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The Diagnostic Importance of Anti-Mullerian Hormone in Predicting Polycystic Ovary Syndrome among Women of Reproductive Age

Jishamol K[1], Gargi R Nair[2], Navami S[3]

[1]Pournami House, Alappuzha Dist., Kerala-690534, India
PH. No- +919544256717

Abstract: ***According to research, the most prevalent endocrinopathy among women in reproductive age is polycystic ovary syndrome (PCOS). Up to one-fifth of women of reproductive age are affected by PCOS, which results in an ovulatory subfertility. Anti-Mullerian hormone (AMH) levels greater than 3.8 to 5 ng/mL have been suggested by some research as a diagnostic threshold for PCOS. The purpose of this study is to evaluate the diagnostic importance of AMH levels in predicting PCOS among women of reproductive age.***

Keywords: Polycystic ovarysyndrome, Anti-Mullerian hormone, Rotterdam Criteria, Endocrinopathy, Hyperandrogenism

1. Introduction

Polycystic ovary syndrome (PCOS) is a complex endocrine disorder that mainly affects 5-15% of women in their reproductive age. It is associated with various ranges of disorders such as menstrual irregularies, amenorrhea and infertility. Multiple metabolic manifestations such as obesity, Insulin resistance, Dyslipidemia are also reported in person with PCOS.

Anti-Müllerian hormone (AMH) is a glycoprotein hormone, which is also known as Mullerian inhibiting hormone. It is produced by granulosa cells in women and play an important role in folliculogenesis. By inhibiting the growth of pre antral follicles, the AMH might inhibit the follicular maturation and ovulation. Moreover, AMH level is the indication of female's ovarian reserve.

Pellet et al reported that production of AMH increases 75 times higher in each polycystic ovarian granulosa cell.

Catteau-Jonard et al also found out in their study that the increased mRNA expression of AMH in ovarian granulosa cells.

Pigny et al outlined that there will be significant increase in the level of AMH in women with PCOS.

A study conducted by Dewailly et al reported that in classical hyperandrogenism, AMH level can be used as a surrogate marker.

The study was conducted to find out the levels of AMH in women with or without PCOS and evaluated the sensitivity and specificity of using AMH level in predicting PCOS among women of reproductive age. Also studied the correlation with occurrence of PCOS and other hormone parameters such as FSH, LH, and Prolactin.

Table 1: Diagnostic criteria for polycystic ovary syndrome

NICHD/NIH Criteria (1990)	ESHRE/ASRM Rotterdam Criteria (2003)	Androgen excess society (AES) Criteria (2006)
Hyperandrogenism	Hyperandrogenism	Hyperandrogenism
Oligo-ovulation/ anovulation	Oligo-ovulation/ anovulation	Oligo-ovulation/ anovulation
Exclusion of other related disorders	Polycystic ovaries on ultrasound	Polycystic ovaries on ultrasound
		Exclusion of other related disorders

2. Methods

The study population was selected from gyenac department. Cases were women who met diagnostic criteria for PCOS and blood samples from control and PCOS patients were collected and separated to serum by standard methods. Hormone parameters such as AMH, FSH, LH, and Prolactin were analysed.

3. Result

The mean level of serum AMH in PCOS cases was 7.54 and in non PCOS group was 2.42. The AMH level was found to be two to three times increased in PCOS when compared to control ($p<0.05$) which is statically significant. Additionally, the mean value of LH level in PCOS cases was 12.92 and non PCOS was 8.75 which shows statistically significant difference (p value <0.05). There was no statically significant difference observed in the level of FSH because the mean level of FSH in cases was 6.67 and that of control was 7.48(p value 0.09). The mean value of Prolactin level in cases was 10.53 and in non PCOS was 12.6 (p value 0.2), shows that no statically significant difference in cases and controls.

Table 2: Differences of Hormone levels between PCOS and non PCOS

HORMONES	PCOS	Non PCOS	P value
AMH (ng/ml)	7.54 ±3.71	2.42 ± 2.01	< 0.05
FSH(IU/L)	6.67±2.04	7.48±2.70	0.09
LH (IU/L)	12.92± 3.07	8.75±1.48	<0.05
PROLACTIN (ng/ml)	10.53±8.0	12.6±9.4	0.2

