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Male Contribution to Infertility in Maiduguri, Nigeria

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Abstract

Context: *Infertility is a frequent reproductive health problem in this environment. Abnormalities of seminal fluid may be found in up to 60% of infertile couples. Various factors are known to be responsible for seminal fluid abnormalities. Local studies on this very important health problem are few.*
Objective: *The objective of this study was to determine the magnitude of male contribution to infertility in North Eastern Nigeria and the factors responsible.*
Study Design, Setting and Subjects: *A descriptive study of 704 males with abnormal seminal fluid profile who were investigated at a university teaching hospital over a 12-month period. Relevant past medical history, physical examination and investigation results were extracted from the patients' case records.*
Results: *A total of 1201 seminal fluid analyses were conducted during the study period. Abnormalities were detected in the seminal fluid of 704 (58.6%) patients. Male factors were the only identifiable cause of infertility in 70% of the cases. Azoospermia (12.8%) and oligozoospermia (26.8%) were the most frequent semen abnormalities found. Varicocoele (13.9%), previous groin surgery (16.8%) and chronic urethritis and/or male accessory gland infection (5.5%) were the main associated clinical findings in the patients.*
Conclusion: *Male factor contributes significantly to infertility in this environment. The treatment of infertility using conventional methods have very low success rates while recent technologies are expensive and not readily available in this environment. It is therefore necessary for us to understand the various factors that contribute to male infertility in our environment so as to develop preventive strategies.*

Key Words: Male Factor, Infertility, Semen Analysis. [Trop J Obstet Gynaecol, 2001, 18: 87-90]

Introduction

Infertility is a global problem and the male partner contributes significantly to this problem [1,2]. Of the 1,201 infertile couples investigated at the University of Maiduguri Teaching Hospital over a 10 year (January 1989 to December 1998), there was an identifiable male factor contribution in 704 (58.6%) [1]. Abnormalities in semen production and quality are the main problems.

Semen analysis is the most important assessment of the male factor in infertility. Semen is best obtained for analysis by masturbation. At least three consecutive semen analyses two to three weeks apart are needed before a diagnosis of an abnormal semen sample is made because of the known variability in the results of semen analysis. Azoospermia (complete absence of spermatozoa from the ejaculate) or severe oligozoospermia (reduced sperm density or count, usually less than 5 million per milliliter) [3] may result either from testicular failure or from obstruction of the seminiferous tubules or efferent ducts even with normal spermatogenesis occurring in the testes. In such instances, hormonal assay, which includes follicle stimulating hormone (FSH), luteinising hormone (LH), testosterone and prolactin measurements are done to determine the aetiopathogenesis of the problem. Testicular biopsy is also done when indicated, usually as a last resort.

The objective of this study was to analyse the results of the examination of the semen samples of patients with identifiable male factors contributing to infertility and to describe the various patterns of abnormalities found.

Materials and Methods

This study was done at the University of Maiduguri Teaching Hospital (UMTH) in the north-eastern corner of Nigeria. In our centre, the diagnostic evaluation of an infertile couple entails interviewing both partners at the initial visit. Although the woman is usually the first to seek help, early education on the requirements for normal fertility usually helps to bring the man around. The infertility clinic is run by teams, which include the gynaecologist and the urologist. A detailed history is obtained from both partners. The man is usually examined in a warm room in privacy and completely undressed and preferably in a standing position. A general physical examination is performed to detect abnormalities relevant to fertility.

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Physical examination will include the size, position and consistency of the testes, state of the vas deferens and epididymis, presence of varicocoele, site of opening of the urethral meatus, and the consistency of the prostate gland.

Sterile wide mouthed specimen bottles are used for collecting semen for analysis. There should be abstinence from sexual intercourse for 2 to 3 days before collections. Semen samples are either produced in a side room within the hospital or are collected at home and brought to the laboratory within one hour of collection. Initial macroscopic examination of the appearance, viscosity and measurement of volume are done. A wet preparation is made and a quick assessment of motility is done. A sample of semen diluted with 1% formalin in distilled water is then placed into a haemocytometer chamber for counting. A semen smear is also stained to study the sperm morphology. The presence of leucocytes, other round cells and agglutination in the wet preparation is also noted.

The WHO guidelines [2,4] are used for the classification of the various forms of semen abnormalities. Azoospermia refers to the complete absence of spermatozoa in the ejaculate while aspermia implies the absence of semen in the ejaculate. Oligozoospermia refers to spermatozoa concentration less than 20 million per ml. Teratozoospermia implies that less than 30% of the spermatozoa have normal morphology while asthenozoospermia refers to a situation where less than 50% of spermatozoa are actively motile.

The diagnosis of chronic urethritis and male accessory gland infection was made based on a history and clinical findings of chronic or recurrent urethral discharge, dysuria, soft, tender and enlarged prostate gland on rectal examination, epididymal thickening or nodularity, and a palpable and/or tender seminal vesicles backed by numerous pus cells on semen microscopy and a positive culture result. The data obtained were analysed using simple percentages and the results presented.

