Original Research Paper

Volume -10 | Issue - 4 | April - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Gynaecology

ROLE OF S.PSA AS A MARKER OF OVARIAN DYSFUNCTION IN POLYCYSTIC OVARIAN SYNDROME

Ruchi Kumari	Junior Resident, Department Of Obstetrics And Gynaecology, MLN Medical College, Prayagraj.
Amita Yadav*	Assistant Professor, Department Of Obstetrics And Gynaecology, MLN Medical College, Prayagraj. *Corresponding Author
Kumari Shweta	Junior Resident, Department Of Obstetrics And Gynaecology, MLN Medical College, Prayagraj.

ABSTRACT **OBJECTIVES :** To evaluate role of S.PSA as a marker of ovarian dysfunction in polycystic ovarian syndrome.
MATERIAL AND METHODS: Study was done in 100 female attending outpatient department as well as admitted in department of obstetrics and gynecology in Swaroop Rani Nehru Hospital and Kamla Nehru Memorial Hospital affiliated to Moti lal Nehru Medical College, Prayagraj, over a period of one year from August 2018 to july 2019.
RESULTS: In our study out of 100 cases of PCOS, only 10 (10%) cases had Raised Serum PSA(Mean Value 0.15±0.063ng/ml), and 90 (90%) had normal Serum PSA (Mean Value 0.032±0.016 ng/ml) (vide table no-1). p=0.0001 i.e. significant.
CONCLUSION: Maximum cases of PCOS had normal Serum PSA 90% and only 1(10%) had raised Serum PSA.

KEYWORDS :

INTRODUCTION

Polycystic ovary syndrome (PCOS) is the most common female endocrine disorder, affecting approximately 4%–18% women of reproductive age **Chunla He et al,(2015)[1].**In 1990 National Institutes of Health (NIH) sponsored conference defined polycystic ovary syndrome (PCOS) as hyperandrogenism (HA) with oligo-anovulation, excluding other endocrinopathies like nonclassic adrenal hyperplasia, Cushing's syndrome, androgen-producing tumors, and drug-induced androgen excess **Zawadzki J et al,(2014)[2].** In 2003 however, the Rotterdam consensus expanded the diagnostic criteria to include at least two of the following features: 1.) clinical or biochemical hyperandrogenism; 2.) oligo-anovulation; and 3.) polycystic ovaries (PCO), excluding the same endocrinopathies **Clark M et al(2014)[3]**

Oligomenorrhea was defined as a history of menstrual cycles of >38 days[6]. Hyperandrogenism was defined as a modified hirsutism score of ≥7 and/or an elevated total testosterone value of ≥3.96 nmol/L as described previously **Fraser I et al,(2007)[4].** Poly cystic ovary on ultrasonography was defined as the presence of ≥26 follicles measuring 2 to 9 mm throughout the entire ovary and/or an ovarian volume (OV) greater than 10 cm^3 **Lujan M et al,(2013)[5].**

PSA is produced as a proenzyme,the propeptide is removed to generate active PSA ,of which a small protein then enters the blood stream and circulates in an unbound state (free PSA). Active PSA bounds to protease inhibitors including alpha-1-antichymotrypsin and alpha-2-macroalbumin. **Plymate S et al,(1998)[11]** PSA has been detected in some female tissues such as breast, ovarian and endometrial tissues, amniotic fluid and milk **Wehr E et al (2011)[18]**.PSA production seems to be associated by steroid hormones such as androgens, progestin and glucocorticoids. **Mikolajczyk S et al,(2002)[12] Diamandis E et al,(2017)[13]**.PSA levels increase in women with androgen excess **Wang MC et al(1979)[14]**.As the gene expression of Prostate specific antigen is upregulated by the androgens and progestins in hormonally responsive tissues, hyperandrogenic syndromes such as PCOS may be associated with elevated serum Prostate specific antigen levels. Prostate specific antigen appears to be a promising marker of endogenous androgen excess in females suffering from PCOS **Knochenhauer E et al (1998)[15]**.

MATERIAL AND METHODS

The "study of **S.PSA AS A MARKERS OF OVARIAN DYSFUN CTION IN POLYCYSTIC OVARIAN SYNDROME** " was carried out on 100 female attending outpatient department as well as admitted in department of obstetrics and gynecology in Swaroop Rani Nehru Hospital and Kamla Nehru Memorial Hospital affiliated to Moti lal Nehru Medical College, Prayagraj, over a period of one year from August 2018 to July 2019.

SELECTION OF PATIENT-
THE INCLUSION CRITERIAE:

- Patient with Amenorhoea or Oligomenorhoea
- Patient with primary and secondary infertility,
- Patient with hirsutism,acne and obesity
- Patient with family history of type 2 diabetes.

THE EXCLUSION CRITERIAE:

Participating females enrolled in study should not have used the following in the last three months:-

- Fertility medications
- Antiepileptic drugs
- Insulin sensitizers,
- Drugs known to alter lipid metabolism and
- Patients not ready to give written informed consent for the examination and follow up.