Table 3: AMH as a PCOS diagnostic tool in various studies

References	Year	Study Design	No. of Patients	Mean AMH values (ng/ml)	Cut off value of AMH (ng/ml)
Pigny et al	2006	Prospective	73	11.42	8.4
Dewailly et al	2010	Retrospective	270	7.88	4.90
Li et al	2010	Retrospective	47	9.85	8
Skalba et al	2011	Retrospective	87	10.2	
Woo et al	2012	Retrospective	140	11.58	7.82
Sahmay et al	2013	Retrospective	419	7.34	3.94
Wiweko et al	2014	Case control	71	9.50	4.45
Saxena	2017	Prospective case control	90	4.32	3.44
Singh S et al	2019	Prospective case control	100	7.1096	4.22
Yu Ran et al	2021	case control	2262	8.63	
M.Salman But et al	2022	Cross sectional study	98	7.23	3.9

4. Conclusion

Finding of this study concluded that there is significant correlation between PCOS and serum AMH level, since the value of AMH is two to three times higher in PCOS patients. Numerous studies have also been reported that when compared to control, the AMH level is significantly elevated in PCOS patients. Our findings along with others emphasize that serum AMH level can be used as a diagnostic tool for the PCOS among women of reproductive age, when there is a scarcity of reliable ultrasonographic data and laboratory findings. More researches will be required to evaluate the AMH as tool for monitoring the success of PCOS treatment.

References

[1] Pellatt L, Hanna L, Brincat M, Galea R, Brain H, Whitehead S, Mason H. Granulosa cell production of anti-Mullerian hormone is increased in polycystic ovaries. The Journal of Clinical Endocrinology & Metabolism. 2007 Jan 1;92(1):240-5.

[2] Catteau A, Caillon H, Barrière P, Denis MG, Masson D, Fréour T. Leptin and its potential interest in assisted reproduction cycles. Human reproduction update. 2016 Apr 1;22(3):320-41.

[3] Pigny P, Jonard S, Robert Y, Dewailly D. Serum anti-Mullerian hormone as a surrogate for antral follicle count for definition of the polycystic ovary syndrome. The Journal of Clinical Endocrinology & Metabolism. 2006 Mar 1;91(3):941-5.

[4] Dewailly D, Gronier H, Poncelet E, Robin G, Leroy M, Pigny P, Duhamel A, Catteau-Jonard S. Diagnosis of PCOS: revisiting the threshold values of follicle count on ultrasound and of the serum AMH level for the definition of polycystic ovaries. Hum Reprod. 2011;26:3123-9.

[5] Li L, Chen X, Mo Y, Chen Y, Wenig M, Yang D. Elevated serum anti-mullerian hormone in adolescent and young adult Chinese patients with polycystic ovary syndrome. Wiener Klinische Wochenschrift. 2010 Sep;122(17):519-24.

[6] Skałba P, Cygal A, Madej P, Dąbkowska-Huć A, Sikora J, Martirosian G, Romanik M, Olszanecka-Glinianowicz M. Is the plasma anti-Müllerian hormone (AMH) level associated with body weight and metabolic, and hormonal disturbances in women with and without polycystic ovary syndrome?. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2011 Oct 1;158(2):254-9.

[7] Woo HY, Kim KH, Rhee EJ, Park H, Lee MK. Differences of the association of anti-Müllerian hormone with clinical or biochemical characteristics between women with and without polycystic ovary syndrome. Endocrine journal. 2012;59(9):781-90.

[8] Sahmay S, Atakul N, Oncul M, Tuten A, Aydogan B, Seyisoglu H. Serum anti-Mullerian hormone levels in the main phenotypes of polycystic ovary syndrome. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2013 Sep 1;170(1):157-61.

[9] Wiweko B, Maidarti M, Priangga MD, Shafira N, Fernando D, Sumapraja K, Natadisastra M, Hestiantoro A. Anti-mullerian hormone as a diagnostic and prognostic tool for PCOS patients. Journal of assisted reproduction and genetics. 2014 Oct;31(10):1311-6.

[10] Saxena U, Ramani M, Singh P. Role of AMH as diagnostic tool for polycystic ovarian syndrome. The Journal of Obstetrics and Gynecology of India. 2018 Apr;68(2):117-22.

[11] Singh S, Firdaus A, Chaudhary R, Dhama V. Role of anti-mullerian hormone as a diagnostic tool for polycystic ovary syndrome. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2020 Sep 1;9(9):3730-7.

[12] Ran Y, Yi Q, Li C. The relationship of anti-Mullerian hormone in polycystic ovary syndrome patients with different subgroups. Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy. 2021;14:1419.

[13] Butt MS, Saleem J, Aiman S, Zakar R, Sadique I, Fischer F. Serum anti-Müllerian hormone as a predictor of polycystic ovarian syndrome among women of reproductive age. BMC Women's Health. 2022 Dec;22(1):1-9.