VOLUME - 11, ISSUE - 04, APRIL - 2022 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper | Obstetrics & Gynaecology

ROLE OF SERUM ANTIMULLERIAN HORMONE FOR DIAGNOSIS OF POLYCYSTIC OVARIAN SYNDROME IN ADOLESCENCE

Dr. Karuna Kanta Das	Associate Professor, Obstetrics And Gynaecology, Gauhati Medical College And Hospital.
Dr. Manoj Kumar Majumdar	Associate Professor, Obstetrics And Gynaecology, Gauhati Medical College And Hospital.
Dr. Gayatri Sharma	Postgraduate Trainee, Obstetrics And Gynaecology, Gauhati Medical College And Hospital

ABSTRACT Polycystic ovarian syndrome is one of the most common endocrinal pathology amongst reproductive age group females leading to various long term complications in future like infertility , cardiovascular diseases and diabetes mellitus in future. Thus, an early diagnosis and treatment may be helpful. Serum antimullerian hormone as is secreted by the primordial follicles will be raised in PCOS females even from adolescence after the development of HPO axis. Hence , it can be used as a diagnostic marker for PCOS in adolescence.

Materials And Methods : It is a hospital based prospective case control study carried out in Gauhati Medical College and Hospital from April 2020 to March 2021. 110 adolescent girls between 15 years to 18 years were considered of which 55 fulfilled the inclusion criteria and 55 did not after which both the groups were subjected to a set of investigations including S. AMH. The comparison between two groups with qualitative data were done by chi square test and / or Fischer's test . associated risk factors were also determined.

Results And Discussion: The serum AMH levels were considerably higher in cases of PCOS which was 11.83+ 3.62ng/ml compared to controls being 4.14 + 0.98 mg/ml ($p<0.05$) . Complaints of oligomenorrhoea with increase in BMI, signs of hirsutism and increase in LH and testosterone levels were found to be more common amongst the cases.

Conclusion: In the study on Serum AMH level showed a statistically significant rise in cases when compared to controls. It was noted that there was a rise in LH and total testosterone levels. So, it can be said that S.AMH does have a role for diagnosis of PCOS in adolescence.

KEYWORDS : S. AMH, PCOS, ADOLESCENCE, RISK FACTORS

INTRODUCTION:

Polycystic ovarian syndrome is a multifaceted enigmatic disease. It is the most common endocrine disorder in women of reproductive age group[1] and is the most common cause of infertility[2]. Its clinical presentation may vary with age but menstrual irregularities such as amenorrhea and oligomenorrhoea- signs of anovulation; and hirsutism - a sign of hyperandrogenism may occur at any age. Thus, making them the most common complaints of patients with PCOS.

The pathophysiology of PCOS is dependent on a number of factors. PCOS may be caused by abnormalities in any of the four endocrinologically active compartments: ovaries, adrenal glands, hypothalamo-pituitary axis and peripheral fat of which ovarian compartment is the most consistent contributor of androgens. Dysregulation of CYP17, the androgen forming enzyme in both the ovaries and adrenal glands may be one of the central pathogenic pathway leading to an increase in androgen levels. Majority of women with PCOS have increased levels of LH and normal /decreased levels of FSH and thus an increased LH/FSH ratio.[3] PCOS is multifactorial caused by increase insulin, insulin resistance, anovulation, decreased/normal FSH, increased LH, increased estrogens , chronic inflammation and lifestyle changes PCOS has a prevalence ranging from 5% to 13% among women of reproductive age[4,5] . PCOS is associated with a number of health- related problems which usually starts with:

obesity leading to 1. diabetes mellitus, 2. abnormal lipid profile, 3.cardiovascular disease, 4. impaired glucose tolerance, 5. atherosclerosis, 6.hypertension,7. myocardial infarction, 8. increased risk of endometrial cancer

Different diagnostic criteria have been used for the diagnosis of PCOS. The most accepted criteria by far has been the Rotterdam criteria, according to which two of the following criteria needs to be fulfilled which are:

1) *presence of polycystic ovaries,*
2) *oligo/anovulation clinically diagnosed as oligo/amenorrhea,*
3) *hyperandrogenism- biochemical or clinical.*

Puberty is initiated with maturation of the hypothalamo-pituitary axis and secretion of GnRH, whose activity is supressed in childhood. With the onset of puberty, it has been found that there is increase in growth hormone secretion which in turn induces the release of insulin like growth factor (IGF-1) by the liver and other tissues and provokes insulin resistance causing hyperinsulinemia. Hyperinsulinemia acting on IGF-1 causes ovarian hyperstimulation and produce excessive androgens and peripheral aromatization to estrone occurs. After puberty this phenomenon persists in patients with PCOS[6].