STUDY DESIGN : Observational analytical study.

SAMPLE SIZE : 100.

METHOD OF ANALYSIS : Chi square test.

STUDY PROTOCOL INCLUDED-
detail history, examination and investigation.

TEST FOR PSA:

One vial of 200µL per sample was provided blinded to Meso Scale Diagnostics (MSD) for PSA measurement using MSD's MULTI-ARRAY® electrochemiluminescence technology in the S-PLEX™ format, which allows quantitation of previously unmeasurable levels of biomarkers with ng/dl sensitivity. The samples were thawed and centrifuged at 10,000g for 10 minutes at 4°C before being aliquoted into low retention 96 well round bottom plates for subsequent testing. Plates were immediately frozen on dry ice and stored at −80°C until testing. PSA assays were calibrated to the WHO International Standard for prostate-specific antigen with 90% bound to alpha1antichym otrypsin and 10% in the free form (National Institute for Biological Standards and Control (NIBSC), code 96/670, Hertfordshire, England) and the WHO International Standard for prostate-specific antigen free (NIBSC, code 96/668), respectively. Assay characteristics were determined prior to sample testing.

For each assay 8-point calibration curves were included on each plate , and the data were fitted with a weighted 4-parameter logistic curve fit. Limit of detection (LOD) is a calculated concentration corresponding to the average signal 2.5 standard deviations above the background (zero calibrator). Lower limit of quantitation (LLOQ) and upper limit of quantitation (ULOQ) are established for the plate lot by measuring

multiple levels of calibrator near the expected LLOQ and ULOQ. LLOQ and ULOQ are, respectively, the lowest and highest concentration of calibrator tested which have a %CV of 20% or less, with recovered concentration within 70–130%. The LOD was .04 ng/dL for PSA. Serum, EDTA plasma, and heparin plasma samples (7–8 samples total) were spiked with calibrator at two or three concentrations. The non-complexing form of PSA (Scripps Laboratories, San Diego, CA; #90024) that does not bind to α1-antichymotrypsin (ACT) was used in spike recovery experiments for the fPSA assay. Average spike recoveries for the fPSA and cPSA assays were 88% and 90%, respectively. Serum, EDTA plasma, and heparin plasma samples (7–8 samples total) were diluted 2, 4 and 8-fold. Average dilution linearities for the fPSA and cPSA assays were 114% and 109%, respectively.The samples and calibrator dilutions were assayed in duplicate and all samples were measured for cPSA and fPSA. Measurement of cPSA was performed with a 2 fold dilution of the samples; fPSA measurement was performed on neat samples. Concentrations of biomarkers in each sample were calculated from the calibrator curves taking into account sample dilutions. The mean of two measurements was derived for each analyte in each sample and reported in ng/dL.

For all statistical analysis p-value <0.05 was considered as significant.

OBSERVATION

Table -1 Distribution of cases according to level of Serum PSA

Level of Serum PSA (ng/mL)	No of patients	Percentage	Mean Value±SD (ng/mL)	p-value
Raised(>.07)	10	10%	0.15±0.063	0.0001
Normal(undetectable-<.07)	90	90%	0.032±0.016	
Total	100	100%		

Table 1 Shows distribution of cases according to Serum PSA. This table shows that, out of 100 cases of PCOS, only 10 (10%) cases had Raised Serum PSA(Mean Value 0.15±0.063ng/ml), and 90 (90%) had normal Serum PSA (Mean Value 0.032±0.016 ng/ml)

TABLE-2 Relationship of Serum PSA with age in PCOS

Level of Serum PSA (ng/mL)	No of patients	Percentage	Mean Value±SD (ng/mL)	p-value
Raised(>.07)	10	10%	0.15±0.063	0.0001
Normal(undetectable-<.07)	90	90%	0.032±0.016	
Total	100	100%		

Table 2 Shows the relationship between S.PSA and age of patients with PCOS. Out of total 10 (10%) cases with Raised S.PSA, maximum i.e. 5(5%) belonged to 26-30 years age group, 2 (2%) belonged to 21-25 years age group, 2 (2%) belonged to 31-35 years age group and 1 (1%) belonged to 15-20 years age group ,

Out of total 90 (90%) cases with normal S.PSA, maximum i.e. 45(45%) belonged to 26-30 year age group, 33 (33%) belonged to 21-25 year age group, 10 (10%) belonged to 15-20 year age group and 2 (2%) belonged to 31-35 year age group.

