ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 02 | February - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

SERUM PROSTATE SPECIFIC ANTIGEN LEVEL IN FEMALES WITH UNEXPLAINED INFERTILITY

Biochemistry

Dr. Simi Sam	Assistant Professor, Department Of Biochemistry, Government Medical College, Kottayam
Dr. Ajay Kumar	Associate Professor, Department Of Obstetrics And Gynaecology, Government Medical College, Kottayam
Dr. Geetha A	Professor, Department Of Biochemistry, Pushpagiri Institute Of Medical Sciences And Research Centre, Thiruvalla
Dr. Cukku Sara Benny	Assistant Professor, Department Of Biochemistry, Msrmc, Bangalore

ABSTRACT

Introduction Prostate-specific antigen (PSA) is a serine protease produced primarily by the prostate gland and its assay is widely accepted for prostate diseases. But the PSA has been detected in some female tissues (periurethral gland, breast, ovarian, and endometrial tissues) and body fluids (amniotic fluid, milk, and breast cyst fluid).[1] With the advent of highly sensitive methods for measuring trace amounts of PSA in serum, it proves that it indeed represents PSA and not immunoassay noise.[2] Detectable levels of PSA is considered to be the effect of hyperandrogenism in females.[3] In this study we would like to estimate the serum levels of PSA in a group of females with fertility issues. **Materials and Methods** In this cross sectional study, we have included 57 females who attended the fertility clinic in a tertiary care hospital for fertility problems. Following the clinical diagnosis of infertility, the serum PSA level was estimated in all the participants using fully automated immunoassay analyser. **Results** Among 57 females included in this study, 26 females were having detectable levels of serum PSA (46%) and the mean PSA value was found to be 0.011 ng/ml which is significant when compared to the normal value of serum PSA in females (less than 0.004ng/ml).[4] And another important observation is that out of the 26 females detected to have serum PSA levels, 6 were clinically diagnosed as unexplained infertility[5] and others with various diagnosed causes of infertility. **Conclusion** Since the detectable levels of serum PSA is considered to be the effect of hyperandrogenism in females, it may be beneficial to consider this serine protease as an indicator for androgen excess, especially in females diagnosed with unexplained infertility.

KEYWORDS

Prostate specific antigen (PSA), female infertility, unexplained infertiltiy

INTRODUCTION

Prostate-specific antigen (PSA) is a serine protease released by the prostate gland and its assay is widely accepted for both benign and malignant prostate diseases. Earlier, PSA was considered to be absent in females. But, PSA can be detected now, in some female tissues and body fluids with the help of the highly sensitive detection methods. The association of PSA in the females is related to steroid hormone regulation, including glucocorticoids, androgens and progestins. Androgens can up-regulate the PSA gene expression through the receptors of androgen. With the advances in highly sensitive diagnostic methods for measuring trace amounts of PSA in body fluids, it can prove that the antigen detected in females represents PSA itself and not any immunoassay noise.[2] Detectable levels of PSA is considered to be the effect of hyperandrogenism in females.[3]

Hyperandrogenism is one of the commonest causes for fertility issues in females. Infertility is "a disease of the reproductive system defined as "the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse." (WHO-ICMART glossary[1]).

Among all the causes of infertility, more than one third of infertile couples worldwide are diagnosed with unexplained or idiopathic infertility.

The unexplained infertility is defined as the lack of an obvious cause for a couple's infertility and the females' inability to get pregnant after at least 12 cycles of unprotected intercourse or after six cycles in women above 35 years of age for whom all the standard evaluations are normal.[2]

Unexplained infertility[5] is diagnosed after excluding the common causes of infertility with standard fertility investigations which includes assessment of ovulation, tubal patency test and semen analysis.

In this study we would like to estimate the serum levels of PSA in a group of females with fertility issues.

BACKGROUND

The name "PSA" was given to this antigen since it was isolated from the prostate gland. But later numerous studies have shown the extraprostatical expression of the PSA. The Skene's (periurethral) gland was the first tissue in females detected to be able to produce PSA, so this gland has been referred to as the "female prostate" since its developmental origin is homologous to that of the male prostate. That means, it is not surprising that this gland produces PSA in both males and females. It is now evident that some tissues in females, also can produce PSA. PSA in breast tissue is identical to seminal PSA in molecular weight and mRNA sequence, which indicates that the name Prostate Specific Antigen is really a misnomer.

