

EPIDEMIOLOGICAL AND AETIOLOGICAL FACTORS OF MALE INFERTILITY IN NORTHERN NIGERIA

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ABSTRACT

Objective: To evaluate some epidemiologic and aetiologic factors for male infertility in our patients.

Method: All male patients who presented with infertility in urology clinic of the department of surgery between 1991 and 2005 were retrospectively reviewed. Epidemiologic and aetiological factors of male infertility were studied.

Result: There were 537 patients; age ranged 18 to 56 years with a mean of 34 ± 9.0 SD years. Primary infertility was seen in 515 (96%) patients. About 70% were infertile for 2 to 6 years. Primary testicular insufficiency was seen in 260 patients (48.7%) mainly resulting from genitourinary tract infection. Azoospermia resulting from testicular pathology was seen in 18 (3.4%) and obstruction to the vas or epididymis was seen 75 (14.0%) patients. Two hundred and fourteen (45%) patients had oligospermia resulting from testicular insufficiency while 61 (11.4%) had oligospermia due obstruction.

Conclusion: Infertility resulted mainly from preventable causes. This can be prevented by prompt and adequate treatment of genitourinary infection, testicular maldescent and testicular torsion.

Key Words : Epidemiological, Aetiological factors, Male Infertility, Northern Nigeria

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INTRODUCTION

Fertility has always been vitally important in human society and its absence is a major cause of social and medical problems. About 15% of all couples will experience infertility at sometime during their reproductive life^{1,2}. Male infertility is an important but neglected reproductive health issue in Nigeria. Male factor accounts for 20-50% of the causes of infertility in different parts of the country^{1,2}. Only few studies evaluated the causes of infertility in the country.^{3,4} In developing countries, inadequately treated sexually transmitted diseases are responsible for 50-80% of infertility⁵. Obstruction to the vas or epididymis was found in 32.2% and 40% in Nigeria and Ghana respectively, compared to 7% in developed countries.^{18,19,27} Infection is also associated with high incidence of auto-immunization of sperms and may also directly impair spermatogenesis²⁵. While the investigation of the infertile male aims at establishing the aetiology of the abnormality, conventional treatment methods are mainly directed at the treatment of symptoms because of the difficulty in ascertaining a more specific cause, since diagnosis such as asthenospermia and oligospermia are purely descriptive.¹ The development of IVF and microinsemination technique have enhanced

the delivery of children to subfertile men whose only other option would have been adoption or the use of donor sperm. However these procedures are costly and are not available in most centers in our country. Previous reports indicated smoking, type of occupation, alcohol and coffee intake and nutritional factors as risk factors of male infertility^{5,6}. Heavy smoking in males is associated 20-40% reduction in serum ascorbic acid level associated with increased sperm abnormalities⁸. It was suggested that supplementation of ascorbic acid to heavy smokers improved sperm quality⁷. Only few studies in Nigeria are done to determine the effects of these risk factors^{3,4}. Important local factors, such as tuberculosis, mumps, sexually transmitted diseases, testicular trauma, torsion and undescended testes, may play a significant role. Other important factors with high prevalence in Nigeria are exposure to drugs, smoking and alcohol and concurrent medical illnesses, as well as surgical procedures such as herniorrhaphy.⁴ Subfertile men usually present late in developing countries². Recently we have noted an increasing number of infertile men most of whom present early. This is probably due to improved awareness of male factor contribution to the infertility of a couple.

We retrospectively reviewed some epidemiologic and aetiologic factors of 537 patients seen with male

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infertility at department of surgery Ahmadu Bello University Teaching Hospital, Zaria Northern Nigeria. Identification of these risk factors will help in planning adequate control measures which will lead to reduction in the prevalence of male infertility.

