



Perspective

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OHIO spectrum as a proposed modified nomenclature for polycystic ovary syndrome

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"What's in a name? That which we call a rose by any other name would smell as sweet" – William Shakespeare

Polycystic ovary syndrome (PCOS) is one of the commonest endocrinopathy in the reproductive age group, as depicted in a study among the North Indian population[1]. The nomenclatures, the diagnostic criteria, the pathophysiology, and the modalities of treatment are full of controversies. Other names for this syndrome include Stein-Leventhal syndrome, polycystic ovary disease (PCOD), polycystic ovarian disease, functional ovarian hyperandrogenism, ovarian hyperthecosis and sclerocystic ovary syndrome, etc.

Syndrome is a collection of signs and symptoms known to frequently appear together but without a known cause. So, the treatment is nonspecific and mostly symptomatic. Definition of disease is a little more intricate. Sometimes, it is defined as a disorder in a system or organ that affects the body's function and has definite aetiology and also a specific treatment.

Spectrum, on the other hand is a condition that is not limited to a specific set of values but can vary, without gaps, across a continuum. The nomenclature PCOS enormously emphasizes the presence of polycystic ovaries. It has been clearly understood that all cases of PCOS do not have polycystic ovarian morphology on ultrasonographic examination; and all cases of ultrasonographically detected polycystic ovarian morphology do not have PCOS. The classic study by Polson *et al* demonstrated that polycystic ovary may be detected in about a quarter of the asymptomatic women[2]. A cohort study of women with polycystic ovarian morphology did not find subsequently to develop PCOS[3].

A Danish study emphasized that polycystic ovary in young women is a relatively common finding (73% of non-users of hormonal contraceptives). According to Rotterdam criteria, 41% could be defined as having PCOS in this study. As the number of follicles is higher at a younger age, they suggested the revision of Rotterdam criteria, to avoid misdiagnosis in this age group[4].

Furthermore, although any fluid filled cavity is termed as cyst, in cases of PCOS, these are practically follicles arrested in different

stages. For all practical purposes, these are not cyst at all. A typical cyst is more than 2 cm in diameter and in epithelium-lined. The so-called cysts in PCOS are actually granulosa cell-lined follicles of 2-9 mm dimension. A mature follicle, when reaches a diameter of 16 mm, burst out to release ovum. In PCOS, follicular maturation is arrested so it does not reach to the stage of ovulation.

One of the most consistent features is presence of anovulation. This is commonly manifested as oligomenorrhoea, amenorrhoea and occasionally heavy periods. Another common feature is the clinical features of hyperandrogenemia manifested as acne, hirsutism, or both. Last decade has clearly established the link of this syndrome and insulin resistance. Once again, it is also not a constant association. Interestingly, thin girl with this syndrome may have a different pathophysiology than the obese one.

There is a huge impact of this nomenclature to the patient and their parents. A significant number of patients, parents or both are returning to the clinic with very similar types of questions, apprehension and fear. The questions are: 1) Cysts means tumour so is there a possibility of growth of this tumour over the years? 2) Is there a possibility of conversion of these cysts to cancer in coming years? 3) Is there any threat to life? 4) Will there be any problem in conception later? 5) Should she get married earlier and try for pregnancy earlier?

Nearly 90 years has passed, more than 10 000 articles been published, about a dozen monographs are available, almost every

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conference in gynaecology has had at least one, if not more, sessions on this topic, several days long (some are even 3–4 days long) conferences have been arranged solely on it, yet another study group had discussed it in October 2013. But the ground reality in practice is very different. Our observations shows: 1) Repeated ultrasonography are being advised to see whether there are any changes in the size of the follicles or not; 2) Batteries of expensive hormonal investigations are being advised at regular intervals; 3) Laparoscopic ovarian drilling are being employed as the first line of treatment for subfertility; 4) Laparoscopic ovarian drilling are being performed as a treatment for cure even in unmarried adolescent girls with menstrual problems; 5) Indiscriminate use of metformin and/or myoinositol in all age groups and during pregnancy; 6) Use of clomiphene citrate in young adolescent every month to induce menstrual bleeding for years!

Uptil now, all the nomenclatures related to this particular syndrome are either by the name of the pioneers in this field (Stein-Leventhal); or by spectacular ultrasonographic finding of array of tiny fluid-filled cystoid structure at the periphery of ovaries. Presently, many authors have suggested few names, like HA-PODS[5], PFOS-HM[6], *etc.*, which are purely based and focused on the same misunderstanding of enlarged follicles being designated as ovarian cyst. The different phenotypes of this condition clearly represent a spectrum from milder symptoms and signs to full blown one with most of the features. Our suggestion, OHIO spectrum, is an improvised version in the same queue. Hence, such type of newer nomenclature are only interim ones just to avoid misunderstanding among all stakeholders.

Notwithstanding we must mention that we are yet to find a specific aetiopathogenesis of this particular disease entity. Whenever the academia could explore that, very precise nomenclature could be suggested based on the aetiopathogenesis. That very nomenclature would not only be precise in terms of aetiopathogenesis but also would direct the proper diagnostic, prognostic and therapeutic understanding.

It should be explained that: 1) It is not a serious illness; 2) It is a condition with some abnormality in hormones; 3) It is not a tumour; 4) It has few short term problems – menstrual irregularity, acne, hirsutism; few medium term problems – problems in conceiving, sleep apnoea syndrome, feeling low; and few long term problems – increased chance of development of diabetes mellitus, hypertension, heart disease; 5) We do not know the exact reason for this condition; 6) Exact treatment of this condition is also not known; 7) All treatments are symptomatic; 8) Symptoms may recur once the medications are stopped; 9) There is no need to have regular check by ultrasonography to find out whether the enlarged follicles have disappeared or not; as these may persist throughout her reproductive life; 10) Most important aspect it to reduce weight (if overweight or obese), that can be achieved mostly by diet and exercise; 11) Menstrual irregularities can be addressed by combined oral

contraceptive pill or only progestogens in very young girls; 12) Anti androgen containing combined oral contraceptive pill may be helpful in managing acne or hirsutism or both; 13) Insulin sensitizers like metformin or myo-inositols can be used in special circumstances, not in all cases; 14) Lipid lowering agents specially statin also need to be used in special situations.

To understand PCOS more extensively and also intensively, multiomics have been considered to be a novel approach[7,8]. So, there should be great emphasis in informing/educating people. Changing name is not going to solve all the problems. But it is very timely to think about the change of this ever increasing global problem from PCOS to “oligomenorrhoea, hyperandrogenaemia, insulin resistance, ovarian follicle dysfunction (OHIO) spectrum”. After nearly 90 years of its recognition this may be a simple way to reduce the confusion, anxiety and mental burden to a large section of already overburdened young girls and their families. It may also help to reduce some of the unnecessary interventions by physicians as well.

Although, based on the present scenario, we are judiciously trying to name the condition to avoid all the dust and fumes in its understandings, that arise out of ultrasonography-based nomenclature. The new nomenclature will avoid the panic but at the same time should not produce complacency among the patients and practitioners alike. Advice on lifestyle modifications should be clearly emphasized to avoid many apprehended complications and to delay the menace of metabolic syndrome in future.

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Authors' contributions

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