

SHORT COMMUNICATION

Urogenital Tract Infection in Asymptomatic Male Patients with Infertility in University of Benin Teaching Hospital, Benin City, Edo State

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ABSTRACT

Urogenital tract infection (UTI) contributes to the commonest single defined cause of infertility worldwide. To evaluate the role of urogenital tract infection in male with infertility and its association with sperm quality. Three hundred and twenty three (323) samples from infertile male subject were screened microbiologically for microorganisms associated with urogenital tract infection with seventy-two (72) age-matched male as a control using microbiological standard procedure. 164 (50.8 %) infection rate was recorded. The dominant uropathogen detected or isolated were *Staphylococcus aureus* (14.0 %), *Chlamydia trachomatis* (11.4 %), *Escherichia coli* (4.3 %), *Mycoplasma genitalium* (4.0 %), *Klebsiella aerogenes* (4.0 %). Others were *Staphylococcus saprophyticus*, *Pseudomonas aeruginosa*, *Protein mirabilis* with 2.7 % each respectively, *Protein vulgaris treponema pallidum* (2.1 %), *Schistosoma haematobium* (0.9 %) *Wulchereria Bancrofti* (0.3 %), *Human immune virus* (2.7 %). Semen profile of the male patients with urogenital tract infection had abnormal semen quality in this study $P < 0.05$. Oligospermic infertile male subjects should be screened for urogenital tract infection to further enhance good quality sperms and functions.

Keywords: UTI, infertile male, semen quality

INTRODUCTION

Infertility is defined by some reproductive specialist and previous studies as failure of conception 1 – 2 years of unprotected intercourse or exposure to the risk of pregnancy. Infertility in Africa is an important health problem with far-reaching consequences for the individual woman or couple, for the health system, for family planning programmes, and for sexual networking and the spread of STD and AIDS. Much attention has not been paid to the etiological role of urogenital tract infection (UTI) and the attendant consequences on sperm functions/quality in recent years. Male factor infertility contributes to the commonest single defined cause of infertility. Analysis of etiology has been based on conventional semen profile with information analysed on the volume of the ejaculate, the concentration of spermatozoa, their motility, morphological appearance, viability and inter-ejaculation variability (Bukharin *et al.*, 2003). Urogenital infection in male is one of the most important causes of male infertility and accounted for about 40 – 41.4 % of male infertility cases worldwide (Esfandari *et al.*, 2002; Askienazy-Elnhar, 2005; Ibadin

and Ibeh, 2008). Conclusions regarding the incidence and consequences of infection in the male reproductive tract have been made uncertain by the lack of suitable diagnostic criteria for demonstrating its presence and the possibility that a large number of cases are symptomless. When these conditions are allowed to progress unregistered by the patient, undetected by the physician, the possibility of damage to the reproductive tract.

Microbial infection has been associated with male infertility for many years. Kect *et al.*; 1998 reported colonization of human sperm by *Neisseria gonorrhoea*, *Chlamydia Trachomatis* is known to cause urethritis and epididymitis in men. Aurox *et al.* (1987) discovered IgM antibodies of the D.K range of *Chlamydia* in serum from sperm donors. Close *et al.* (1990) also detected *C. trachomatis* by serum IgM and IgA analysis. Infectious processes lead to deterioration of spermatogenesis, impairment of sperm functions and obstruction of the seminal tract (Esfandari *et al.*, 2002). It has been regarded that the rate of non-motile sperms and morphological abnormal sperm are higher when there is urogenital tract infection involved (Burkharin *et al.*, 2003). These

Table 1: Number of organisms detected/specimen collected from infertile male patients

Microorganism	Blood No. (%)	Urine No. (%)	Urethral Swab No. (%)	Semen No (%)	Total No. (%)
<i>Chlamydia trachomatis</i>	25 (7.7)	-	-	-	25 (7.7)
<i>Mycoplasma genitalium</i>	13 (4.0)	-	-	-	13 (4.0)
<i>Treponema pallidum</i>	7 (2.1)	-	-	-	7 (2.1)
<i>Human immune virus</i>	9 (2.7)	-	-	-	9 (2.7)
<i>W. Bancrofti (Microfilaria)</i>	-	1 (0.3)	0 (0.0)	0 (0.0)	1 (0.3)
<i>S. haematobium (Trematode)</i>	-	3 (0.9)	0 (0.0)	0 (0.0)	3 (0.9)
<i>Staphylococcus aureus</i>	-	8 (2.4)	14 (4.4)	23 (7.1)	45 (14.0)
<i>Staphylococcus saprophyticus</i>	-	1 (0.3)	2 (0.6)	6 (1.0)	9 (2.7)
<i>Escherichia coli</i>	-	9 (2.7)	0 (0.0)	5 (1.5)	14 (4.3)
<i>Pseudomonas aeruginosa</i>	-	5 (1.5)	0 (0.0)	4 (1.2)	9 (2.7)
<i>Proteus vulgaris</i>	-	3 (0.9)	0 (0.0)	4 (1.2)	7 (2.1)
<i>Proteus mirabilis</i>	-	3 (0.9)	1 (0.3)	5 (1.5)	9 (2.7)
<i>Klebsiellia aerogenes</i>	-	6 (1.8)	1 (0.3)	6 (1.8)	13 (4.0)
n = 323	54 (16.7)	39 (12.0)	18 (5.5)	53 (16.4)	164 (50.8)

