IS SEMINAL PROSTATIC ACID PHOSPHATASE A RELIABLE MARKER FOR MALE INFERTILITY?

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ABSTRACT

This project was undertaken to determine whether there is any correlation between sperm counts and motility and the level of prostatic acid phosphatase (PAcP). Fifty-six patients were studied in this series - those with normospermia (Group A,n=19); mild oligospermia (Group B,n=18) and very severe oligospermia (Group C,n=19). Each group was further subdivided into 2 groups - those who were 25-35 years old and those 36 years old and above. The results in this age group are discussed and it was found that individuals with very severe oligospermia (sperm counts 1-20x10^5/mL) showed a positive correlation (p=0.009) in the age group 36 years and above. The results have to be treated with caution since a statistically significant result was only displayed in one group, ie, individuals over the age of 35 years and very low sperm counts.

Keywords: prostate, prostatic acid phosphatase, normospermia, oligospermia, fertility

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INTRODUCTION

Seminal acid phosphatase activity was examined in 56 patients. This study was undertaken because there is a relative paucity in the literature correlating sperm counts with the varying degrees of male fertility as judged by prostatic enzymology methods[1].

Seminal plasma is one of the richest source of prostatic acid phosphatase and it is generally accepted that the quantitation of this enzyme in ejaculum, blood, plasma, or serum is a useful tool for the evaluation of prostatic function in health and disease. In prostatic carcinoma[2], with or without metastasis and benign prostatic hypertrophy, the levels of PAcP increase significantly[3]. The prostatic fluid also affects the metabolism, motility, vitality, morphology and quality of spermatozoa[4]. In our study, we arranged PAcP activities in normal and abnormal cases - as judged by sperm counts and motility and then attempted to correlate prostatic function with sperm counts in the ejaculate samples.

PATIENTS AND METHODS

Our patients comprised of fertile and infertile patients totalling 56. They were divided into 3 groups - normospermic, mildly oligospermic and severely oligospermic. Each group was further subdivided into 2 subgroups according to age. Normospermic ejaculates were obtained from healthy undergraduates and staff members, and abnormal samples were obtained from the male infertility clinic. Normalcy was defined as follows: sperm count>40x10^6/mL, semen motility>60%. After collection of the specimen, it was allowed to coagulate, liquefy and centrifuge at room temperature, at 660G. The supernatant was assayed by the calorimetric method[5]. The test principle was

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phosphate + H_2O + PAcP ---> phosphate + 1 naphthol
1 naphthol + 4-chloro-2 methyl phenyl diazonium salt ----> azodye

The azodye was exposed to the calorimeter and the results were expressed in kU/100 mL semen.

RESULTS

Normospermic ejaculates were placed in Group A as control. They had a sperm count of more than 40 million/mL and a motility of more than 60%. Oligospermic individuals (mild) were classified as having sperm counts of 20-40 million/mL and a motility of 40%-60%. The severely oligospermic patients had a sperm count of between 1-20 million/mL of sperm and a motility of 10%-40% only.

The results are expressed in 3 tables (Tables I, II, III) and are self-explanatory.

It was found that the level of seminal PAcP was highly significant at least in the severe oligospermics with a p value of 0.009 (p value of 0.05 significant, two-tailed student's test).

Table 1 – Normospermic (Controls)
Group A

	25 - 35 yrs	36 yrs above	combined
Sperm count		> 40 x 10^6/mL	
Motility		> 60%	
Acid phosphatase (kU/100 mL)			
Mean	65.95	87.42	78.37
SEM	13.07	14.54	10.11
n	8	11	19
p value	–	–	–

SEM - Standard Error of Mean

DISCUSSION

The estimation of PAcP is extremely important in making a diagnosis of malignancy of the prostate because it increases significantly in this pathological condition. However, serum PAcP comprises 10%-25% of the total PAcP and therefore only very high increases in the level of total PAcP are seen in serum[6]. The enzymatic activity in semen is about 10x10^5 times higher than reported for the serum of normal men[7] and seminal analysis can reveal PAcP activity much more accurately. However, it has been reported that there is no difference in PAcP

Table 2 – Mildly Oligospermic Group B

	25 - 35 yrs	36 yrs above	combined
Sperm count		20-40 x 10⁶/mL	
Motility		40%-60%	
Acid phosphatase (kU/100 mL)			
Mean	84.15	68.33	77.11
SEM	15.61	17.45	11.68
n	10	8	18
p value	0.21	0.21	0.95

Table 3 – Severely Oligospermic Group C

	25 - 35 yrs	36 yrs above	combined
Sperm count		1-20 x 10⁶/mL	
Motility		10%-40%	
Acid phosphatase (kU/100mL)			
Mean	50.7	37.44	43.74
SEM	10.6	12.44	8.17
n	9	10	19
p value	0.19	0.009*	0.01*

*p value<0.05 means significant (two-tailed students' t-test)

enzymatic activity between normal and abnormal seminal plasma after vasectomy [8]. The same authors found no correlation between PAcP and sperm counts or motility. This is contrary to our findings which are in line with the results of other workers [9]. It has been stated that our standard instruments are rather blunt instruments for evaluation of a man's fertility. The basis for such a statement is our insufficient and inadequate knowledge of the function properties of human spermatozoa.

From a review of the literature, it would appear that PAcP is more extremely used as a tumour marker [10-11] than as an indicator of male fertility or infertility where its scope has yet to be exhausted. Research aimed at identification of such parameters and how they may be influenced by endogenous and exogenous factors therefore increases stimulation and support to a much greater degree and extent that has been the case up to now.

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