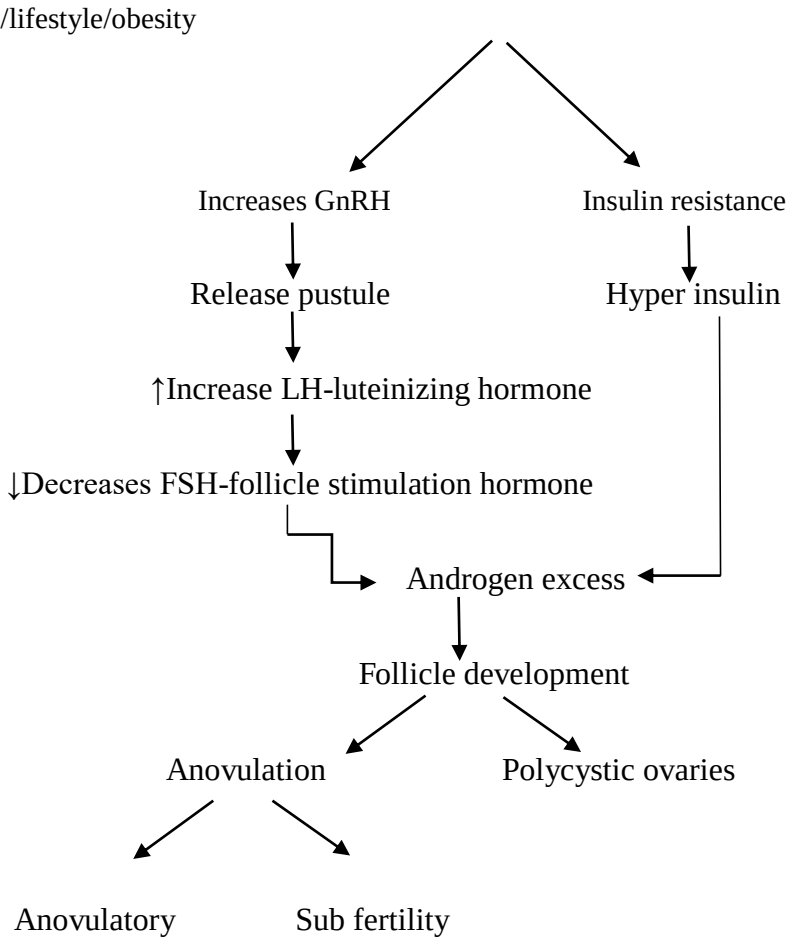
POLYCYSTIC OVARIES ON ULTRASOUND:

The most popular and widely used method for examining PCO with ultrasound is ultrasonography. The sonographic criteria have been balanced in this way, coupled with the inclusion of ovarian volume (>10 cm3) and the presence of >12 follicles within 2 to 9 mm of each other in one ovary. In addition to these requirements, other curative conditions that can result in persistent ovulation deficiency and androgen excess should also be avoided, such as hyperprolactinemia/hyperthyroidism, congenital adrenal hyperplasia, traditional and unrecognised structure, Cushing's disorder, and secretory ovarian tumour of adrenal androgens.

THE AMSTERDAM ESHRE/ASRM:

The most recent examples of two out of the three requirements being present are: polycystic ovary and menstrual irregularity; hyperandrogenism and hyperandrogenism; and an ultrasound revealing a polycystic ovary.

Polycystic Ovarian Syndrome of Pathophysiology:[7]



The most common pathology seen in older women is polycystic ovary disease. In 1935, Stein and Leventhal outlined it for the first time. It is necessary to cut off shared and vital in clinical practise due to the heterogeneity of clinical introduction, eccentricity of signs in completely different age groups, and covering of instrumental and research office symptomatic criteria with physiological circumstances. PCOS pathophysiology: Anovulation: Through endometrial releases, anovulatory women produce less progesterone and more oestrogen, which raises the risk of endometrial cancer.

The main causes of PCOS include genetic predisposition, lifestyle, and environmental factors. increased insulin, androgen, and oestrogen levels irregular periods, a weakened immune system, unhealthy food, hormonal discomfort, and inflammation.

