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CLINICAL PATTERN AND MAJOR CAUSES OF MALE INFERTILITY IN A TERTIARY REFERRAL CENTER IN THE STATE OF RAJASTHAN

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ABSTRACT

Aim-To study the clinical pattern and causes of male infertility at IVF Centre attached with the Medical College in the state of Rajasthan.

Material and Methods-A descriptive observational prospective study was done of male infertile partners of couples presenting with infertility at Raj Care IVF centre, SMS medical college & Hospital, Jaipur. A detailed socio-demographic, personal and reproductive history was taken. All patients underwent semen analysis. Special investigations like endocrinological evaluation, USG scrotum, testicular biopsy and karyotyping were carried out as and when required.

Results- Of the 1154 infertile couples, 302(26.2%) male infertile patients were studied in detail. In our study, most common abnormality was oligo-zoospermia(53.9%) followed by oligo-asthenospermia (18.21%), oligo-asthenoteratospermia(8.6%), azoospermia(15.23%) and aspermia (3.97%).

After detailed workup, azoospermic patients were divided into three groups according to the cause: pre-testicular(1.37%), testicular (67.8%) and post-testicular (30.73%).

Conclusion-This study determines the magnitude, causes and clinical patterns of male factor infertility in our environment.

KEYWORDS : Azoospermia, Oligozoospermia, Oligoasthenozoospermia,

INTRODUCTION

Infertility is a global health issue, affecting approximately8-10% couples worldwide. According to the International Committee for Monitoring Assisted Reproductive Technology(ICMART, World Health Organization), infertility is a disease of the reproductive system defined by failure to achieve clinical pregnancy after 12 or more months of regular unprotected sexual intercourse[1]. Male infertility refers to a male's inability to result in pregnancy in a fertile female. "Male factor" infertility is seen as an alteration in the sperm concentration and/or motility and/or morphology in at least one sample out of two sperm-analysis collected 1 and 4 weeks apart. Male infertility is commonly due to semen abnormalities. Semen quality is used as a surrogate measure of male fecundity. Infertility in a couple is related to female factors in 33%, male factors in20%, both male and female factors in39% and unexplained cause in8% cases. Doctors from All India Institute of Medical Sciences, New Delhi had reported that over 12-18 million couples in India are diagnosed with infertility every year. They found that while the sperm count in the semen specimen of a normal Indian adult male used to be 60 million/ml three decades ago, it now stands at around 20million/ml. In societies with lot of extended families, there is a lot of pressure on a couple to have a baby. Hence, the diagnosis of infertility can have a detrimental effect on self-image, sexuality and relationships. Male infertility is an important cause of infertility with a strong impact on the psychology and physiology of a couple. Current literature suggests that male factor infertility is on the rise in India. Therefore, it is the need of the hour to look into the factors which are leading to such an alarming rise in male infertility and attempts should be made to control such factors in the near future. Male infertility needs to be studied and researched to truly understand its magnitude and prevalence and to get a better insight into its etiology and treatment.

MATERIALAND METHODS

This is a descriptive observational study of the infertile male partners of couples presenting with infertility at IVF center of a teaching hospital, SMS Medical College, Jaipur, Rajasthan. Of the patients who came to OPD for treatment of infertility between August 2016 and September 2017, 302 cases of male infertility were selected. All of them were having regular unprotected sexual intercourse for at least one year without achieving the desired pregnancy. Written consent was taken from every patient for evaluation and use of data for scientific research before their recruitment into the study. A detailed socio-demographic, personal, social and reproductive history was taken. All patients underwent semen analyses. Patients were provided with standardized instructions for semen collection including a predefined pre-test abstinence of 2-3 days. Semen sample was collected by masturbation into a specimen cup at the IVF centre and examined within an hour. Semen was interpreted as per '2010 WHO semen analyses criteria'. All abnormal semen analyses were repeated four weeks later. The diagnosis of azoospermia was established only after the specimen was centrifuged at 1500G for15 minutes and examining the pellet. In cases of low semen volume (<1.5 ml) and in clinical cases experiencing orgasm with missing ante-grade ejaculation, the retrograde ejaculation was confirmed by examining a sample of post-ejaculatory urine for the presence of spermatozoa. Special investigations like endocrinological evaluation, USG scrotum, testicular biopsy and karyotyping were carried out as and when required. A detailed work up was done to evaluate the risk factors and cause of male infertility.

