Polycystic Ovary Syndrome (PCOS)

Introduction

Polycystic Ovary Syndrome (PCOS), less commonly referred to as hyperandrogenic anovulation (HA), is one of the most common reproductive disorders in women. It occurs due to the presence of 10 or more small cysts ranging in diameter from 2 to 9 mm on one or both ovaries increasing the volume of at least one ovary over 10 ml. Despite its symptoms being more prevalent in women of reproductive age, it is now known that PCOS is a lifelong disease and manifests as several other complications such as cardiovascular effects and insulin signaling. Therefore, its appropriate diagnosis and treatment is essential to prevent lifelong effects of this disorder (El Hayek et al., 2016).

This report aims to throw light on PCOS, its clinical symptoms and complications, the various techniques used for its diagnosis including imaging and histology, its treatment and prevention, and directions for future research required to prevent and treat this medical condition.

Symptoms and complications

Clinical indicators of PCOS include increased levels of luteinizing hormone and gonadotropin-releasing hormone, and unaltered or decreased levels of follicular stimulating hormone. Due to the increase in gonadotropin-releasing hormone, the ovarian thecal cells are stimulated leading to the increased production of androgens. In around 25% of PCOS patients, the prolactin levels are also increased (Sidra et al., 2019).

The primary complication of PCOS in women of the reproductive age is infertility. Apart from this, the spectrum of clinical presentation includes irregularities in ovulation, cystic ovaries, and increased levels of androgens. This, in turn, results in menstrual irregularities, seborrhea, obesity, alopecia, acne, and hirsutism in affected people. Apart from reproductive manifestations, PCOS may also lead to metabolic and cardiovascular complications, psychological disorders such as depression, anxiety, and sexual dysfunction, and social disorders affecting the patients' quality of life. It is also linked to the future development of glucose intolerance, diabetes mellitus, hyperinsulinemia, and hypertension (Sidra et al., 2019).

Diagnosis

Diagnosis of PCOS is done using a combination of medical history, clinical examination, blood tests, and a pelvic ultrasound. Clinical indicators that point towards PCOS include unexplained increase in weight, abnormalities in the menstrual cycle, hair growth similar to males, changes in the skin, and increased blood pressure. Blood tests are performed to assess lipid, glucose, and hormone levels in the body and any deviation from the normal range is noted. A pelvic ultrasound is recommended for scanning for ovarian cysts and reporting on their size, number, and enlargement of ovaries (if any). Differential diagnoses include Cushing's syndrome, adrenal hyperplasia, and hyperprolactinemia (Ndefo et al., 2013).

Ultrasonography may either be performed using a transvaginal approach or it may be abdominal, and it is typically carried out during the follicular phase, i.e. days 2 to 6 of the menstrual cycle. Using the transvaginal approach, presence of more than 24

follicles per ovary confirms diagnosis of PCOS. On the other hand, if the ovaries show the presence of more than 6 large follicles having a diameter of 4 to 10 mm, it is typically not considered a representation of PCOS (Witchel et al., 2015).

Treatment and prevention

The underlying pathophysiological mechanisms that give rise to PCOS are unknown, and therefore, its treatment is majorly based on its symptoms. Treatment objectives usually include correction of anovulation, inhibition of the effects of excess androgen in the body, and reduction of insulin resistance. In obese patients with PCOS, weight reduction also helps in alleviating the symptoms of the condition. Losing weight helps reduce levels of androgens, luteinizing hormone, and insulin in the body. It also helps regulate the menstrual cycle and improves fertility prospects for the patient. A surgical therapeutic approach is laparoscopy where several perforations are made in the surface and stroma of the ovaries and the tissues that produce excessive androgens are destroyed (El Hayek et al., 2016).

Lifestyle modifications that are recommended for PCOS include exercise therapies and calorie-restricted diet targeted at reducing weight. Weight loss significantly improves female fertility, regulates the menstrual cycle, reduces levels of testosterone and insulin, decreases hirsutism and acne, and enhances psychological well-being (El Hayek et al., 2016).

Pharmacological treatment approaches are also chosen based on the specific symptoms of the patient. Oral contraceptive pills are considered the first line of treatment for menstrual cycle irregularities and hyperandrogenism. Anovulation is

usually treated using clomiphene, anti-diabetic agents such as metformin, gonadotrophins, and aromatase inhibitors. Androgenic symptoms can be treated using anti-androgens and oral contraceptive agents. Other therapeutic approaches include medroxyprogesterone acetate, statins, thiazolidinediones, inositol, and spironolactone (El Hayek et al., 2016).

Prevention of PCOS is a challenge because it is considered to be a genetic and hereditary disorder. Other risk factors include unhealthy habits that may result in obesity, insulin resistance, hyperandrogenism, and hyperinsulinemia. Overconsumption of a diet rich in sugars and fructose, animal fats, transfats, and processed foods is considered to be an important risk factor for PCOS. Therefore, avoiding these habits, maintaining a healthy weight, and engaging in physical exercise can help prevent PCOS (Sununta, 2020).

Conclusion and future directions for research

PCOS is a multifactorial disorder that primarily affects the reproductive system in females along with causing several other disturbances in the body. Its primary outcome is infertility, apart from irregular menstrual cycles, skin and hair changes, insulin resistance, and cardiovascular effects. Its primary diagnostic method is a pelvic ultrasound that reports on the presence of cysts on the ovaries, their size and number, and the size of the ovaries. Its treatment includes medications that help alleviate the symptoms, and a surgical laparoscopic method that can destroy the faulty tissues of the ovaries.

Despite its widespread prevalence in women of the reproductive age, not much is known about the underlying etiology and pathophysiology that lead to the development of cysts on the ovaries. Future research needs to focus on these aspects of PCOS so that treatments can attempt to treat the cause rather than just the symptoms. Also, knowledge of the pathophysiological mechanisms can help prevent the development of this condition through specific practices.

References

El Hayek, S., Bitar, L., Hamdar, L. H., Mirza, F. G., & Daoud, G. (2016). Poly Cystic Ovarian Syndrome: An Updated Overview. *Frontiers in Physiology*, *7*. https://doi.org/10.3389/fphys.2016.00124

Ndefo, U. A., Eaton, A., & Green, M. R. (2013). Polycystic ovary syndrome: a review of treatment options with a focus on pharmacological approaches. *P & T : a Peer-Reviewed Journal for Formulary Management*, *38*(6), 336–355.

Sidra, S., Tariq, M. H., Farrukh, M. J., & Mohsin, M. (2019). Evaluation of clinical manifestations, health risks, and quality of life among women with polycystic ovary syndrome. *PLOS ONE*, *14*(10). https://doi.org/10.1371/journal.pone.0223329

Sununta, Y. (2020). Polycystic ovary syndrome: Risk factors and prevention. *Journal of Gynecological Research and Obstetrics*, *6*(1), 001–001. https://doi.org/10.17352/jgro.000074

Witchel, S. F., Oberfield, S., Rosenfield, R. L., Codner, E., Bonny, A., Ibáñez, L., Pena, A., Horikawa, R., Gomez-Lobo, V., Joel, D., Tfayli, H., Arslanian, S., Dabadghao, P., Garcia Rudaz, C., & Lee, P. A. (2015). The Diagnosis of Polycystic Ovary Syndrome during Adolescence. *Hormone Research in Paediatrics*, *83*(6), 376–389. https://doi.org/10.1159/000375530