COMMON SYMPTOMS FOR PCOS PATIENTS:

Some women begin to experience symptoms right before the beginning of their menstruation. Others don't find out they have PCOS until they've put on a lot of weight or struggled to conceive. PCOS is a hormonal issue that affects women between the ages of 15 and 44 who are planning to have children. Up to 70% of PCOS-positive women were undiagnosed. The reproductive organs that generate the hormones oestrogen and progesterone, which control the menstrual cycle, are affected by PCOS in a woman's ovaries. A limited quantity of androgens, which are male hormones, are also produced by the ovaries. The ovaries release eggs that a man's sperm can fertilise. Ovulation refers to the monthly release of an egg. Ovulation is regulated by the hormones luteinizing and follicle-stimulating (FSH and LH). The ovary is stimulated by FSH to generate an egg. Ovulation is regulated by the hormones luteinizing and follicle-stimulating (FSH and LH). The ovary is stimulated by FSH to create a follicle, a bag that houses an egg, and is subsequently prompted by LH to release a mature egg. A "syndrome" or collection of symptoms known as PCOS affects the ovaries and ovulation. the following three characteristics:

- Cysts in the ovaries
- High levels of male hormones
- Irregular or skipped periods

In PCOS, the ovaries develop a large number of tiny sacs filled with fluid. "Many cysts" is what the word "polycystic" refers to. Each of these sacs is actually a follicle that houses an immature egg. Never do the eggs get old enough to start ovulation. Oestrogen, progesterone, FSH, and LH concentrations change when there isn't an ovulation. While androgen levels are greater than typical, oestrogen and progesterone levels are lower than usual. Women with PCOS get fewer periods than usual because excess male hormones interfere with the menstrual cycle.

OTHER SYMPTOMS:

a) Improper periods: A lack of ovulation prevents the uterine lining from shedding every month. Some women with PCOS get fewer than eight periods a year.

b) Heavy flow: The uterine lining builds up for a longer period of time, so the periods you do get can be heavier than normal.

c) Growth of hair: More than 75% of women with this condition grow hair on their face and body including on their back, belly, and chest. Excess hair growth is called hirsutism.

d) Acne: Male hormones can make the skin oilier than usual and cause breakouts on areas like the face, chest, and upper back.

e) Darkening of the skin: Dark patches of skin can form in body creases like those on the neck, in the groin, and under the breasts.

f) Headaches: Hormone changes can trigger out headaches in few women.

PCOD affects body by following ways: Having higher than normal androgen levels can affect your fertility and other aspects of your health.

Infertility.[8]

Weight gain.

Metabolic syndrome.

Sleep aponia.

Cancer.

Insulin resistance.

Inflammation.

COMPLICATIONS ASSOCIATED WITH PCOD

A wide variety of symptoms, showing up in different combinations, are seen in women with PCOD. Anovulation, weight gain or obesity, acne vulgaris, androgenic alopecia, increased androgen production, menorrhagia, oligomenorrhagia, hirsutism, subfertility or infertility, and insulin resistance are a few of these (9,10). In addition, new evidence links metabolic disorders and illnesses like PCOS to an increased risk of endometrial cancer(11,12) (e.g., type 2 diabetes, cardiovascular disease, dyslipidaemia, and hypertension). Additionally, mucus accumulation, salt retention, and accelerated weight gain are all caused by hypothyroidism.

One of the underlying causes behind the metabolic symptoms of this syndrome, such as an elevated risk for obesity, dyslipidemia, glucose intolerance, and chronic cardiovascular disease, is insulin resistance. (CVD). Additionally known CVD risk factors include depression and anxiety disorders. Recent research found that women with PCOS had a four times higher likelihood of having depression symptoms than age-matched control women. Mood disorders and anxiety disorders are frequently linked, particularly generalised anxiety disorder (GAD). For women evaluated in the primary care environment, the estimated prevalence of anxiety disorders ranges from 5% to 8%. When it manifests without any discernible trigger or when the experience does not call for such a response, abnormal or inappropriate anxiety can become a problem.

Numerous characteristics of this condition, including hirsutism, acne, obesity, irregular menstruation, and trouble getting pregnant, have a detrimental effect on health-related quality of life (HRQOL) and may raise the risk of mood disorders.

Measures;

1.Body mass index.

2.Mental health measures.

3.Quality of life.

According to a study on PCOD complications, 78% of women experience irregular menstrual cycles, 68% gain weight, 44% develop hirsutism, 36% experience anxiety, 32% develop acne and acanthosis nigricans, 22% experience hair loss, 16% experience infertility and depression, 10% have abnormal TSH levels, and 6% have had abortions in the past. Patients with PCOD who were younger than the age of 22 to 26 were more likely to experience problems, according to the study.