RESULTS

This study was conducted at Rajcare IVF Center, Department of Obstetrics and Gynecology, SMS Medical College Jaipur, Rajasthan between September 2016 and August 2017. A total of 1154 infertile couples attended the infertility clinic. Among the 1154 male partners of infertile couples examined, 302 patients(26.2%) were diagnosed with male factor infertility. Age of the males ranged from 21 to 45 years, with a mean age of 30.37years with mean duration of infertility being 6.79 years. Among the study groups, 56.95% participants were in the age group 20-30 years, followed by 41.05% in 30-40 years and 1.98% in age group > 40years. With regards to education level of the study groups, majority (33.66%) had only primary education, 6.6% were illiterate, 14.56% had passed High School and 45% had completed their graduation and above degrees. It was also seen that 41% of respondents were smokers and rest 59% did not smoke. In the study 21.8% of respondents were in the habit of drinking alcohol and rest78.1% were not alcoholic. The BMI of the males ranged from 15.1 to 32.9 with 75% of patients having BMI< 25. Only 5% patients had

BMI>30. In our study, the most common semen abnormality was oligozoospermia (53.9%) followed by oligoasthenozoospermia (18.21%), oligoasthenoteratozoospermia (8.6%) azoospermia (15.23%), and aspermia(3.97%).After detailed workup, azoospermic patients were divided according to causes into pre-testicular(1.37%), testicular(67.8%)and post-testicular(30.73%). In the study 54% patients were not exposed to any significant environmental toxin whereas 26% were exposed to heat, 8% to chemicals, 4% to pesticides and 5% to radiation. Patients had varied etiology like varicocele(6%) orchitis(5%), undescended testes(7%) erectile and ejaculatory dysfunction(3%), diabetes(1%), congenital absence of bilateral vas deference(1%) and 0.6% patients had cancer and genetic causes.

DISCUSSION

At present there are no reliable available statistical data of male factor infertility in the state of Rajasthan. This is the only referral government IVF center associated with medical college for infertility in state of Rajasthan. Male infertility is due to a variety of conditions. Some are identifiable and reversible whereas others are identifiable but not reversible. Thus it is important to identify the cause and correct it accordingly.

In our study, the male factor infertility among infertile couple was 26.2%.Mean age of the patients was 30.37 years (ranging from 21 to 45 years) and the mean duration of infertility was 6.79 years which is comparable to a study in Nigeria[2] where the mean age of male partners was 39.1+/-6years and mean duration of infertility was 65 months. In developing countries and in a patriarchal society like ours, males usually present late to seek treatment.

In our study 41% patients were smokers and 31% were tobacco chewers, which is quite high. Toxins from tobacco smoking can potentially affect sperm development and function, with a negative effect on semen parameters. Liu et al, El-Melegy et al, Al-Matubsi et al, reported an association between smoking and negative effect on semen parameters which includes sperm count, motility, morphology and DNA fragmentation, but not on semen volume. On the other hand some studies like Collodel et. al., Aghamohammadi and Azfari, Davar et al[3] found no correlation between smoking and semen parameters.

In our study, only 21% patients were alcoholics. Most studies that included alcohol as a point of investigation have failed to show a significant impact on sperm counts, at least among those with moderate alcohol consumption (Marinelli et al. 2004). In contrast, in chronic alcoholics, there is good evidence for impairment of spermatogenesis and reductions in sperm counts and testosterone levels (Muthusami &Chinnaswamy 2005).