MATERIAL AND METHOD

This study involved retrospective review of case notes of all patients seen in Urology Clinic with diagnosis of infertility between January 1991 and December 2005 at Ahmadu Bello University Teaching Hospital, Zaria. Information was obtained from a standardized data abstraction form which was developed to record the important demographic and study variables for each patient. In every patient, a detailed history was obtained with emphasis on past history, suggestive of mumps orchitis, testicular torsion and testicular maldescent. The history of alcohol, or drug intake, smoking and sexual habit was also sought as well as history of diabetes mellitus, hypertension and other chronic diseases. Physical examination was performed with focus on size, position and consistency of the testes, presence of epididymal indurations and presence and texture of the vas deferens. Varicocele was sought by Valsalva maneuver while standing. Semen analysis was performed on three occasions at five weekly intervals each after 3 days abstinence from coitus. Serum Follicle stimulating hormone, luteinizing hormone and testosterone were assessed. Testicular biopsy was done on patients with azoospermia and those undergoing varicocelectomy. Vasography was performed at the time of epididymo-vasostomy for patient with obstructive azoospermia.

RESULTS

During the period of study, 537 infertile men with apparently normal female partners were seen. Their ages ranged between 18 and 56 years with a mean of 34 ± 9.0 SD years. 515 (96%) patients presented with primary infertility while 22 (4%) patients had secondary infertility. Two hundred and thirty one (43%) were married to two or more wives at the time of presentation. The duration of infertility ranged between 1 and 13 years with 70% being infertile for 2 to 6 years. Six (1.1%) patients were taking various antihypertensive drugs including propranolol and nifedipine for 2-5 years. The history of alcohol intake and cigarette smoking was elicited in 38 (7.1%) and 118 (21.9%) patients respectively. Two hundred and twenty (41%) were agricultural workers. The causes of infertility are shown in Table 1. Primary testicular insufficiency was the leading cause of infertility and was seen in 260 (48%) patients. This includes congenital hypoplastic testes and testicular atrophy resulting from torsion, cryptorchidism and post mumps orchitis. Testicular failure was also

considered in patients whose testicular biopsy revealed Sertoli cells only, maturation arrest and germ cell hypoplasia and in patients with poor quality semen in whom no other cause could be found (Table 2). Chronic epididymitis was observed in 124 (23.1%) patients. Unilateral and bilateral epididymal indurations were found in 87 and 26 patients respectively. Three patients had congenital absence of the vas deferens confirmed at scrotal exploration. Varicocele was found in 115 (21.4%) patients while testicular and prostatic inflammations were found in 35 (6.5%) patients, including four with tuberculous orchitis. Bilateral testicular biopsy was performed in 315 patients and the commonest histological finding being hypospermatogenesis seen in 110 (35.2%) patients. One hundred and seventy three (32.2%) patients had azoospermia on seminal fluid analysis, which was due to testicular lesion in 98 (18.2%) patients and obstruction of the vas or epididymis in the remaining 75 (14%) patients.

Table 1: Aetiologic Factors of Male Infertility.

Pathology	No. of Patients	Percentage (%)
Testicular insufficiency	260	48.4
Chronic epididymitis	124	23.1
Varicocele	115	21.4
Left	75	
Right	15	
Bilateral	25	
Testicular and prostatic Inflammation	35	6.5
Bilateral absence of vas deferens	3	0.6
Total	537	100

Table 2: Causes of Testicular Insufficiency in 260 Patients.

Pathology	No. of Patients	Percentage (%)
Idiopathic	120	46.0
Hypoplastic testis	102	26.5
Cryptorchidism	20	7.6
Right	(10)	
Left	(6)	
Bilateral	(4)	
Testicular torsion	15	5.8
Right	(7)	
Left	(5)	
Bilateral	(3)	
Mump Orchitis	3	1.3
Total	260	100

Oligospermia was as a result of obstruction in 20% of patients and testicular insufficiency in 80%. Multiple factors were present in 100 (18.6%) patients while 91 (16.9%) patients had normal clinical and laboratory findings including normal sperm characteristics.