RISK FACTORS ASSOCIATED WITH PCOD

PCOS is of clinical and public_health importance as it is very common, affecting 116 million women worldwide in 2012 according. This syndrome exhibits a PCOS is of clinical and public_health importance as it is very common, affecting 11 million women worldwide in 2012._PCOS is of clinical and public health importance as it is very common, affecting 116 million women worldwide in 2012 according to WHO[13]. This syndrome exhibits a variety of symptoms including oligomenorrhoea, hirsutism, obesity, acne, and infertility[14] all of which are not necessarily present in one woman. It is a multifaced disease arising from hereditary, non-hereditary intra and extra uterine environmental influences. The exact pathophysiology of PCOS is complex and remains largely unclear. Due to these different diagnostic criteria, there can be many potential phenotypes 2 and resulting in fewer prevalence studies in the community. There may be several possible phenotypes as a result of these various diagnostic criteria, which leads to a dearth of population prevalence research.

Due to the irregular menstrual cycles of the majority of teenagers, PCOS may present itself in adolescence but may not be detected at that time, leading to a much later diagnosis in adulthood. To enhance the quality of life and offer proper therapy, it is necessary to identify young women who are at risk of having PCOS. In this study, the prevalence of PCOS was discovered to be 21.05%, which is greater than the prevalence reported in earlier Indian studies, which revealed prevalences of 8.1%(14) in a study conducted in south India and 10.97% in a study conducted in Andhra Pradesh (15). The fact that most of the pupils in this survey live in metropolitan areas may account for the increased prevalence. The metropolitan population's sedentary lifestyle, access to high-calorie foods, and use of machines for all domestic chores all contribute to the increased incidence. A positive family history of diabetes mellitus is reported for 58.3% of the students who had PCOS verified in this research. Due to the etiological relationship between PCOS and insulin resistance and the fact that India has been dubbed the "Diabetic Capital of the World," a greater incidence may be anticipated (16).

POLYCYSTIC OVARY SYNDROME AND HASHIMOTOS THYROIDITIS

Elevated thyroid autoantibodies are a hallmark of Hashimoto's thyroiditis (HT), which results in varying degrees of thyroid dysfunction. Due to lymphocytic infiltration and thyroid fibrosis, thyroid ultrasounds exhibit hypoechogenicity. Numerous studies have shown a connection between HT and recurrent miscarriage, pregnancy

loss, and PCOS, but the negative consequences of thyroid autoantibodies in women of reproductive age remain a significant issue (17,18). PCOS patients may also have abnormal thyroid hormone levels. Thyroid hormone disruption in PCOS adds to the clinical picture's complexity and may have a substantial impact on comorbidity. Every year, there are more cases of PCOS. It is becoming more well understood that PCOS and autoimmune thyroid disease are related as the frequency of endocrinological illnesses rises. However, the explanation for this link is still unknown, and its precise nature has not yet been clarified.

Comparing the PCOS and HT groups to the control group, we found a statistically significant rise in ovulatory dysfunction as well as blood levels of testosterone and LH. In comparison to the control group, both illness groups had higher BMIs, fasting glucose levels, and prevalences of ovulatory dysfunction, hirsutism, and acne. Despite the fact that the differences were not statistically significant, TSH levels were greater in the PCOS group than in the control group in this research while fT4 levels were lower.

According to the study, HT and PCOS are clearly related. One of the two disorders may make the other more common, according to the literature, which contains enough data to support this claim. Because both illnesses' etiologies are complicated, the relationship between them is still uncertain. The two illnesses may have developed as a result of autoimmune susceptibility, according to our theory. The prevalence of TPOAb and TgAb is greater in PCOS individuals, according to our data. Additionally, our findings imply that people with PCOS and HT should have their thyroid and ovaries checked in later life.

HYPOTHRODISIM IN RELATION WITH PCOD

TSH, T3, T4, FSH, LH, and the prevalence of TSH, LH, and E2 are all considerably greater in this study's sample than they are in healthy women. FSH and T3 levels in polycystic ovarian syndrome were virtually normal. In contrast to the healthy control group, the T4 level in PCOS sufferers significantly reduced. According to the results, hypothyroidism was present in PCOS individuals, as evidenced by elevated TSH and LH to FSH ratios. A few of the clinical signs of PCOS are oligomenorrhea, infertility, acne, hirsutism, and obesity. These individuals also have a higher chance of developing endometrial cancer, poor glucose tolerance, diabetes, and cardiovascular disease. They may also develop a variety of other linked endocrine and metabolic illnesses.