Although many studies including Sermondade et al[4] and MacDonald et al[5], have shown correlation between male infertility and obesity, in the present study only 5% patients have BMI >30. The lower number of obese patients could be due to the fact that most patients belong to lower socioeconomic status and are involved in heavy outdoor work and activities. Obesity causes decrease in sperm count due to changes of hypothalamic-pituitary gonadal (HPG) axis, thermal effect resulting from increased scrotal adiposity and erectile dysfunction. In our study 26% patients who are laborer, drivers and farmers and were involved in outdoor activities involving exposure to heat. Any occupation or lifestyle causing raised temperature around scrotum can have a detrimental effect on sperm parameters. Many studies have shown detrimental effects of heat on semen parameters (Figa-Talamanca et al. 1996, Bujan et al.2000). Numerous studies have addressed that occupational exposure to pesticides in farmers can affect spermatogenesis. In countries like India, where DDT is still used, may have detrimental effect on semen parameters (Dalvie et al. 2004, Aneck-Hahn et al 2007). In our study most common semen abnormality was oligozoospermia(53.9%) followed by oligoasthenozoospermia (18.21%), oligoasthenoteratoszoopermia (8.6%) azoospermia (15.23%) and aspermia(3.97%). In Ile-lfe study oligozoospermia was the commonest sperm abnormality. Same was reported by Ikechebetu et al in an earlier study[6]. Another study conducted in Nnewi South East Nigeria[2] reported Oligozoospermia(61 %) as the most common abnormality followed by asthenozospermia (17.4%), azoospermia (13%) and teratozoospermia(8.7%).In most of the patients of oligospermia after detailed work-up, no cause was found but 32% had history of heat, environmental toxins and chemical exposure. One patient was diagnosed as Kartagener syndrome. In our study, two patients were diagnosed with carcinoma (CML, testicular carcinoma) and were being given chemotherapy and as a result were exposed to gonadotoxic drugs. After detailed workup, azoospermic patients were divided according to cause into pre-testicular(1.37%), testicular (67.8%) and post-testicular(30.73%). There were 2 cases of pre-testicular azoospermia, one was diagnosed as Idiopathic hypogonadotrophic hypogonadism and other as a case of Kallman's syndrome.

Most of the patients of azoospermia in our study are of testicular pathology. Direct testicular pathology may derive from varicocele-induced testicular damage, undescended testes, testicular torsion, mumps orchitis, gonadotoxic effects from medications, genetic abnormalities and idiopathic causes. In our study 22 patients had undescended testes. Early treatment can potentially minimize the risk of infertility, and the success depends on the initial position of the testicle. But in our study, majority of the patients were surgically corrected late in life, hence without benefit. Azoospermia in association with varicocele occurs in between 5 and 10% of men. In our study, 20 patients had varicocele. Currently, there is convincing evidence in literature that varicocele produces a progressively harmful effect on the testis, and varicocelectomy has been shown to prevent the progressive decline in testicular function and reverse the damage and improve pregnancy rates and ART outcomes[7]. In our study 16 patients had a history of mumps orchitis and chronic orchitis. Testicular atrophy occurs in 36% of those affected bilaterally, whereas infertility occurs in just 13%. There was one patient of Klinefelter Syndrome, which is the most common numerical chromosome anomaly observed in male infertility occurring in between 1:500 and 1:1000 males. Patients are commonly azoospermic, but testicular spermextraction (TESE) may reveal spermatozoa in approximately 69% of Klinefelter Syndrome men[8]. Testicular biopsy reports of 14 patients of azoospermia reported Sertoli cell only syndrome. In our study, one patient had a history of testicular torsion. The most significant complication of testicular torsion is loss of testis, which may lead to impaired fertility [9]. The most frequent cause of vasal obstruction is inadvertent injury during the performance of a hernia or hydrocoele repair. In our study 24 patients gave a history of hernia, hydrocoele, hypospadiasis, bladder neck surgery and uretric stone surgery. Congenital bilateral absence of the vas deferens (CABVD) is found in 1% of infertile men and in up to 6% of those with obstructive azoospermia[10]. In our study, there were 4 patients of CABVD, with all having normal testicular size. Seminal vesicles were absent in two patients. There were 12 patients having erectile and ejaculatory defects. Although ejaculatory defect is a relatively unusual cause of male infertility, ejaculatory dysfunction should be suspected in any patient with a low volume (<1.0 ml) of or absent ejaculate. Retrograde ejaculation can be defined as the abnormal backward flow of semen into the bladder with ejaculation. The etiology may be anatomic, neurogenic, pharmacologic or idiopathic. The diagnosis of retrograde ejaculation is made by examining the post-ejaculate urine for sperm. Thus, the present study provided significant information on the sociodemographic, clinical pattern and specially the causes of male infertility in our state.