Polycystic ovarian syndrome is believed to originate during puberty. However, it is extremely difficult to diagnose it during initial years of puberty as most of the clinical features that helps in diagnosis amongst adults usually occur during puberty and is considered physiological. Moreover, there is no definitive criteria to diagnose it in adolescent population. Diagnostic features of adolescent girls are menstrual irregularity, clinical hyperandrogenism, and/or hyperandrogenemia. Pelvic ultrasound findings are not needed for the diagnosis of PCOS in adolescent girls. Even before definitive diagnosis of PCOS, adolescents with clinical signs of androgen excess and oligomenorrhea/amenorrhea, can be regarded as being " at risk for PCOS" as there is no definitive criteria to diagnose patients belonging to this age group. Management of both those at risk for PCOS and those with a confirmed PCOS diagnosis includes mostly awareness, lifestyle modification and therapeutic interventions that include metformin, combined oral contraceptive pills, spironolactone, and local treatments for hirsutism and acne. Regular follow-up visits and planned transition to adult care providers are necessary [7] S.AMH is a dimeric glycoprotein of the transforming growth factor family

[8]and is expressed in the growing follicles in ovary until they have reached the size and differentiation state after which selection for dominance is done[9]. As no dominance of follicles is achieved in majority of the time in PCOS ,growing follicles keep on secreting S.AMH and thus its quantity is found to be more in PCOS cases. Moreover, the plasma levels have been found to be stable from one cycle to another[8]. The prevalence of PCOS has been increasing over the past years making it important to be diagnosed during adolescent stage that will help in proper management. Therefore, AMH estimation might be helpful in early diagnosis and deciding the treatment protocols from adolescence to prevent future consequences. Hence, as a diagnostic marker, AMH measurement has been found to offer a high sensitivity and specificity.

Considering the benefits of S.AMH, it has been considered as a useful diagnostic marker for PCOS in adolescence. Thus, in order to know its role for diagnosis, the present study is carried out in the department of Obstetrics and Gynaecology, Gauhati Medical College And Hospital.

AIMS AND OBJECTIVES:

1. To find out whether S.AMH level can be used as diagnostic method of PCOS in adolescence
2. To find out any associated risk factors of PCOS

MATERIALS AND METHODS:

This study has been conducted in the Gynaecology Out Patient Department (GOPD) of Gauhati Medical College and Hospital ,Guwahati. It was a hospital based prospective case control study which was done from 1st April 2020 to 31st March 2021.The study groups comprised of adolescent girls of 15-18 years of age attending Gynaecology Out Patient Department (GOPD) clinic with clinical features of PCOS as well as other gynaecological problems by considering the inclusion and exclusion criteria. Sample size of 110 adolescent girls who have fulfilled the inclusion criteria of which 55 were PCOS and 55 were non- PCOS controls.

Inclusion Criteria:

Teenage girls of age 15-18 years with clinical features of PCOS (features of menstrual irregularities and hyperandrogenism) and other gynaecological problems like whitish discharge , vaginal itching, dysmenorrhea and lower abdominal pain.

Exclusion Criteria:

Hyperprolactinemia, thyroid dysfunction, congenital adrenal hyperplasia , cushing's syndrome.

Steps:

A proforma was prepared and data of each case and control was recorded by means of personal interview of the patient followed by examination and finally investigations were done after taking informed consent. The results were finally compared between the 2 groups.

RESULTS AND DISCUSSION:

The subjects were evenly distributed between PCOS and non - PCOS groups.

Out of 55 subjects in the PCOS group, 5.45% presented with amenorrhea and 94.55% presented with oligomenorrhea whereas menstrual symptoms were found to be normal amongst the non-PCOS group.

Table 1: Distribution Of Menstrual Symptoms

	PCOM		WNL		Total		P
Row Labels	N	%	N	%	N	%	
AMENORRHOEA	3	5.45%		0.00%	3	2.73%	<0.0001
OLIGOMENORRHOEA	52	94.55%		0.00%	47	42.73%	
NORMAL		0.00%	55	100.00%	60	54.55%	
Grand Total	55	100.00%	55	100.00%	110	100.00%	

The average waist:

hip ratio in PCOS was 0.86+0.05 and non-PCOS was 0.84 +0.05 which was significant. This could emphasize on the fact that BMI and waist hip ratio being markers of obesity was an associated risk factor for PCOS and was due to modification in lifestyle.

The Ferriman score was significantly higher in subjects of PCOS (6.47+ 3.96) than non -PCOS (4.47+2.11) which depicted the impact of androgens amongst the cases.

The LH of the subjects with PCOS was found to be around (9.21+2.75 IU/L) and the ones with non-PCOS was (7.46 +1.57 IU/L). This could support the fact that increased LH levels is involved in the pathophysiology of PCOS.