The three main features of PCOS are as follows. When there are too many androgens, such as androstenedione, DHT, or testosterone, it is referred to as hyperandrogenism. Hirsutism (excessive hair growth), acne, androgenic alopecia (male pattern baldness), and virilization are examples of clinical symptoms of hyperandrogenism (the development of male characteristics). Another sign of PCOS is oligomenorrhea, also known as amenorrhea. Amenorrhea is the lack of a monthly cycle, whereas oligomenorrhea refers to irregular menstruation. The imbalance in hormones is what causes these illnesses.

Although the exact cause-and-effect relationship between PCOS and thyroiditis is still unknown, our study's findings that PCOS is more common and that serum TSH levels in PCOS patients are significantly higher than those in the control group suggest that the condition may be an autoimmune disorder and that hypothyroidism and PCOS are closely related. Therefore, it will be beneficial to administer thyroid hormone replacement treatment and to frequently check thyroid function in PCOS patients.

THYROID DISORDERS IN WOMEN WITH POLYCYSTIC OVARY SYNDROME

Although the specific processes of PCOS are yet unknown, genetic factors may play some sort of part. There is scant evidence of familial aggregation of hyperandrogenaemia among the first-degree relatives of PCOS patients, either with or without oligomenorrhoea (19). All secondary causes, such as androgen-producing tumours, hyperprolactinemia, and congenital adrenal hyperplasia with adult onset, should be ruled out when making the diagnosis. There are several types of thyroid problems, which may be identified by three criteria: oligo/anovulation, hyperandrogenism, or polycystic ovaries on ultrasonography. These conditions can result from thyroid hormone excess (PCOS), hypothyroidism, or hypothyroidism, respectively. Thyroid issues and PCOS have long been associated with one another. The female reproductive system is impacted by thyroid hormones in a variety of ways. Ovarian enlargement, cyst production, and hypothyroidism are all associated to PCOS and are the most common thyroid abnormalities. Although hormonal and other biochemical abnormalities are not present in hyperthyroidism or hypothyroidism, these two illnesses can both lead to monthly irregularities and reduced fertility.

Globally, thyroid problems are the most prevalent endocrine system illness; overt and subclinical hypothyroidism prevalence rates have been found to vary from 3.5 to 4.2% and 8.02 to 19.3%, respectively. Alterations in the body's metabolic functions have been linked to a lack of thyroid hormones at the peripheral tissues. Their shared existence may have an impact on one another's clinical manifestations, which may then have an impact on how the illness develops and is treated. Thus, it was decided to investigate the blood levels of thyroid stimulating hormone (TSH), Ft4, and their variations with obesity, insulin resistance, and LH:FSH ratio in PCOS-affected women. This research was done in Contraception, Obstetrics and Gynecology.

Females with PCOS are more likely than non-PCOS females to have thyroid abnormalities, and both conditions can present with a variety of comparable clinical symptoms. Significant positive connection between TSH levels and BMI has been seen in females with PCOS. The impact of thyroid dysfunction on insulin resistance, however, is not well understood.

THYROID FUNCTION TESTS ABNORMALITIES IN POLYCYSTIC OVARIAN SYNDROME

A variety of metabolic pathways can change as a result of thyroid disease. Early thyroid dysfunction can cause ovulation and endometrial receptivity to vary subtly, which may have a significant impact on fertility. If left untreated, it may delay puberty's start and lead to anovulatory cycles. Even mild hypothyroidism can have a negative impact on fertility. It is therefore clear that both of these conditions—PCOD and thyroid dysfunction—have a variety of similar manifestations and both have a significant impact on fertility and reproductive biology. More intriguingly, hypothyroidism can start, continue, or exacerbate PCOD (20). To evaluate the status of the ovaries and the existence or absence of numerous cysts, a gynaecological ultrasound was performed.

According to our study, PCOD patients have a significant percentage of thyroid malfunction. We discovered that subclinical (26.6%) or clinical (20%) hypothyroidism was present in 46.6% of the patients. Although none of the

cases had hyperthyroidism. High anti-thyroid peroxidase levels in PCOS patients are thought to be directly related to elevated oestrogen and the estrogen/progesterone ratio, according to research. Thyroid abnormalities in PCOS are thought to be caused by both hereditary and environmental causes. Ovaries that resemble PCOS and an overall worsening of PCOS and IR are both documented effects of hypothyroidism. Because of anovulatory cycles, progesterone levels are almost nonexistent in PCOS, which usually balances estrogen's immune-stimulating activities. Thyroid dysfunction is particularly common in people with PCOS. All patients with POCS should be screened for thyroid dysfunction.