abnormalities are mainly due to inflammatory disease, an infection originating from the lower genital tract which ascends to the upper reproductive organs of the male leading to low sperm count (Hy and Liu, 2002). Asymptomatic bacteriospermia also play a major role (Keck *et al.*, 1998; Kukharin *et al.*, 2003). Infectious processes may lead to deterioration of spermatogenesis, impairment of sperm functions, and obstruction of the seminal tract (Esfandiari *et al.*, 2002). As a result, microbiological investigation can reveal the probable infection.

Infertility in males has also been associated with male accessory gland infections, mumps, tuberculosis and syphilis. Leukocytospermia of the epididymis and accessory sexual glands by *Chlamydia trachomatis*, *Ureplasma urealyticum*, and *Mycoplasma genitalium* have also been detected (Bukharin *et al.*, 2003; Ibadin *et al.*, 2009). In the light of the above submission, the objective of this study is to evaluate the male subjects with infertility for urogenital tract infections in relation to the semen quality and functions.

MATERIALS AND METHODS

Study Population

A total of three hundred and twenty-three samples were collected from male patients attending the Human reproduction research Programme/In-vitro Fertilization Centre (HRRP/IVF) of University of Benin Teaching Hospital, Benin City, Edo State, Nigeria. This number is made up of 183 primary infertile male patients and 140 with secondary infertility. 72 randomly selected age-matched infertile male were used as control. Structured questionnaire were distributed to the male patients involved in this study.

Specimen collection

Sterile universal containers with wide mouth were used for the collection of urine and semen samples. Sterile swab

sticks for urethral discharge were also used for each of the male patients. Blood samples for serum aspiration after clothing were collected for seroanalysis of *Treponema pallidum*, *Human Immune Virus*, *Mycoplasma genitalium* and *Chlamydia trachomatis* and using immunochromatophic technique and according to the laboratory diagnosis of Sexually Transmitted Diseases of, 1999 (WHO). Urine, urethral swabs and semen samples were processed bacteriologically according to the method of Cheesbrough (1984). Seminal fluid analysis was done on each seminal fluid using World Health Organization Standard for semen evaluation of 1999.

Identification of Bacterial Isolates

All emergent bacteria isolates from the processed specimen were subcultured into MacConkey agar and incubated at 37 °C overnight to obtain pure cultures. The pure colonies were further subcultured into nutrient agar slants, incubated at 37 °C overnight and stored at 4 °C until needed. The organisms were identified according to the criteria of Cowan and Steel (1985).

RESULTS

A total infection rate of 164 (50.8 %) out of the 323 was recorded in this study. The main dominant uropathogens are *Staphylococcus aureus* (14.0 %) *Chlamydia trachomatis* (11.4 %), *Escherichia coli* (4.3 %) followed by *Mycoplasma genitalium* and *Klebsiellia aerogenes* with (4.0 %) each respectively. Others were *human immune virus*, *Staphylococcus saprophyticus*, *Pseudomonas aeruginosa* and *Proteus mirabilis* with (2.7 %) each respectively, *Treponema pallidum* and *Proteus vulgaris* with (2.1 %) each. Other secondary organisms were *Wulchereria bancrofti* (0.3 %) and *Schistosoma haematobium* (0.9 %), (Table 1). Table 2 depicts the semen quality of the infertile male patients with urogenital tract infection and control subject with normozoospermia. Sperm profile of the male patients with urogenital tract infection had abnormal semen quality in this study (P<0.05).