DISCUSSION

About 15% of all couples will have infertility at some time during their reproductive lives and in 20-50 % of these there is a male factor^{1,2,10}. In this study, the incidence of infertility increased from 20 years with the highest incidence in the fourth decade. These patients were about a decade younger than previously reported from Ibadan, probably due to younger age of marriage and improved awareness which makes them seek infertility evaluation early⁹. As reported by others, early presentation and previous pregnancy in the female partner correlate with better outcome of treatment¹². Agricultural workers have been found to have poor sperm quality, these patients also had more long term exposure to several insecticides and other pesticides¹³. These toxic chemicals may have a detrimental effect on male fertility and we suggest more caution in their handling. Dietary exposure to aflatoxin which is common in our environment has also been associated with infertility although the nature of the harmful exposure remains to be identified¹². Recently the oestrogenic effects of several environmental toxins have attracted attention as a possible cause of infertility¹⁵. In addition, some lifestyle factors including recreational drugs, the use of alcohol and cigarette may have deleterious effects on reproduction and represent 12% of the etiologic factors in one study¹⁶.

The commonest cause of infertility in our patients was testicular insufficiency which is similar to other studies^{11,17}. This is probably because testicular failure can result from numerous causes including testicular maldescent, orchitis, testicular torsion and varicocele.¹⁸ However in many cases the aetiology is unknown. Infection of the male genitourinary tract is common and may cause infertility by adversely affecting sperm function by induction of sperm autoantibodies, or initiating leukocyte response^{19,20}. * Sexually transmitted diseases which are often inadequately treated may cause chronic epididymitis and lead to blockage of the ductal system resulting in oligospermia or azospermia. Other studies have shown that infertile men are more likely to self-treat or to report to informal sector providers (traditional healers, Chemist, Patent Medicine dealers) than fertile men⁵. Another study has shown that informal sector providers offer poor and ineffective treatment for sexually transmitted infection in Nigeria as compared with formal sector providers²¹. The high

incidence of testicular and prostatic inflammatory conditions (6.5%) in this and other studies suggests that these conditions contribute more to male infertility in our patients than in developed countries¹⁷. While the resulting obstruction can be treated by surgery, the procedure requires expertise and microsurgical facilities which are not readily available. Prevention and prompt treatment of Sexually Transmitted Diseases is more desirable.

Varicocele was found in 115 (21.4%) of our patients and is similar to the findings of others^{11, 22}. The spermatogenic activity was characterized by maturation arrest and hypospermatogenesis which usually present as oligospermia. It is suggested that testicular failure results from increase temperature, accumulation of carbondioxide, catecholamines and other noxious substances brought on by venous reflux²². There is a significant correlation between varicocele ligation and improvement in sperm characteristics and pregnancy rate^{23,24}. However this favorable outcome is not obtained when other factors such as epididymal obstruction co-exist with varicocele, a situation often found in our patients. Testicular maldescent has been associated with impaired spermatogenesis, the extent of impairment varying from Sertoli cells only to almost normal spermatogenesis²⁵. This is more so in our society where only 26% present at 5 year of age or younger, majority presenting at puberty or older when the testes had already suffered irreversible damage²⁵. The retractile testis has also been considered as a cause of infertility and the subsequent quality of semen depends on the original anatomical position of the testes²⁶. The suprascrotal position of the testis in childhood leads to further deterioration of spermatogenesis and early treatment of the maldescended testis is advocated²². Patients with testicular torsion have impaired spermatogenesis which results from release of cytotoxic immunoglobulins in reaction to the ischemic testis²⁵. Testicular torsion is relatively common in our society and 54% of patients present late when the testis has been irreversibly damaged.²⁵ Thus health education on the emergency nature of testicular pain need to be emphasized so that more testes can be salvaged. Sexual dysfunctions including impotence are rare causes of infertility²⁸.

The incidence of unexplained infertility in our patients is 16.9%. These patients had normal clinical findings including normal sperm characteristics. However, it should be noted that the identification of normal sperm characteristics in a sample can only indicate its fertility potential rather than its exact fertilizing capacity²². With improved diagnostic facilities in our centre, many of these patients would have well-defined causes.

In this study, the pattern of infertility is similar to that of other developing countries. While conventional therapy results in little improvement in fertility, preventable and potentially treatable causes are common. These causes can be reduced by adopting prophylactic measures to prevent future infertility which include prompt treatment of testicular maldescent, testicular torsion, genital infections and varicocele. Health education on these factors will ensure early presentation and prompt treatment of treatable causes of male infertility. In addition, adequate measures should be taken to limit occupational, medical and recreational exposures to gonadotoxins.

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