RELATIONSHIP OF HYPOTHYRODISM IN OBESITY AND LEAN PATIENTS IN PCOS

Increased metabolic and cardiovascular risk factors, such as obesity, are linked to PCOS. Obesity is a common finding in PCOS, aggravates many thyroid problems, and has specific effects on menstrual cyclicity and hormonal abnormalities that lead to anovulation, infertility, and hyperandrogenism. Thyroid disorders are more prevalent in women than in males. Among the most frequent endocrine abnormalities seen in PCOS are insulin resistance (IR) and hyperandrogenism.

Over 50% of PCOS patients also have IR, hyperglycemia, weight gain, and metabolic syndrome (MBS). Due to concomitant dyslipidaemia, elevated levels of sex hormone binding globulin (SHBG), and hyperglycemia, hypothyroidism also presents a similar appearance. Notably, hypothyroidism has also been associated with cystic alterations and increased ovarian mass. Two aspects add intrigue to the situation: first, they both have distinct etiopathologies; and second, thyroid disorders are allegedly more prevalent in PCOS sufferers. The altered FSH/LH ratio and elevated dehydroepiandrosterone (DHEA-S) levels are brought on by hypothyroidism as a result of elevated thyrotropin releasing hormone (TRH). Furthermore, excess thyroid stimulating hormone (TSH) stimulates the FSH receptor.

We have observed that the majority of PCOS patients are overweight, and there is no association between obesity and overweight or hypothyroidism in PCOS patients. All PCOS patients are at risk for developing cardiovascular and metabolic problems if they have insulin resistance, but those who are obese are more prone to developing these risks in the future due to the existence of obesity. Therefore, such patients should get counselling and recommendations for thorough lifestyle improvement.

LEAN POLYCYSTIC OVARY SYNDROME (PCOS)

A small but considerable fraction of PCOS patients arrive with a normal body mass index, which makes the diagnosis process and therapeutic approach more challenging, despite the fact that the majority of cases are obese or overweight. These situations are known as lean PCOS. Before the physicians can develop effective therapeutic strategies in such patients, other endocrine and genetic illnesses with a similar clinical picture must be ruled out. In around 80% of cases, PCOS is accompanied with hyperandrogenism, polycystic ovaries, and IR, as well as BMI levels that are above normal or high. Until they have reproductive issues as adults, these people frequently

go undetected. Women with PCOS who have normal or low BMIs and may or may not have symptoms like irregular menstrual periods and acne make up a smaller but noticeable fraction of the population.

Caloric limitations are not necessary for thin women since weight loss may not always be necessary. Lean PCOS women should strive to maintain their weight, not lose it. Among other positive impacts on PCOS symptoms, lifestyle changes including dietary changes and regular exercise have improved insulin resistance and reduced hyperandrogenism. [62–64] To ensure they are getting an appropriate quantity of different minerals, vitamins, and nutrients, lean persons with PCOS must be encouraged to eat vegetables and fruit.

Recent studies have shown that lean PCOS suffers from metabolic, hormonal, and hematopoietic abnormalities, albeit they are comparable to or less pronounced than those affecting the obese phenotype. Regardless of BMI, insulin resistance is a part of PCOS and has to be treated right away. In terms of controlling the lean phenotype, the results are encouraging. A successful pregnancy is more likely with lifestyle changes, pharmaceutical measures to restore ovulation, and even IVF in circumstances when other treatments have failed. To develop treatment strategies for the lean subgroup of women with this puzzling illness, well-designed RCTs involving women from certain ethnic and age demographics are necessary.

INSULIN RESISTANCE AND CARDIOVASCULAR RISK IN HYPOTHYRODISM WITH PCOD

Anovulation, infertility, and hyperandrogenism are the results of the many menstrual and hormonal abnormalities that make up polycystic ovarian syndrome (PCOS). Among the most frequent endocrine abnormalities seen in PCOS are insulin resistance (IR) and hyperandrogenism. More than half of PCOS patients also have insulin resistance (IR), hyperglycemia, weight gain, and metabolic syndrome (MBS). Due to concomitant dyslipidaemia, elevated levels of sex hormone binding globulin (SHBG), and hyperglycemia, hypothyroidism also presents a similar appearance. Notably, hypothyroidism has also been associated with cystic alterations and increased ovarian mass. Increased levels of dehydroepiandrosterone (DHEA-S) and changed FSH/LH ratio are both effects of hypothyroidism brought on by elevated thyrotropin releasing hormone (TRH). Additionally, too much thyroid stimulating hormone (TSH) stimulates the FSH receptor.