The case records of the 704 patients with identifiable male factors contributing to infertility among the1,201 infertile couples analysed at the UMTH between January 1989 and December 1998 were retrieved from the medical records department for detailed study. The data obtained from the case records included the patients' occupation, frequency of coitus, inflammatory and sexually transmitted diseases, congenital malformations affecting the reproductive organs, previous medical and surgical procedures especially a history of groin surgery, mumps orchitis and trauma to the groin. Others include the use of drugs such as alcohol, tobacco and marijiuana, exposure to heat, radiation and the wearing of tight-fitting underwear.

Results

One thousand, two hundred and one male patients performed seminal fluid analysis as part of a comprehensive infertility evaluation of couples seen at UMTH between January 1989 and December 1998. Seven hundred and four (58.6%) of them had one abnormality or the other in their seminal fluid. Biochemical analysis of the seminal fluid was not done. The age range of the patients was 21 – 45 years. The modal age range was 26 – 30 years, which accounted for 49.7% of the cases. Fifty two percent of the patients gave a history of having fathered a child either with the current or a previous partner.

Table 1

Classification of Semen Abnormalities

Type of Abnormality	Number of cases N = 704	%
Azoospermia	90	12.8
Oligozoospermia	189	26.8
Teratozoospermia	48	6.8
Asthenozoospermia	56	8.0
Oligo/teratozoospermia	53	7.5
Oligo/asthenozoospermia	113	16.1
Terato/asthenozoospermia	41	5.8
Oligo/terato/asthenozoospermia	114	16.2
Total	**704**	**100**

Table 1 shows the different semen abnormalities observed in the 704 males. Oligozoospermia (26.8%) and asthenozoospermia (8.0%) were the most frequent abnormalities detected. There was no case of aspermia. The most frequently cultured organisms in the seminal fluid were *Staphylococcus aureus* (49.2%), *Escherichia coli* (32.7%) and *Klebsiella* (11.1%).

Table 2 shows the major clinical findings in males with abnormalities of their seminal fluid while Table 3 shows the histology results of those patients who underwent testicular biopsy on account of azoospermia or severe oligozoospermia. The blood hormone profile of these patients showed either a normal or a high serum FSH and LH.

Table 2

Clinical Findings

Clinical Finding	Number of Cases* N = 704	%
No significant finding	406	57.7
Varicocoele	98	13.9
Testicular Maldescent	7	1.0
Chronic Urethritis/Male Accessory gland infection	39	5.5
Chronic epididymo-orchitis	21	3.0
Gynaecomastia	3	0.4
Herniorraphy	56	8.0
Hydrocoelectomy	49	7.0
Orchidopexy	13	1.8
Trauma to the groin	16	2.3
Mumps orchitis	2	0.3
Hypospadias	2	0.3

**There was more than one anomaly in some patients.*

Discussion

Infertility is an important health problem worldwide [5]. Many cultures regard infertility as a curse. However, with the advent of modern science, factors contributing to low conception rates are increasingly being better understood. As a consequence of this, more people in some of these superstitious societies are seeking orthodox medical care to address the problem of infertility. In sub-Saharan African, the prevalence of infertility is as high as 30 – 40% [6] and the male contribution to this fairly high rate is estimated to be between 40 and 60%[1,6]

In this series, poor semen quality was virtually responsible for all the cases of male infertility. This might be attributed to the fact that our men do not easily volunteer the details of their sexual history and cases of erectile dysfunction and impotence are often missed. Facilities for chromosomal studies and the detection of antisperm antibodies are presently not available in our institution; another reason why some causes of male factor infertility may not be detected. In Jos, Imade *et al* [2] found abnormal semen quality in 71% of their patients. Semen quality is influenced by a number of factors including the competence and skill of the analyst, duration of abstinence from sexual intercourse, mode of semen collection, accessory gland infection, time between the collection and the analysis of the specimen and the type of counting chamber used [4]. In this study, oligozoospermia and astheno-zoospermia were the most frequent abnormalities detected. This is similar to the finding in Jos and other less arid climates [2,6,7], suggesting that environmental temperature is not responsible for the abnormalities in semen quality.

Table 3

Results of Testicular Biopsy

Testicular Histology	Number of Cases N = 109	%
Obstructive Azoospermia	62	56.9
Tubular Sclerosis	18	16.5
Germ cell Aplasia	6	5.5
Germ cell Arrest	7	6.4
Seminiferous Tubular Hyalinization	16	14.7
Total	**109**	**100.0**

Seminal analysis is an indispensable laboratory tool in the evaluation of male partners of infertile couples. The methods used for semen analysis range from the traditional manual method involving the use of counting chambers to the more modern computer assisted semen analysis (CASA) [3]. CASA allows a description average path velocity (VAP) and curvilinear velocity (VCL, the actual path of spiral progress) which is thought to be better related to outcome. Most infertility clinics in advanced countries now make use of semen analysis carried out with CASA standards [4,8].

