

Why PCOS become very common diseases today?

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Abstract: PCOS is a multisynndrome which is occurred due to hormonal imbalance such as androgen, estrogen, progesterone, gonadotropins releasing hormone FSH and LH. PCOS is responsible for ovulatory dysfunction, cysts in ovaries, irregular menstruation cycle, complications in pregnancy, obesity, diabetes, inflammation, sleep apnea, endometrial cancer, mensuration issues like oligomenorrhea, amenorrhea, hypermenorrhea, menorrhagia, infertility, anovulation, acne, hirsutism. There are many reasons behind that increase the risk of PCOS such as hyperandrogenism, insulin resistance or hyperinsulinism, obesity, regular use of contraceptive pills. Hyperandrogenism disturb gonadotropins secretion which leads to ovulatory dysfunction, block folliculogenesis, formation of polycystic ovaries, and stop conversion of androgen into estrogen. This condition occur due to hypertension, depression, Frank virilisation, rise in insulin level in body. Insulin resistance or Hyperinsulinism which cause adverse effect on glucose metabolism, steroidogenesis, cell growth, fat accumulation, suppress sex hormone binding globulin (SHBG) that cause androgen synthesis, hinder oocyte maturation and reproductive cycle. This condition develops due to obesity, physical inactivity and sedentary lifestyle. Other lifestyle factors such as working women avoid breakfast, failed in proper food selection, lots of stress, addiction of alcohol, sleep also matter. Obesity play a significant role in developing PCOS indirectly by evokes the insulin resistance, infertility, abnormal estrogen production; inhibit aromatization of androgen to estrogen and maturation of follicles development. This condition develops by high caloric diets, reduced exercise, behavioural guidness, lack of nutritional diet, aggressive marketing, certain medications like antidepressants. Regular use of contraceptive pills cause hormonal imbalance in body. Contraceptive pills are made up of synthetic version of estrogen and progesterone. Contraceptive pills cause estrogen level high throughout the cycle so the estrogen stimulate high LH which synthesis androgen and low level of FSH inhibit folliculogenesis. All these are very common cause that increase the risk of PCOS.

Key Words: PCOS, Contraceptive pills, Hyperandrogenism, Insulin resistance, Obesity.

1. INTRODUCTION:

Polycystic ovary syndrome is a endocrine hormonal disorder which develops due to enlargement of ovaries, development of rapid and symptomatic ascites, intravascular contraction, hypercoagulability and systemic organ dysfunction, irregular mensuration cycle, infertility, anovulation. This develops due to hormonal imbalance such as androgen, estrogen, progesterone, gonadotropin releasing hormone FSH and LH which cause ovulatory dysfunction, cysts in ovaries, irregular menstruation cycle, acne, hirsutism, complications in pregnancy, obesity, diabetes, inflammation, sleep apnea, endometrial cancer, mensuration issues like oligomenorrhea, amenorrhea, hypermenorrhea, menorrhagia.

Today it become very common problem in females and more than 1 million females are affected from this disease in India or 1 female out of 10 affected from this disease. It affects the age of 15 to 44 years. There is many reason behind PCOS such as hyperandrogenism, insulin resistance, obesity, regular use of contraceptive pills and all these factors play a vital role in increasing the risk of PCOS. It is diagnosed by ultrasound to check abnormal follicles and any problem with ovaries and uterus, blood test to check the androgen, estrogen progesterone, Cholesterol, insulin, triglycerides level and pelvic exam. It is treated by common medical treatment such as metformin, clomiphene, birth control pills, Eflornithine, surgery. It's very important to know about how our lifestyle, diet, hypertension, depression, environment etc. of our life affect it very badly so it increases day by day.

1.1. STUDY: Why PCOS become very common diseases today?

1.1.1. Hyperandrogenism: Hyperandrogenism mean excess androgen secretion which cause ovulatory dysfunction due to disruption of gonadotrophins secretion or from a direct effect on the hypothalamic pituitary ovarian axis on which depends aromatization to estrogen. It inhibits follicle development at ovarian level which causes accumulation of multiple small cysts within ovarian cortex. This pathogenic condition is called polycystic ovary or polycystic ovarian syndrome. The ovary has intermediate and arterial follicle of 2-5 mm in diameter result polycystic which is the sign of dysfunctional follicular development. Ovary become thickened and collagenisation of the tunica albuginea and paucity

of corpus luteum, basal membrane thickening and rises number of follicles in different stages of development and atresia and stromal or thecal hyperplasia. Increased folliculogenesis cause rise in AMH production by polycystic ovaries that rise in follicle count. The different stage of atresia leads to deficiency in granulosa cells and predominance of theca or stromal cells which is responsible for luteinisation. It also inhibits premature luteinisation that hinder ovulation by impairing selection of dominant follicles. 80 to 85% of women suffering from with PCOS due to excess androgen.

Hyperandrogenism cause dysregulation of 11 beta hydroxysteroid dehydrogenase which cause inactivation of cortisol in follicle which result block of folliculogenesis. When the testosterone and androstenedione concentration become abnormal which result libido and abnormal changes in the genitalia and changes in concentration of FSH and LH secretion increased acne, body and facial hair and it also associate with obesity, hypertension, amenorrhea, ovulatory dysfunction which disturb menstrual cycle. Ovulatory dysfunction leads to oligo ovulatory infertility. It is also responsible for abnormalities in other intrinsic factor like inhibin, activin, follistatin which modulate ovarian LH response dysfunction uterine bleeding. It amplified steroidogenic capacity of theca cells which decline FSH responsible for aromatase activity of granulosa cell which is very important for stages of follicular development. Hyperactivity of steroidogenic disturbs intraovarian processes that coordinate ovarian androgen and estrogen secretion. Hyperandrogenism play a great role in increase risk of PCOS due to hypertension, depression, frank virilisation, and rise in insulin level is very common today.