According to our study's findings, PCOS is linked to a higher frequency of thyroid problems than the general population, particularly SCH. When compared to healthy control participants, PCOS subjects had considerably greater levels of the cardiovascular risk factors hypertension, dyslipidaemia, and IR. In addition, it was discovered that PCOS participants with SCH had considerably greater levels of these risk variables than euthyroid PCOS subjects, with the exception of hypertension. Furthermore, it was shown that other biochemical parameters of the PCOS patient, with the notable exception of the lipid profile, are not significantly affected by the SCH status.

DISTRUBED STRESS RESPONSE IN WOMEN WITH POLYCYSTIC OVARY SYNDROME

Additionally, PCOS is linked to psychological issues such chronic stress, sadness, social anxiety, and a worse quality of life(21), which are important for a number of reasons. It goes without saying that clinical attention and

the proper therapy are needed for psychiatric comorbidity. Additionally, psychological variables may have a role in the initiation, maintenance, and advancement of fat accumulation(22) and, thus, may obstruct weight reduction, a crucial therapy objective, particularly when it comes to lowering cardiovascular risks in obese PCOS patients. Last but not least, research from a variety of patient groups indicates that depressive and chronic stress symptoms can be risk factors for cardiovascular morbidity and mortality as well as T2DM, particularly when combined with other risk factors and/or pre-existing morbidity.

Long-term stress has been linked to an elevated risk for incident coronary heart disease in prehypertensive people, and acute stress responses are further changed in those with depression, anxiety, and chronic stress. However, it is clear that PCOS women are defined by several risk factors for cardiovascular diseases and T2DM at a very early age, including the metabolic, hormonal, and psychological aspects of the diagnosis. Although equivalent data have not yet been collected in PCOS patients. These are the first results addressing the acute psychosocial stress neuroendocrine and immune cell responses in PCOS in comparison to age- and BMI-matched healthy women. The primary conclusions were that PCOS women showed significantly larger elevations in the HPA-axis mediators cortisol and ACTH in response to public speaking stress, a much more dramatic rise in heart rate, and impaired up-regulation of IL-6. These results appeared regardless of metformin administration and were not attributed to group differences in the emotional stress response. PCOS patients released significantly more ACTH and cortisol in reaction to the stress of public speaking, which was evidently not due to individual variations in the emotional stress response.

DIETARY OPTIONS IN POLYCYSTIC OVARY SYNDROME (PCOS)

From adolescence through postmenopausal age, PCOS's clinical characteristics might change and are complex and intricate. This suggests a crucial element in assessing PCOS over the course of a person's life and suggests that the condition itself may not be a hyperandrogenic disorder that is just relevant to young, fertile women but may also have long-term health effects.

ROLE OF DIET IN MANAGEMENT OF PCOS:

A balanced diet and lifestyle changes that allow for weight loss in people of all ages are the first line of treatment for overweight women with PCOS, whether or not they have insulin sensitivity. Lifestyle management includes maintaining a healthy weight, participating in regular exercise, and eating a balanced diet. The most favourable dietary macronutrient composition with other dietary approaches, such as low-glycaemic index, low-glycaemic load, high-protein, low-carbohydrate, high monounsaturated fatty acids (MUFA) diets or modified fatty acids diets to improve the insulin resistance and obesity, is the main focus of many studies when assessing a relationship between diet and PCOS. More study is required in this area, but it is thought that these predicted diets may have more favourable hormonal effects or be more successful in helping PCOS patients lose weight and keep it off in the long run.

The recommended macronutrients for the general population are high-carbohydrate (between 50 and 60 percent), moderate-protein (between 15 and 30 percent of energy), and moderate-fat (between 30 and 30 percent of energy, with saturated fat making up about 10 percent of total fat and less than 300 milligrammes of cholesterol daily).

Increased consumption of fibre, fruits, vegetables, whole-grain breads, and cereals is also advised, as is regular exercise. 26,36 There is yet no clear nutritional composition or advice for the treatment of PCOS-related hormonal, metabolic, reproductive, and psychological issues, for long-term weight reduction and type 2 diabetes, cardiovascular disease, and certain hormone-dependent malignancies prevention. Polyunsaturated Omega-3 fatty acids (n-3 PUFAs) Increased consumption of omega-3 PUFAs, particularly ALA, EPA, and DHA, appears to be the most common strategy for treating PCOS in both obese and non-obese individuals, according to recent research. Nuts, notably walnuts, nut butters, and seed oils all contain omega-3 polyunsaturated fatty acids (n-3 PUFAs). Fatty fish also contains these acids.