Usually, the source of androgen excess in women with elevated levels of PSA is peripheral. The commonest peripheral sources of androgen production are skin tissues where the testosterone is becomes to the potent androgen, dihydrotestosterone (DHT). The concentration of PSA in female sera is 0.004 mg/liter ,which is almost 1000-fold less than that of males.[6]

MATERIALS AND METHODS

In this cross sectional study, we have included 57 females who attended the fertility clinic in a tertiary care hospital for fertility problems. Following the clinical diagnosis of infertility, the serum PSA level was estimated in all the participants using Access Hybritech PSA assay in the fully automated immunoassay analyser, Beckman Coulter Access 2. fully automated immunoassay analyser. The mean PSA value and the percentage of unexplained infertility cases were calculated.

RESULTS

Among 57 females included in this study, 26 females (46%) were having detectable levels of serum PSA and the mean PSA value was found to be 0.011 ng/ml which is significant when compared to the normal value of serum PSA in females (less than 0.004ng/ml).[4]

And another important observation is that out of the 26 females detected to have serum PSA levels, 6 (23%) were clinically diagnosed as unexplained infertility and others with various diagnosed causes of infertility.

Table 1: Summary Table

Mean	0.011034
Standard Error	0.002342
Median	0.01
Mode	0
Standard Deviation	0.017838
Sample Variance	0.000318

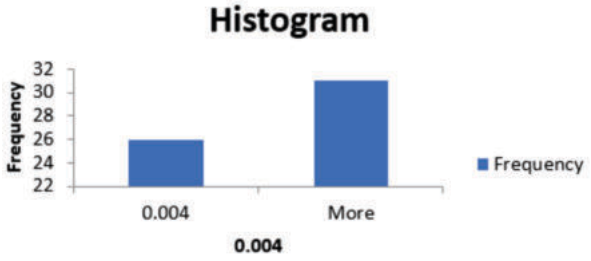

Figure 1:

Fig 1: Histogram showing the frequency of serum PSA level in females with infertility. Less than 0.004ng/ml of PSA is considered as normal in females.

CONCLUSION

Several expensive, time-consuming and risky therapies of Assisted Reproductive Technology (ART) will not increase the chance of pregnancy in many couples especially for those who are diagnosed with unexplained infertility[6]. Clearly, infertility is a cause of major distress for couples and should be assessed thoroughly and not neglected[7].

Since the detectable levels of serum PSA is considered to be the effect of hyperandrogenism in females, it may be beneficial to consider this serine protease as an indicator for androgen excess, especially in females diagnosed with unexplained infertility to reveal the female factor in those couples.

Limitations Expected:

Lack of control population and the difficulty in assessing the male/female factor in couples with unexplained infertility (there is a chance of normal/fertile females included in the study) are the major limitations of this study.

REFERENCES

1. Melegos, D., Yu, H., Ashok, M., Wang, C., Stanczyk, F. and Diamandis, E., 1997. Prostate-Specific Antigen in Female Serum, a Potential New Marker of Androgen Excess. *The Journal of Clinical Endocrinology & Metabolism*, 82(3), pp.777-780.
2. Stamey, T., 1996. Lower limits of detection, biological detection limits, functional sensitivity, or residual cancer detection limit? Sensitivity reports on prostate-specific antigen assays mislead clinicians. *Clinical Chemistry*, 42(6), pp.849-852.
3. Sharaf A, El Mongy N, Fawzy M, El Razik H. Prostate-specific antigen as a diagnostic marker in female hyperandrogenism. Journal of the Egyptian Women□s Dermatologic Society. 2013;10(2):58-62.
4. H. Black M, Giai M. Serum Total and Free Prostate-specific Antigen for Breast Cancer Diagnosis in Women. Clinical Cancer Research. 2000;Vol. 6,:467–473.
5. Gelbaya TA, Potdar N, Jeve YB, Nardo LG. Definition and epidemiology of unexplained infertility. Obstet Gynecol Surv. 2014;69(2):109-15.
6. Nardelli AA, Stafinski T, Motan T, Klein K, Menon D. Assisted reproductive technologies (ARTs): evaluation of evidence to support public policy development. Reprod Health. 2014;11(1):76.