Table 2: Semen Profile of Infertile Male Patients with Urogenital Tract Infection at University of Benin Teaching Hospital and Control Male Subjects

Age in years	Male subjects under test					Control subjects				
	Tm (%)	Morph Abn (%)	Via (Dead) (%)	Tc ($\times 10^6/ml$)	leu ($\times 10^6/ml$)	Tm (%)	Morph Normal (%)	Via Live (%)	Tc ($\times 10^6/ml$)	leu ($\times 10^6/ml$)
20 – 24	10	86	90	0.8	1.2	68	46	72	31.2	0.2
25 – 29	10	74	90	1.2	0.8	69	40	66	30.8	0.8
30 – 34	20	66	80	1.4	0.4	60	42	64	40.4	0.4
35 – 39	10	62	90	0.6	0.8	58	50	60	51.4	0.4
40 – 44	10	60	95	0.3	1.3	62	38	60	22.4	0.4
45 – 49	20	40	80	0.6	1.6	63	41	62	31.8	1.0
50 – 54	10	40	90	0.4	1.4	55	38	70	40.2	1.0
55 – 59	30	76	90	0.2	1.4	56	40	60	31.4	1.0
60 – 64	10	76	90	0.1	1.8	52	40	62	36.4	0.4
65 – 69	40	84	90	0.3	1.7	54	39	60	58.6	0.7

DISCUSSION

In this study, urogenital tract infection was positive in 50.8 % out of the total number of infertile male patients enlisted and investigated. This infection rate obtained in this study is similar to the 40.2 % obtained in previous studies (Esfandiari *et al.*, 2002). Ibadin and Ibeh (2008) reported 41.4 % among infertile male patient from a similar study on Bacteriospermia and sperm quality. The male reproductive tract with the exception of urethra is normally free from aerobic bacterial (Fowler and Kessler, 1993). The existence of pathogenic bacteria in seminal plasma or elevated numbers of bacteria has been taken as signs of an active infection in the male reproductive tract (Dahlberg, 1996). It is therefore not surprising that bacteria culture was positive in 41.4 % of semen samples from asymptomatic infertile male patients in previous studies (Ibadin and Ibeh, 2008). It was discovered that infertile male with *Staphylococcus aureus* and *Escherichia coli* played a significant role in the deterioration of spermatogenesis and impairment of sperm function (Ibadin and Ibeh, 2008). This certainly so in cases of bacterial prostatitis (Meares, 1989).

Over almost two decades, two organisms in particular have been discussed as having key roles in both symptomatic and non-symptomatic infection in the male reproductive tract, particularly *Chlamydia trachomatis* and *Mycoplasma genitalium*. *Chlamydia* infections are now reported to be the most prevalent and the most damaging of all the sexually transmitted organism. More recently, Auroux *et al.*, (1987) have measured Chlamydia-specific immunoglobulin either in serum or seminal plasma. In an earlier study, Suominen *et al.*, (1993) reported elevated levels of *Chlamydia trachomatis* as against 35 % observed in 28 oligospermia patients (Bjerke and Pourvis, 1992). Ibadin *et al.*, (2009) observed 24 % out of 156 infertile male patients. Significantly, *Chlamydia trachomatis* is capable of attaching to sperms (Wolner-Hanssen and Mardh, 1994). A similar conclusion about a bacterial reservoir function for the male was reached by other authors (Toth *et al.*, 1996) that noted the incidence of vaginitis, salpingitis, herpes and urinary tract infection in

1350 infertile couples and was generally higher in women whose husbands had reported a previous history of genitor-urinary infection. Another possibility is that *Chlamydia trachomatis* may influence infertility by inducing sperm autoantibodies (Soffert *et al.*, 1990; Ibadin *et al.*, 2009).

The role of *Mycoplasma genitalium* as an aetiological agent in male infertility has been discussed since the early observation that this organisms can attach firmly to spermatozoa (Owlkes *et al.*, 1995). It has often been associated with reduced sperm motility and poor sperm morphology (Swenson *et al.*, 1999; Aparicoli *et al.*, 1990; Toth and Lesser, 1992). Mycoplasma infections also appear to be associated with an increase in the percentage of coiled sperm tails (Busolo and Zanchetta, 1985). Some have made the general observation that the ejaculates of infertile men contain more leucocytes than infertile controls (Ulstein *et al.*, 1996) and that sperm quality has decreased in the presence of elevated concentrations of leucocytes (Calamone and Crockett, 1991). This association between infection and depressed sperm quality was also supported in some studies by the finding that there were fewer bacteria in the seminal fluid of fertile than infertile men (Toth *et al.*, 1991; McGowan *et al.*, 1991). The seminal vesicles and the prostate are frequently affected by egg-induced inflammation in *Schistosoma haematobium* infected men. The study also suggests that *Scistosoma haematobium* infection is associated with sperm quality and reduced production of seminal fluid (Peter *et al.*, 2008).

CONCLUSION

The impact of urogenital tract infection as one of the main cause of male infertility cannot be over-emphasized as demonstrated in this study. Circumstantial evidence favours the role of chronic inflammatory conditions in the male reproductive tract as a major cause of disturbances in sperm quality. Indirect consequences of glandular infection such as the induction of sperm antibodies, alterations in seminal fluid viscosity by virtue of disturbances in secretory function and the role of the male

sex glands as reservoirs for repeated infection of the female partner should also be explored more fully to avoid repeated infection in these subjects.

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