A hypocaloric diet and altered carbohydrate intake have been proven to be efficient. Patients with PCOS may benefit from choosing meals with low glycaemic load (GL) and high fibre content and swapping their saturated fats for polyunsaturated fats. Regarding the ideal nutritional composition or general recommendations for the management of weight loss and weight maintenance in such individuals, there are significant differences in the study literature. There have been studies on a number of dietary strategies for PCOS, but definitive evidence-based clinical practise recommendations need to be created.

RECENT ADVANCES IN THE MANAGEMENT OF POLYCYSTIC OVARY SYNDROME

CLOMIPHENE CITRATE IS A SELECTIVE ESTROGEN RECEPTOR MODULATOR (SERM)

Clomid citrate (CC) is the drug of choice for ovulation induction in polycystic ovarian syndrome in adolescents(23). By inhibiting estrogen receptors in the hypothalamus, CC works as an anti-estrogen, increasing the pulse width of gonadotropin-releasing hormone (GnRH) in the anterior pituitary as well as an increase in follicle-stimulating hormone production (FSH). Luteinizing hormone (LH) is a hormone that aids in the development of follicles. CC is usually given for five days between the second and fifth days of the period, commencing at 50 mg per day and rising progressively to 150 mg per day. CC can be administered in tandem with metformin for women with PCOS resistant to CC. But around 30% of successful pregnancies are brought on by clomid. Ovarian enlargement, hyperstimulation syndrome, multiple pregnancies, hot flushes, gas, bloating, and exhaustion are a few of the side effects (24).

AROMATASE INHIBITORS (AI) LETROZOLE

The enzyme aromatase converts androgens to oestrogen. The most popular non-steroidal selective AI for inducing ovulation in the third generation is letrozole. Letrozole prevents the release of ovarian estradiol. When the pituitary secretes more FSH, the sensitivity of the follicles to it increases, increasing the ovulation rate. This results from the release of negative feedback by the hypothalamus and a brief increase in androgens in the ovary.

GONADOTROPINS

Treatment with gonadotropins for PCOS sufferers who are anovulating. Consider this as a second-line option, such as AI and SERM, for patients who have not responded to first-line oral ovulation stimulation medications.

INSULIN SENSITIZING AGENTS

Individuals with PCOS have abnormal insulin secretion and function. Patients with PCOS have long been known to have elevated testosterone levels as a result of hyperinsulinemia and insulin resistance. Insulin regulates ovarian function, and high insulin levels can be harmful to the ovaries. Acanthosis nigricans is a typical indicator of insulin resistance. Long-term insulin resistance may result in harmful systemic consequences. As a result, PCOS therapy must include medication and lifestyle adjustments to address insulin resistance (25).

METFORMIN

Biguanide medicine metformin has been shown to be both secure and efficient. Metformin has long been used to treat type 2 diabetes and is one of the most often utilised insulin sensitizers in the treatment of PCOS, despite the fact that it is still an authorised usage. By reducing hepatic glucose synthesis, increasing glucose absorption, and lowering hepatic glucose generation, metformin increases insulin sensitivity in peripheral tissues. Abdominal distension, nausea, vomiting, and diarrhoea are a few of the adverse effects of metformin. Patients with PCOS are more prone to develop type 2 diabetes or prediabetes (26).

INOSITOL

A dietary supplement called inositol helps insulin signalling. Its function in controlling the metabolic and biochemical elements of PCOS is not fully understood. Menstrual cycles and ovulation can be improved, claims a recent research. Inositol has little benefits, therefore this suggestion recommends against using it, but it also has a minimal risk of side effects and is inexpensive.

STATINS:

One of the most important indicators of cardiovascular risk is dyslipidaemia, which is characterised by high LDL-C, triglycerides, and low HDL-C in PCOS women. Therefore, an effective PCOS therapy would involve lowering the risk of cardiovascular disease and raising the lipid profile. It has been demonstrated that statins can aid in the treatment of PCOS. A statin, often referred to as atorvastatin, Fluvastatin, Pravastatin, Rosuvastatin, and Simvastatin, is a medication that stops the production of cholesterol.