CONCLUSION

This study determines the magnitude, causes and clinical patterns of male factor infertility in our environment. Attempts should be made to create awareness about male infertility by reducing the barriers from stigmas associated with infertility due to religious and cultural beliefs so that patients open up and share their problems. This will help to identify correctable causes of male infertility and offer timely treatment.

Table 1 Sociodemographiccharactertistics

variables	Number	Percentage
Age (yrs)		
<20	0	0
20-30	172	56.95
30-40	124	41.05
>40	6	1.98
Education qualification		
illiterate	20	6.62
Primary school	100	33.11
High secondary school	44	14.56
Graduate	94	31.12
Postgraduate	44	14.56

Table 2 Distribution of the respondents by azoospermic etiology

Azoospermia	Frequency	Percentage
Pretesticular	3	1.37
Testicular	148	67.88
Post-testicular	67	30.73

Table 3 Distribution of the respondents by BMI

BMI (kg/m2)	Frequency	Percentage
<25	228	75.49
25-29.9	58	19.2
>30	16	5.29

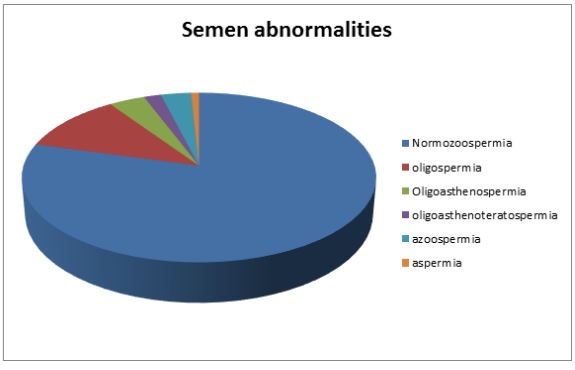
Table 4 Distribution of the respondents by environmental exposure

exposure	Frequency	Percentage
unexposed	166	54.96
Heat	80	26.49
Chemical and solvents	26	8.60
Pesticides	14	4.63
Radiation	16	5.29

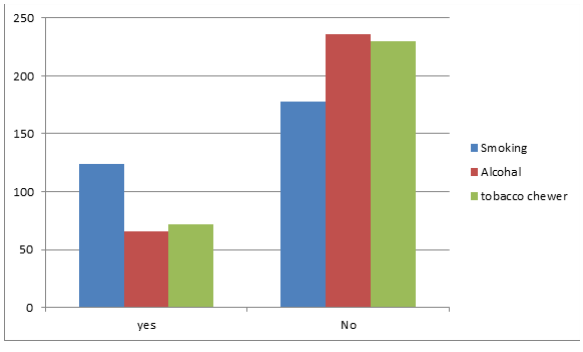
Table 5 - Distribution of Diagnostic Categories in a Groupof Infertile Men

	Frequency	Percentage
Varicocele	20	6.62
Mums orchitis and chronic orchitis	16	5.29
Erectile and ejaculatory dysfunction	12	3.97
Systemic diseases	4	1.31
Cancer	2	0.66
Cryptorchidism	22	7.28
Genetic	2	0.66
CABVD	4	1.31
Postsurgical complication	24	7.94

Abnormalities of semen contributing to male factor infertility



Distribution of the respondents by smoking, alcohol and tobacco history



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