

EFFECT OF GENDER ON ANTISPERM ANTIBODIES IN INFERTILE COUPLES IN CENTRAL INDIA

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Abstract : The presence of antisperm antibodies in serum may impair sperm function leading to immunological infertility. The aim of study was to determine the presence of antisperm antibodies in the circulating blood of infertile couples. This cross sectional study included 109 couples suffering from infertility for more than one-year duration. Serum antisperm antibodies were determined by Varelisa Sperm Antibodies Enzyme Immunoassay kit. The percentage incidence of antisperm antibodies in infertile men was 30.27% was statistically not significant from the 33.03% incidence in infertile women (P Value >0.05). In the nineteen (15.59%) couples both the husband as well as wife was positive for sperm antibodies. The presence of antisperm antibodies may impair fertilizing ability therefore its assessment should be considered as an essential part of infertility management.

Key words : antisperm antibodies infertile couples incidence

INTRODUCTION

Infertility is a worldwide problem affecting people of all communities, though the cause and magnitude may vary with geographical location and socio-economic status (1, 2). Infertility could be as a result of anatomical, physiological, pathological, endocrinological, immunological and psychosexual character (3). Immuno-infertility is one of the major causes of infertility in humans (4). The antigens responsible for inducing the immune reactions causing infertility originate in the testis, apparently in the secondary

spermatocyte cells and are sperm bound. Sperms are potentially immunogenic in men but are separated from the immune system by the blood testes barrier. Autoimmunization against sperm may occur if the barrier is breached by testicular trauma, vasectomy, tubal obstruction, or inflammation. Isoimmunisation against sperm might be common in sexually active women as sperm are recognised as foreign antigens but immunosuppressive factors in semen, the few sperm passing high into uterus and tubes, and phagocytosis of sperm by macrophages may discourage sensitisation (5).

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Antibodies against sperm can prevent their motility through the female reproductive tract or prevent the process of fertilization. Males as well as females can make antibodies that react with human sperm. In males, it is found in seminal plasma, serum and on the surface of sperm, which cannot be detected in a routine semen analysis. In female it is found in circulating blood and in cervical mucus. Antisperm antibodies also found in homosexual males and in cases of testicular trauma, varicocele, mumps orchids, spinal cord injury, congenital absence of the vas and vasectomy (6). Sperm antibodies in the male differ from those in the female and coexisting immunological parameters allow to a very high degree the correct prediction of the sex of the affected individual thus suggesting that women and men respond differently to sperm antigens (7). The presence of ASA in female serum related with decreased fertilization in in-vitro fertilization and also associated with significantly reduced fertility (8). Pregnancy is reduced by 12-18% in the presence of antibodies to spermatozoa in the female and 18% in the male partner respectively (9). 5-10% of infertile men and women show evidence of antibodies to sperm (10). There is no known data pertaining to percentage incidence of antisperm antibodies in infertile couples in the central India zone therefore, the aim was to find out the incidence of sperm antibodies in infertile couples.

MATERIAL AND METHODS

This research was carried out as a cross-sectional study that include 109 couples suffering from infertility for more than one year duration who were referred to the Reproductive Biology Unit, MGIMS,

Sewagram. Detailed history of present and past illness as well as medical and surgical treatment was taken. The tests was done with due permission of the ethic committee of the Institute and with written consent from the subjects. 5 ml Peripheral blood was collected from infertile couples and the presence of Antisperm Antibodies (IgG and IgA classes) was determined in the serum by Varelisa Sperm Antibodies Enzyme Immunoassay kit (OSB India Agencies Ltd, New Delhi, India).

Exclusion criteria

Subjects with Varicocoele, hydrocoele, undescended testis, any structural abnormality, and any history of surgical intervention in the genitourinary tract, acute febrile illness or treatment history with drugs were excluded. Female with tubal block and genital tract infection were also excluded from the study.

Statistical analysis

Statistical analysis was done by using descriptive and inferential statistics using Z-test and chi-square test. The statistical software used in the analysis was SPSS 17.0 and graph pad prism 5.0. Results were tested at 5% level of significance.

