

SHORT COMMUNICATION

Bacteriospermia and sperm quality in infertile male patient at University of Benin Teaching Hospital, Benin City, Nigeria

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ABSTRACT

Male Urogenital tract infection plays an important role in men infertility. Asymptomatic bacteriospermia has been regarded as of the contributing factor to male infertility. In this study, 87 semen samples of infertile men attending the Human Reproduction Research Programme and Invitrofertilization unit (HRRP/IVF) of University Benin Teaching Hospital were evaluated Bacteriologically using standard Bacterial culture method. Standard semen analysis was performed according to WHO guidelines. Among the total cases, 36 (41.4%) showed at least one pathogen. *Staphylococcus aureus* (16.1%), *Staphylococcus Saprophyticus* (9.1%), *Escherichia Coli* (6.9%) *Proteus mirabilis* (3.4%) *Klebsiella spp* (2.3%) *Pseudomonas aeruginosa* (1.1%) and *Proteus vulgaris* (2.3%). There was a significant relation between bacteriospermia and the rate of number of total motility and morphologically abnormal sperms ($p < 0.0001$.) The quality of sperm motility was significantly decreased in contaminated semen. The percentage of morphologically normal sperm was lower in this study. *Staphylococcus aureus* *Staphylococcus saprophyticus* and *Echerichia coli* were the most common pathogen with negative effects on sperm motility and morphology in this study. Moreover presence of bacterospermia and Leukocytospermia did not correlate with each other ($P > 0.05$). It seems that leukocytospermia is not a good maker to predict bacteriospermia.

Keywords: Bacteriospermia, Sperm Quality

INTRODUCTION

Male Urogenital Tract Infections is one of the most important causes of male infertility, worldwide. Genital tract infection and inflammation have been associated to 8-35% of male infertility cases (Askienazy–Elnhar, 2005; Keck *et al.*, 1998). Asymptomatic bacteriospermia may play a major role. (Li and Lui, 2002; Bukharin *et al.*, 2003). Male accessory sex glands infection is a major risk factor in infertility (Diemer *et al.*, 2000). The significant of Pathophysiology of bacteriospermia has been discussed in recent years. Some possible Pathomechanisms of the development of infertility linked with infection are considered: direct effect on sperm function (motility, morphology, etc), deterioration of spermatogenesis, autoimmune processes induced by inflammation and dysfunction of accessory sex glands (Keck *et al.*, 1998, Bukharin *et al.*, 2003). Hence, microbiology investigation of male partners in infertile couple can be useful to detect the male urogenital tract infection, especially asymptomatic infections.

The aim of this study was to investigate microbiology semen samples of infertile men and evaluate the effects of bacteriospermia on semen quality.

PATIENTS AND METHODS

Semen sample of 87 infertile men attending infertility Clinic at the Human Reproduction Research Programme/Invitro fertilization Unit (HRRP/IVF) of the University of Benin Teaching Hospital were collected by masturbation, after a 3 days abstinence period. Patients should not have taken any antibiotic one week before collection of semen sample. Before collection, patients were advised to wash their hands and genital area with soap and water. Samples were collected into sterile Universal containers.

All specimen collected were rapidly transferred to Microbiology Laboratory and processed according to the method of Cheesbrough 1984. Culture was incubated at 37 °C for 24-48 h. Semens were prepared on each sample on a slide and stained with gram staining techniques. All emergent colonies from culture were identified according to the criteria of Cowan and Steel 1985. Standard analysis of semen parameters was performed according to WHO, guidelines (Rebenstein J. 2005; WHO, 1999). Nigrosin-Eosin Staining Technique and Sodium Bicarbonate formalin fluid diluted 1/20 were used for the enumeration of sperm cells morphology and sperm count respectively. Control semen from fertile male

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patient was also treated according to the WHO guidelines on semen examination and evaluation.

Social demographic data of each male patient were noted in form of a structured questionnaire in this study.

RESULTS

Out of a total number of 87 specimen processed, 36 (41.4%) yielded bacterial growth with *Staphylococcus aureus*, *S. saprophyticus* and *Escherichia coli* having the highest incidence rate of 16.9%, 9.1% and 6.9%, respectively. Trailing behind these were *Proteus mirabilis* 3.4%, *Klebsiella pneumonia* and *Proteus vulgaris* recorded 2.3% each respectively. *Pseudomona aeruginosa* had 1.1% (Table 2).

Using Chi-square statistical analysis, there was a relationship between Bacteriospermia and Quality from these male infertile patients (Table 1 and 2).

Table 1: Bacterial isolates: sperm morphology and total motility from processed semen

Bacterial isolate (%)	% Sperm cell morphology (abnormal)	% Total/mL motility
<i>Staphylococcus aureus</i> 14(16.9)	90	20
<i>S. saprophyticus</i> 8(9.2)	80	20
<i>Escherichia coli</i> 6(6.9)	90	30
<i>Proteius mavbilis</i> 3(3.4)	70	30
<i>Proteus vulgaris</i> 2(2.3)	60	20
<i>Klebsiella pneumonia</i> 2(2.3)	60	10
<i>Pseudomonas aeruginosa</i> (1.1)	60	20
Total 36(41.4)		