2. Insulin resistance or Hyperinsulinism:

Insulin resistance or hyperinsulinism exerts various effects on female ovary. It suppress the hepatic generation of sex hormone binding globulin (SHBG) which cause excess androgen secretion. It affect glucose metabolism, steroidogenesis, cell growth / differentiation and all these factors effect normal ovarian function and its physiology. Glucose uptake and glycolysis by granulosa cell provide energy for oocyte maturation which is regulated by insulin and gonadotropins and both of these disturb by insulin resistance lead to anovulation. Increase serum concentrations of insulin cause ovarian defect and its high amount boost androgen production. Hyperinsulinism cause higher resistin which help in maximum fat accumulation. Increase of free fatty acid circulation hinder insulin to bind with insulin receptor that result increase insulin level in body and defect in MAPK component of insulin signalling pathway rise androgen synthesis. Hyperinsulinism affects IGF 1 and changes on it. IGF regulate ovarian folliculogenesis and act as survival factor for early stage of follicles, activation of mitotic cell cycle of granulosa cell, regulation of growth of primary and secondary follicles which affected due to changes in IGF and this changes due to insulin resistance. High IGF 1 cause impaired glucose tolerance and risk of type 2 diabetes and when it high it accelerate prenatal follicle that is more growing follicle at the outset which result in polycystic ovaries. IGF 1 is negative regulator of estrogen bioavailability and it mediates position GH action and increase estradiol. It also effect on adiponectin which control steroidogenesis of ovarian granulosa, theca cell, oocyte maturation, embryo development and its lower level cause dysfunction menstruation and hindered reproduction cycle. Hyperinsulinism higher the leptin cause infertility. Leptin regulate menses or oligomenorrhea or amenorrhea, hirsutism, hyperandrogenism and not less than 12 follicles place peripherally around and dense core of ovarian (2 to 9 mm) stroma spread throughout and enhanced quantity of stroma. Insulin resistance or hyperinsulinism develops commonly in today's women due to obesity, physical inactivity and sedentary lifestyle. All these things help in burns excess blood sugar. Other lifestyle factors such as working women avoid breakfast, failed in proper food selection, lots of stress, addiction of alcohol, sleep also matter. All these factors are responsible for increasing risk of PCOS.

3. Obesity:

Obesity is pathological conditions or a disease involving excess body fat. Obesity increases the risk of various types of diseases like heart problem, atherosclerosis, type 2 diabetes, insulin resistance, infertility etc. It plays a significant role in development of PCOS. However there is very little chance that obesity cause insulin resistance and we know very well insulin resistance is one of the most important factors for causing PCOS. Thus we can say that obesity indirectly evokes the PCOS. Obesity lead abnormal estrogen production in women with excess belly fat and it can affect ovaries and ability of ovulation. Lower portion of body (gynoid) that cause prevalence of diabetes, hypertension, atherosclerosis. Higher in android result in hyperandrogenism such as hirsutism and it develops visceral adiposity. Upper body obesity decreased insulin sensitivity and high risk of cardiovascular diseases and diabetes. Inflammatory factor rise in obesity which may stimulate exceeds androgen production or inhibit aromatization of androgen to estrogen. Anorexia nervosa or hypothalamic amenorrhea cause gonadotropin suppression results loss of ovulatory function. When HI is established, pituitary promote to secrete excess amount of LH, tend to increase LH/FSH ratio, excess LH stimulate androgen synthesis. TNF alpha and IL 6 are elevated in obesity with PCOS. TNF alpha induce IR by decreased expression of glucose transporter type 4 that reduces transport of glucose and contribute in the development of HI. FSH hinders aromatization of androgen to estrogen in granulosa cell result changes cause growth of small ovarian follicles, inhibit maturation necessary for development of dominant follicle leads to polycystic ovaries.

Increased FSH activity in hair follicle lead to conversation of testosterone to DHT, Powerful androgen. Androgen glycation end product (AGE) deposition in ovarian tissue induce oxidative stress and aberrant structure modification due to cross Linking leading to damage of all ovarian cell types and it's functionality. FFA lead to synthesise of very low density lipoprotein (VLDL) rich in triglycerides with stimulus decrease in HDL (high density lipoprotein) cause dyslipidaemia to cardiovascular diseases. Increased in FFA in blood responsible for insulin resistance. Today it is very common due to high caloric diets, reduced exercise, behavioural guidness, lack of nutritional diet, aggressive marketing, certain medications like antidepressants which increases the risk of PCOS.

4. Regular use of contraceptive pills:

Regular use of contraceptive pills cause hormonal imbalance in body. Contraceptive pills are made up of synthetic version of estrogen and progesterone that suppress ovulation by stop the production of FSH and LH which trigger changes in the lining of the uterus and make it thickens. Natural hormone bind to specific receptor and keep body in balance and synthetic progesterone don't bind to their specific receptor or it bind to other receptor which cause hormonal imbalance. In natural menstrual cycle, each month level of progesterone and estrogen varies and estrogen level high before ovulation after that estrogen level drops but after taking contraceptive pills estrogen level continue high throughout the cycle. Overall effect of chronic estrogenic stimulation of circulating level of gonadotrophins which result high level of LH which cause excess androgen secretion and low level of FSH inhibit folliculogenesis. It has aging effect on the ovaries and also responsible for weight gain.

5. CONCLUSION:

After considering all these factors such as hyperandrogenism , insulin resistance or hyperinsulinism , obesity , regular use of contraceptive pills we can conclude that all these things are directly or indirectly increase the risk of PCOS and all these things are occur in individual due to sedentary lifestyle or physical inactivity and hormonal imbalance etc.

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