DISCUSSION

In our study out of 100 cases of PCOS, only 10 (10%) cases had Raised Serum PSA(Mean Value 0.15±0.063ng/ml), and 90 (90%) had normal Serum PSA (Mean Value 0.032±0.016 ng/ml) (vide table no-1). p=0.0001 i.e. significant. Therefore statistically significant difference found between level of S.PSA in raised S.PSA cases and normal S.PSA cases.Our result were contrast to studies by Mardanian F et al (2011)17 and Hajiagha M A et al (2019)45 they reported Raised Serum PSA in 91% and 72.3% cases respectively. In present study Mean value of S.PSA was 0.044±0.045ng/ml(vide table no-1) almost similar to study by Mardanian F et al (2011)17 where mean values were 0.19±0.192 ng/ml butcontrast to study by Hussein M et al (2017)33 where mean values were 0.025±0.013ng/dl.

The mean S. PSA in 20-30 Year age group cases in the present study was 0.04 ±0.03ng/dl, p=0.461 i.e. not significant. Therefore there is no significant relation between age and S.PSA(vide table no-2).In Contrast to study done Hussein M et al (2017)33 where Mean S.PSA in similar age group was 0.007±0.009 ng/dl.

RESULT

1. Maximum cases of PCOS had normal Serum PSA (0.032 ± 0.016ng/ml)i.e. 90 (90%) and only 10 (10%) had raised Serum PSA (0.15±0.063ng/ml). (p =0.0001 i.e significant)
2. Majority of cases of both Raised S.PSA 5(5%) and normal S.PSA 45(45%) were found between 26-30 year of age. (p =0.461 i.e not significant)

REFERENCES

1. Chunla He, Lin Z., Robb S.W., Ezeamama A.E. Serum Vitamin D Levels and Polycystic Ovary syndrome. Nutrients 2015, 7, 4555-4577.
2. Zawadzki JK, Dunaif A. Diagnostic Criteria for Polycystic Ovary Syndrome: Towards a Rational Approach. Boston: Blackwell Scientific Publications; 1992.
3. Clark M et al. Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome (2014). Fertil Steril 2004;81:19–25.
4. Fraser IS, Critchley HOD, Munro MG, Broder M. Can we achieve international agreement on terminologies and definitions used to describe abnormalities of menstrual bleeding? Hum Reprod. 2007;22(3):635-643.
5. Lujan ME, Jarrett BY, Brooks ED, et al. Updated ultrasound criteria for polycystic ovary syndrome: Reliable thresholds for elevated follicle population and ovarian volume. Hum Reprod. 2013;28(5):1361-1368.
6. Daniel A et al.Endocrine Reviews, Volume 36, Issue 5, 1 October 2015, Pages 487–525, https://doi.org/10.1210/er.2015-1018
7. Alebic M.S., Stojanovic M., Duhamel A., Dewailly D. The phenotypic diversity in per-follicle anti-Mullerian hormone production in polycystic ovary syndrome. Human Reproduction, Vol.30, No.8 pp.1927–1933, 2015.
8. Pierre A, Peigne M, Grynberg M, Arouche N, Taieb J, Hesters L, et al. Loss of LH-induced down-regulation of anti-Mullerian hormone receptor expression may contribute to anovulation in women with polycystic ovary syndrome. Hum Reprod (Oxford, England). 2013;28(3):762–9. doi:10.1093/humrep/des460.
9. Teegarden, D.; Donkin, S.S. Vitamin D: Emerging new roles in insulin sensitivity. Nutr. Res. Rev. 2009, 22, 82–92.
10. https://en.wikipedia.org/wiki/Prostatespecific_antigen#/media/ File:PSA_ KLK3_ PDB _2ZCK.png
11. Plymate, S.R.; Matej, L.A.; Jones, R.E.; Friedl, K.E. Inhibition of sex hormone-binding globulin production in the human hepatoma (Hep G2) cell line by insulin and prolactin. J. Clin. Endocrinol. Metabol. 1998, 67, 460–464.
12. Mikolajczyk SD, Marks LS, Partin AW, Rittenhouse HG. Free prostatespecific antigen in serum is becoming more complex. Urology. 2002;59(6):797–802. [PubMed] [Google Scholar]
13. Diamandis EP, Yu H. New biological functions of prostate-specific antigen? J Clin Endocrinol Metab. 2017;80(5):1515–7. [PubMed] [Google Scholar]
14. Wang MC, Valenzuela LA, Murphy GP, Chu TM. Purification of a human prostate specific antigen. Invest Urol. 1979;17(2):159–63. [PubMed] [Google Scholar]
15. Knochenhauer ES, Key TJ, Kahsar-Miller M, Waggoner W, Boots LR, Azziz R. Prevalence of the polycystic ovary syndrome in unselected black and white women of the southeastern United States: a prospective study. J Clin Endocrinol Metab.1998;83(9):3078–82. [PubMed] [Google Scholar]
16. S. Hahn, S.Tan, S. Elsenbruchetal., "Clinical and biochemical characterization of women with polycystic ovary syndrome in North Rhine-Westphalia," Hormone and Metabolic Research, vol.37, no.7, pp.438–444,2005.
17. Mardanian F,et al. Diagnostic value of prostate-specific antigen in women with polycystic ovary syndrome. Journal of Research in Medical Sciences August 2011 16(8): 999-1005.