Table 2: Distribution Of Hormone Levels

Values	PCOS	NON-PCOS	Total	P
Average of LH(IU/L)	9.21±2.75	7.46±1.57	8.34±2.4	0.0002
FSH (IU/L)	5.06±1.26	5.27±1.39	5.16±1.32	0.1849
LH/FSH	1.92±0.61	1.39±0.17	1.66±0.52	0.0000
AMH(ng/ml)	11.83±3.62	4.14±0.98	7.95±4.67	0.0000
TOTAL TESTOSTERONE(ng/dl)	48.75±12.94	25.36±3.81	37.05±15.1	0.0000
TSH(mIU/l)	1.75±0.68	1.87±0.75	1.81±0.72	0.4377
PPBS(mg/dl)	111.91±11.13	107.58±10.34	109.75±10.91	0.0035

The follicle-stimulating hormone (FSH) was noted be 5.06±1.26IU/L in the PCOS and 5.27±1.39IU/Lin the non-PCOS groups. The difference was not statistically significant as $p>0.05$ Due to the increase in LH levels when compared to FSH levels in cases, the LH/FSH was higher among subjects of PCOS (1.92+0.61) than non-PCOS (1.39+0.17)which could be helpful in the early diagnosis.

The serum anti:-

mullerian hormone (AMH) was significantly higher in PCOS girls (11.83+3.62 ng/ml) than in non-PCOS (4.14 + 0.98ng/ml)which signify that the rise is not purely physiological but there ia a pathological componenttoo leading to the increase in serum AMH. Thus, its rise can be considered as a marker for early diagnosis.

The total testosterone level was significantly higher in subjects with PCOS (48.75 + 12.94 ng/dl) than in non-PCOS (25.36 + 3.81ng/dl)which was the reason for the rise in Ferriman score amongst cases.

The average of TSH(mIU/l) in the PCOS group was 1.75±0.68miu/l and in the non-PCOS group it was 1.87±0.75miu/l. The difference was no statistically significant as $p>0.05$.

The postprandial glucose test (PPBS) was noted to be significantly higher in subjects of PCOS (111.91±11.13) group than non- PCOS (107.58±10.34) group.

A positive correlation was noted with respect to the LH levels (0.366), BMI (0.231) and total testosterone levels (0.729) which depicted that the higher the serum AMH levels ,the higher would be the other three parameters .

CONCLUSION:

Our study on Serum AMH level showed a statistically significant rise in cases when compared to controls. It was also noted that there was a rise in LH levels and total testosterone

levels. So, it can be said that Serum AMH does have a role for the diagnosis of PCOS in adolescence and can be considered as a key marker of ovarian dysfunction in PCOS patients in combination with other clinical features , such as oligomenorrhea, amenorrhea and signs of hyperandrogenism especially with ultrasound features. However, its acceptability asthe sole marker for diagnostic purpose still requires further studies to create a significant difference.

Financial Support And Sponsorship: *Nil*

Conflict Of Interest: *There are no conflicts of interest.*

REFERENCES:

1. *Carmina E, Lobo RA. Polycystic ovary syndrome (PCOS): arguably the most common endocrinopathy is associated with significant morbidity in women. The journal of clinical endocrinology & metabolism. 1999;84(6):1897-9.*
2. *Hsu M-I. Changes in the PCOS phenotype with age. Steroids. 2013;78(8):761-6.*
3. *Qin K-n, Rosenfield RL. Role of cytochrome P450c17 in polycystic ovary syndrome. Molecular and cellular endocrinology. 1998;145(1-2):111-21.*
4. *Hickey M, Doherty D, Atkinson H, Sloboda D, Franks S, Norman R, et al. Clinical, ultrasound and biochemical features of polycystic ovary syndrome in adolescents: implications for diagnosis. Human reproduction. 2011;26(6):1469-77.*
5. *Christensen SB, Black MH, Smith N, Martinez MM, Jacobsen SJ, Porter AH, et al. Prevalence of polycystic ovary syndrome in adolescents. Fertility and sterility. 2013;100(2):470-7.*
6. *Vignesh J, Mohan VJJopm. Polycystic ovary syndrome: A component of metabolic syndrome? 2007;53(2):128.*
7. *Anderson R, McLaughlin M, Wallace W, Albertini D, Telfer E. The immature human ovary shows loss of abnormal follicles and increasing follicle developmental competence through childhood and adolescence. Human Reproduction. 2014;29(1):97-106.*
8. *Auble B, Elder D, Gross A, Hillman JB. Differences in the management of adolescents with polycystic ovary syndrome across pediatric specialties. Journal of pediatric and adolescent gynecology. 2013;26(4):234-8.*
9. *Visser JA, Themmen AP. Anti-Müllerian hormone and folliculogenesis. Molecular and cellular endocrinology. 2005;234(1-2):81-6.*