The place of testicular biopsy in the evaluation of male infertility is controversial. Testicular spermatozoa are now used for intra-cytoplasmic sperm injection (ICSI) during *in vitro* fertilization (IVF) [9] and studies suggest an increased risk of testicular carcinoma *in situ* (CIS) in idiopathic azoospermia [4]. Therefore, it is suggested that except where testicular CIS is suspected, testicular biopsy should be performed only when adequate microsurgical facilities are available to treat obstruction to sperm transport; and when facilities are available for cryopreservation of spermatozoa and/or part of the excised testicular tissue for further use in assisted reproduction [4]. Some microsurgeons prefer that biopsies should be avoided altogether for fear of compromising future microsurgical procedures [10].

Most cases of male infertility defy conventional methods of treatment [2, 3, 4], but the advent of the newer micro- manipulation techniques of assisted reproductive technology like zona drilling (ZD), partial zona dissection (PZD), sub-zonal insemination (SUZI) and, most recently, intracytoplasmic sperm injection (ICSI) have put smiles on the faces of some of these men, especially those with multiple defects like oligo-astheno-zoospermia and oligo-terato-astheno-zoospermia which together account for 32.3% of the cases in this study. They would, otherwise, be unable to father their own children [3, 9]. In this study, poor semen quality was the parameter used to select the cases of male infertility that were analysed. The role of other abnormalities like male genital tract infection, varicocoele and groin surgery, such as herniography and hydrocoelectomy, which could damage the vas deferens need to be further explored [2, 3, 4, 7].

Sexually transmitted diseases, especially those caused by *Neisseria gonorrhoeae* and *Chlamydia trachomatis*, are highly prevalent in Sub-Saharan Africa [6,7] and may contribute to the aetiology of male infertility. In the male, gonorrhoea begins as urethritis and is usually symptomatic. However, asymptomatic infection is more common in areas with a high prevalence of gonorrhoea and where treatment is inadequate like it usually is in our environment. An ascending infection may also involve the prostate gland and the seminal vesicles. The epididymis may also get involved as a result of retrograde passage of infected urine or purulent discharge from the urethra along the lumen of the vas deferens. Both chronic seminal vesiculitis and chronic epididymitis may be associated with occlusive azoospermia [7]. Engorgement of the pampiniform plexus of veins (varicocoele) may suppress spermatogenesis by elevating the intra-scrotal temperature beyond its normal value of 32°C. Hernia repair (particularly in young children) may result in damage to the vas deferens with partial or complete obstruction, or an immunological reaction with production of antisperm antibodies. This may also occur after hydrocoelectomy or any other genital or inguinal surgery[4]. Trauma to the groin may result in testicular injury with subsequent testicular atrophy, or it may cause disruption of the blood–testis barrier and initiate antisperm antibody production [4].

In this study obstructive azoospermia was the commonest histological finding. Azoospermia with a high serum FSH and LH might indicate testicular failure and this is confirmed by histology of a testicular biopsy. Azoospermia with a normal serum FSH and LH might indicate normal spermatogenesis with blockage and this is also confirmed by testicular biopsy and histology, which will also indicate the level of the obstruction.

Since the causes of male infertility are diverse, a proper search for the aetiological factor in each individual case is desirable as the treatment of abnormal semen quality in the male can be difficult, and sometimes impossible. At present, the cost of assisted reproductive technology is not within the reach of the average African [11].

References

1. Idrisa A, Ojiyi E. Pattern of Infertility in North-Eastern Nigeria. *Trop J Obstet Gynaecol*, 2000; 17: 27-29.

2. Imade GE, Sagay AS, Pam IC, Ujah IOA, Daru PH. Semen quality in male partners of infertile couples in Jos, Nigeria. *Trop J Obstet Gynaecol,* 2000; 17: 24-26.

3. Cooke ID. Infertility. In: Edmond DK (ed) *Dewhurst's Textbook of Obstetrics and Gynaecology for Postgraduates*, 6th edition. London, Blackwell Scientific publication 1999; 437-440.

4. Rowe PJ, Comhaire FH, Hargreave TB, Mahmoud AMA(eds) *WHO manual for the standardized investigation, diagnosis and management of the infertile male* 4th Edition Cambridge University Press, England. 2000.

5. Adinma JIB. The tubal factor in infertility. *Nig Med Pract*, 1993; 14: 58-61

6. Cates A, Ferley TMM, Rowe OJ. Worldwide patterns of infertility: is Africa different? *Lancet* 1983, ii: 596–598.

7. Mati JKG. Infertility in Africa: magnitude, major causes and approaches to management. *J Obstet Gynaecol East Cent Afr*, 1986; 5: 65–69.

8. Mortimer D. Semen analysis and other standard laboratory tests. In Hargreave TBC(ed) *Male Infertility*. Berlin. Springer-Verlag 1994; 37 – 72.

9. Imade GE, Baker HWG, Otubu JAM. Intracytoplasmic sperm injection: an advance in-vitro fertilization procedure for male infertility. *Trop J Obstet Gynaecol,* 1997; 4: 15–27.

10. Jow WW, Steckel J, Schilegel PN, Magid MS, Goldstein M. Motile sperm in human testis biopsy specimens. *J Androl*, 1993; 14: 194–198.

11. Okonofua FE. The case against assisted reproductive technology in developing countries. *BMJ* 1996; 957–962.