RESULTS

The mean age of male was 31.5 ± 4.7 years (Mean \pm SD) and for females; it was 26 ± 3.9 years. The duration of infertility was 4.1 ± 3.1 years. Overall 52 of 109 infertile couples were positive for sperm antibodies with 47.70% incidence. From them 36 (33.03%) women and 33 (30.27%) men possessed sperm

TABLE I

<i>Parameters</i>	<i>Male</i>	<i>Female</i>	<i>z-value</i>	<i>P-value</i>
Age (years)	31.55±4.73	26±3.99	9.34	0.000
BW (kg)	68.48±8.91	51.12±6.83	16.13	0.000
BMI (kg/m ²)	24.28±2.76	20.03±2.45	12.01	0.000
Duration of infertility	4.11±3.18	4.11±3.18	–	–
Concentration of ASA (ODDs)	0.62±0.43	0.70±0.49	1.23	0.219
Concentration of ASA (Ratio)	1.28±0.95	1.42±0.99	0.99	0.323
Incidence ASA	30.27%	33.03%	0.20	0.64

Data presented are mean±SD.

antibodies. This was statistically not significant (P value >0.05). In the 17 couples both the husbands as well as wife possessed ASA giving its incidence 15.59%.

DISCUSSION

At puberty, with the development of immunologically unique antigens within the male reproductive tract barriers form that protect tissue-specific products from recognition and destruction by immune system. Autoimmune responses in men and alloimmune responses in women can elicit by different sperm and germ cell antigens that leads to the development of ASA in both males as well as females (11). Autoimmunity to spermatozoa could compromise male fertility by interference with normal spermatogenesis & reduction in the migratory potential of spermatozoa. The ability of spermatozoa to migrate through the mucus of the cervix is impaired by agglutinating antibodies and to be virtually eliminated by immobilizing cytotoxic antibodies in semen (12).

Sperm Ags could activate sensitized lymphocytes in women with ASA to release cytokines in the reproductive tract that

exert adverse effects on sperm function, fertilization, or early embryo development. If sperm reach the site of fertilization, antibodies are capable of interfering with sperm interaction with ovum. Various effects include inhibition of sperm binding to & penetration of the zona pellucida & fusion with the egg vitelline membrane. ASA activity in the cervical mucus of infertile women also effectively blocks sperm hamster egg fusion. Sperm bound with ASA over the head lose the ability to undergo capacitation & acrosome reaction resulting in failure of the sperm to bind & penetrate the zona pellucida. Pregnant women with ASA experience a higher incidence of spontaneous abortion than women without ASA (13). Recently antibodies against sperm membrane antigens from ASA positive IVF patients were characterized as exerting inhibitory effects on initial cleavage stage of pronuclear egg (14). Women with recurrent pregnancy loss show antibodies that attack an early developing pregnancy, resulting in either a miscarriage or severe preeclampsia with risk of intrauterine growth retardation or even foetal death (15). So the different study indicates that antisperm antibodies play one of the important roles in the causation of infertility by different ways.

Our present study revealed no significant difference in the incidence of ASA in male & female. This was in accordance with Omu et al 1998, who found overall incidence of ASA in the infertile men 18.8% was not significantly different from the incidence of 17.7% in the infertile women (8). Our results are comparable to the observations by other studies: Anusha K et al (1999) found serum ASA in 30% of infertile couples that include 25% of female and 10% of male partner by ELISA (3). Damianova V et al (1999) noted 31.48% incidence of ASA by ELISA among patients included in a programme for assisted reproduction (16). Menge A C et al (1989) found ASA incidence was 19.0% of men, 20.4% of the women and 32.8% of the couples where one or both the partners were positive for ASA (17). Menge & Medley et al (1982) revealed ASA incidence in 16.5% of men and 21.6% of women and overall 31.1% of the couples where at least one individual with positive results (18). Shulman S et al (1975) noted 23% and 5% incidence of ASA in infertile couples as compared to very low antibody activities in fertile people (19).

The present study revealed that among 109 infertile couples 17 (15.59%) husbands were autoimmune to sperm and their wives also had sperm immunity. 19 (17.44%) males had no antisperm antibodies in the serum but their wives possess sperm antibodies.

16 (14.67%) husbands had immunity to sperm but their wives were not immune to antibodies. This finding is supported by Steven S Witkin et al 1989, who found 12.4% incidence of sperm surface antibodies in men whose wives also had ASA in their sera, but only a 6.5% incidence in partners of women who lacked these antibodies by immunobead binding test ($P < 0.025$) (20).

Conclusion

Our study concluded that the incidence of antisperm antibodies in infertile couples of central India is not different from population studied in other parts of India as well as in Western countries. But the presence of antisperm antibodies in 47.70% couples with almost affecting equal number of males (33.03%) and females (30.27%) in infertile couples is a cause for concern and screening these subjects for sperm antibodies must be taken into account before subjecting to such expensive procedure like IVF, ICSI, etc.

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