Table 2: Age classification, number of isolates, leucocytes and sperm count/mL

Age [yrs]	No. Examined	No. Positive [%] Leucocytes	Sperm count (Mean) (Mean)	
21-25	4	1 (25)	1.4 x10 ⁵	0.4 x10 ⁶
26-30	10	4 (40)	1.2 x10 ⁶	0.0 x10 ⁶
31-35	18	9 (38.9)	1.4 x10 ⁶	1.0 x10 ⁶
36-40	32	18 (56.3)	1.3 x10 ⁶	1.6 x10 ⁶
41-45	16	5 (31.3)	1.1 x10 ⁶	1.6 x10 ⁶
46-50	7	1 (14.3)	1.3 x10 ⁶	6.0 x10 ⁶
	87	36(41.4)		

DISCUSSION

In this study 36 (41.4%) out of a total number of 87 semen samples from infertile males collected yielded bacterial growth. In Table 1, *Staphylococcus aureus* (16.1%), *S. saprophyticus* (9.1%) and *Escherichia coli* (6.9%) were the main organisms with the most negative influence on sperm motility and morphology. (Rodin *et al.*, 2003; Sanack *et al.*, 2005; Esfandiari *et al.*, 2002). There was a definite relationship between Bacteriospermia (Bacterial Isolates), Leucocytes (Puscells) and Total sperm count (P < 0.001). The immobilization effect of certain bacteria particularly *Escherichia coli* had been reported (Teague *et al.*, 1991). The rate of non-motile sperm cells and abnormal morphology was also established through WHO 1999 evaluation techniques and was found to be affected by these bacterial isolates (Table 2).

The results obtained from questionnaire on infertility assessment shows that most of the semen samples from these infertile male patients belong to 36-40 years old yes category. Generally the risk of infertility increases by age but most of our investigated patients were young.

The idea that bacterial infection may be partly responsible for male infertility arises from the clinical observation of the patients' male reproductive system. Male Urogenital Tract Infection is one of the most important causes of male infertility worldwide. (Askienazy – Elnhar, 2005; Li and Lui, 2002; Bukharin *et al.*, 2003). Infection processes may lead to deterioration of spermatogenesis, impairment of sperm functions, and obstruction of the seminal tract (Keck *et al.*, 1998). In the light of the above, there is the need to institute a microbiological intervention to detect the probable microbial agents.

In view of our study, it seems that Leukocyspermia is a poor maker to predict bacteriospermia (P> 0.05) (Table 1). Consequently in presence or absence of the Leukocytospermia, microbiological investigation should be performed on all semen, as a routine test, from infertile male attending infertility clinics (Rondin *et al.*, 2003).

It should be noted that presence of Urogenital Tract Infection and inflammation poised a danger to the fertility profile of male patient and should be eradicated by antibiotics and anti-inflammatory treatment, especially during Assisted Reproductive Technique (ART) (Askienazy – Elnhar, 2005). This is because genital bacteria can attach to sperms and some of them cannot be removed even during the process of sperm washing in the Invitro Fertilisation Lab (IVF). The most common organisms isolated form IVF culture system is *Echerichia coli* and fungi. Microbial contamination of the IVF culture media may lead to fertilization failure (Askienzy – Elnhar, 2005).

Therefore, because of the important role of bacteriospermia in male infertility, more attention was attached to young men sexual health in this study.

REFERENCES

- Askienazy – Elnhar (2005).** Male genital tract infection: the point of view of the bacteriologist. *Gynecology Obstetrique and Fertilité* **33(9): 691 – 697.**
- Bukharin, O.V., Kuz min, M.D. and Ivanov, luB. (2003).** The role of the microbial factor in the pathogenesis of male infertility. *Zhurnal Microbiologii, Epidemiologii I Immunobiologii* (2): **106 – 10.**
- Cheesbrough, M. (1984).** Medical Laboratory Manual for Tropical Countries. Vol. II. Microbiology. 2nd ed. University Press. Cambridge. pp 100-196.
- Cowan, S. T. and Steel, K. J. (1985).** *Manual for the Identification of Medical Bacteria.* 4th ed. Cambridge University Press. London pp. 217.
- Diemer, T., Ludwig, M., Huwe, P., Haler, D.B. and Weidner, W. (2000).** Influence of genital urogenital infection on sperm function. *Current Opinion in Urology* **1(1): 39 – 44.**
- Esfandiari, N., Saleh, R. A., Abdoos, M., Ruozrokh, A. and Nazemian, Z. (2002).** Positive bacterial culture of semen from infertile men with asymptomatic leukocytospermia. *International Journal of Fertility and Womens Medicine* **47 (6): 265 – 270.**
- Keck, C., Gerber – Schafer, C., Clad, A., Wihelm, C. and Breckwoldf, M. (1998).** Seminal tract infections: impact on male fertility and treatment options. *Human Reproduction Update* **4(6): 891 – 903.**
- Li, H. Y. and Lui, J. H. (2002).** Influence of male genital bacteria infection on sperm function. *Zhonghoa Nan Ke Xue*, **8(6A): 442 – 444.**
- Rebenstein, J. (2005).** Infertility, male. University of california, Sanfracisco, USA.
- Rodin, D.M., Larone, D. and Goldstein, M. (2003).** Relationship between semen cultures, leukospermia, and semen analysis in men undergoing *Fertility evaluation, fertilsteril* **3:1555 – 1558.**
- Sanack- Maciejewska, D., Ciupinska, M. and Kurpisz, M. (2005).** Bacterial infection and semen quality. *Journal of Reproductive Immunology* **18; [Epub ahead of print].**
- World Health Organization (WHO) (1999).** *World Health Organization (WHO) Laboratory manual for the examination of human semen and sperm – cervical mucus interaction.* 4th ed. Cambridge University Inc. Cambridge, UK, pp: 1 – 138.