ANTIANDROGENS:

For PCOS patients, spirolactone, flutamide, and finasteride are antigens that lessen hirsutism and acne issues. These antigens may help those whose lipid levels are elevated, which is common in PCOS.

ORAL CONTRACEPTIVES

The main mechanism of action of OCs in the treatment of PCOS is to regulate menstruation. These medications also lower testosterone levels, which reduces hirsutism, acne, and hirsutism. The most popular OCs used to treat hirsutism and acne brought on by PCOS are oestrogen and progestogen combos.

MEDROXYPROGESTRONE ACETATE

It can be used to treat PCOS in people who are unable to conceive but are not at risk of pregnancy, amenorrhea, or irregular uterine bleeding (MPA). Monthly progestogen treatment reduces ovarian androgen production, but not aberrant endometrial growth. Additionally, MPA enhances PCOS patients' lipid profiles and insulin sensitivity (27).

VITAMIN D:

Insufficient or inadequate vitamin D affects 45–90% of women of reproductive age. According to studies, vitamin D deficiency was linked to a significant decrease in the likelihood of a live birth, pregnancy rate, and ovulation rate in PCOS women receiving ovarian stimulation for infertility (28,29). Medication containing vitamin D may be helpful for those with polycystic ovarian syndrome, ovulation dysfunction, and metabolic diseases. Randomized, prospective, and controlled trials are necessary to draw definitive findings about the impact of vitamin D supplementation on female reproductive health (30).

Life style modification in PCOD:

PCOS is a complex hormonal, metabolic, and psychological disorder with numerous clinical presentations. It is one of the most common reasons for infertility. Before contemplating any pharmaceutical options, lifestyle changes should be considered the primary therapeutic prescription for PCOS-related infertility. According to current research, PCOS increases the risk of endometrial cancer in women of all ages, although it has no effect on the risk of ovarian or breast cancer. These findings point to the possibility of gynaecological cancer morbidity as a result of PCOS.

A menstrual cycle is counted from the first day of a period to the first day of the next. The average menstrual cycle is 28 days, but it can vary from person to person and month to month. Your periods are still considered regular if they come every 24 to 38 days. Your periods are considered irregular if the time between periods keeps changing and your periods come earlier or later. Treatment depends on finding out what's causing your irregular periods, but there are remedies you can try at home to get your cycle back on track.

1. Practice yoga

Yoga may be an effective treatment for different menstrual issues. It has also been shown to reduce menstrual pain and emotional symptoms associated with menstruation, such as depression and anxiety, and improve quality of life Trusted Source in women with primary dysmenorrhea. Primary dysmenorrhea is a condition that causes extreme pain before and during menstrual periods.

2. Maintain a healthy weight

Changes in your weight can affect your period. If you're in a larger body, losing weight could help regulate your periods Trusted Source. Alternatively, extreme weight loss or being underweight can cause irregular menstruation. That's why it's important to maintain a moderate weight.

3.Exercise regularly

Exercise has many health benefits that can help your periods. It can help you reach or maintain a moderate weight and is commonly recommended as part of a treatment plan for polycystic ovary syndrome (PCOS). PCOS can cause menstrual irregularity.

***4. Spice things up with ginger*:**

Ginger is used as a home remedy for treating irregular periods, but there isn't any scientific evidence to show that it works. However, ginger does seem to have other benefits related to menstruation, primarily related to relieving pain.

5. Add some cinnamon

Cinnamon appears to be beneficial for a variety of menstrual issues. It has also been shown to significantly reduce menstrual pain and bleeding, and relieve nausea and vomiting associated with primary dysmenorrhea. Cinnamon is generally regarded as a safe and effective natural treatment for young women with primary dysmenorrhea.

6. Get your daily dose of vitamins for a healthy period

Vitamin D is often added to some foods, including milk and other dairy products and cereal. You can also get vitamin D from sun exposure or through supplementation. B may also lower the risk of premenstrual symptoms.

7. Eat pineapple

Pineapple is a popular home remedy for menstrual issues. It contains bromelain, an enzyme that is claimed to soften the lining of the uterus and regulate your periods, though this hasn't been proven.

SUMMARY: polycystic ovary syndrome is one of the most common endocrinophathy of women at the reproductive age. A number of women with polycystic ovary syndrome may also have an underactive thyroid gland. PCOD is associated with multiple causes, and is also associated with psychological problems, including chronic stress, depression, social fears, and reduced quality of life. Before contemplating any pharmaceutical options, life style changes should be considered the primary therapeutic prescriptions for PCOS.

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