Section: Obstetrics and Gynaecology

Original Research Article

STUDY OF CULTURE SENSITIVITY OF SEMEN IN INFERTILITY CASES IN TELANGANA POPULATION

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Abstract

Background: The majority of genito-urinary tract infections remain asymptomatic, making it a challenge to treat such asymptomatic bacteriospermia and altered semen quality. Hence, seminal patterns and studies of the prevalence of bacteriospermia and their impact on semen quality among the infertile are ideal ways to rule out aetiology. **Materials and Methods:** 53 (Fifty three) infertile adults aged between 25 to 45 years were studied. Semen samples were collected in an instance container by masturbation after the minimum obstinate period of 3 days. Semen parameters included appearance volume. PH, viscosity, liquefaction, and motility, morphology were analysed microscopically. **Result:** 45 (84.9%) had primary infertility, 8 (15.09%) had secondary infertility, 5 (9.45%) were smokers, and 9 (16.9%) were alcoholics. In comparison of semen parameters between bacterial cultures, Group I and Group II participants studied the mean volume of semen PH in value, median sperm concentrations, and median progressive motility, which had a significant p value ($p<0.001$). The comparison of semen concentration, motility, and morphology between PCR Group I and Group II had a significant p value ($p<0.001$). **Conclusion:** Present pragmatic study of bacteriological and PCR will help the clinician to rule out the aetiology of semen morphology, concentration, patho-physiology and treat efficiently in infertile men.

INTRODUCTION

Infertility is a serious health issue worldwide, affecting approximately 8% to 10% of couples. About 60–80 million couples suffer from infertility every year globally; probably between 15 to 20 million (25%) are in India alone.[1] Both sexes are more or less equally involved; men; either alone or along with a female partner, contribute to 40–45% of infertility.[2] Moreover, infections with aetiologies involving bacteria, viruses, fungi, and protozoa contribute to 15% of causes of infertility.[3]

Bactrospermia affects the normal fertility process by any of the following mechanisms i.e. deterioration of spermatogenesis, decreased sperm motility, altered acrosome reaction, altered morphology, formation of reactive oxygen species leading to increased DNA fragmentation index, formation of anti-sperm antibodies due to a breach in the blood testes barrier, and genital tract obstruction due to inflammation and fibrosis.[4]

The majority of genitourinary tract infections remain asymptomatic, thereby leading to a dilemma about how to treat such asymptomatic bacterospermia and altered semen quality. Hence, an attempt is made to evaluate the seminal pattern and prevalence of bacteriospermia and their impact on semen quality among infertile men.

MATERIALS AND METHODS

53 adult males regularly visited the infertility section of the obstetrics and gynaecology department of Maheshwara Medical College and hospital Chitkul (village), near Isnapur X Roads, Patancheru, Sangareddy (dist), Telangana state-502307, were studied.

Inclusive Criteria

Male partners of couples attending the infertility centre and giving written consent for investigation were selected for study.

Exclusion Criteria

Patients with congenital causes of infertility, such as anarchy, and patients without congenital causes of infertility who were immune compromised were excluded from the study.

Procedure

Semen samples were collected in a sterile container by masturbation after a minimum abstinence period of 3 days. None of the patients had taken prior antibiotics.

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Semen parameters such as liquefaction, volume PH, viscosity liquefaction, count, motility, and morphology were analysed according to the WHO guidelines.[5] Microbiological evaluation included microscopic examination of gramme-stained smears and culture for bacteria. Inoculation was done on blood agar and Mac Conkey agar and inculcated aerobically at 37 oc for 48 hours. Aerobic and facultative anaerobic bacteria isolates were identified by standard methods. A semen sample was also preserved 80oc for further processing. DNA was extracted from the semen sample by the DNA extraction kit by Helini Biomolecules, as per the manufacturer's instructions. The extracted DNA material was tested for U. urealyticum and M. homins by real time polymerase chain reaction (PCR).

The duration of the study was from January 2021 to March 2023.

Statistical Analysis

The demographic factors percentage, comparison of PCR positive and negative groups of semen parameters, and comparison of semen concentrations, motility, and morphology between groups I and II were studied with the t test and the Many Whitney z score, respectively. The statistical analysis was carried out in SPSS software.

RESULTS

[Table 1] Distribution of demographic factors –

- 45 (84%) had primary infertility, 8 (15.9%) had secondary infertility
- Smokers – 5 (9.45%) were smokers, 48 (90.5%) were non-smokers
- Alcoholic – 9 (16.9%) were alcoholic, 44 (83.01%) were non-alcoholic

[Table 2] Comparative study of positive (group I) and negative PCR (group II)

- The volume of semen 2.58 (± 0.34) in group-I, 1.95 (± 0.15) in group-II, t test 6.33 and p<0.001
- Mean PH of semen – 8.11 (± 0.17) in group-I, 7.68 (± 0.19) in group-II, t test was 7.47 and p<0.001
- Median sperm concentration (millions.m1) – 34.4 in group-I, 25 in group-II, Mann Whitney z score 5.36 and p<0.001
- Median progress motility (%) 8.0 in group-I, 7.8 in group-II, Mann Whitney z score 1.653 and p<0.05
- Median % of Normal forms – 4.8 in group-I, 7 in group-II, Mann Whitney z score 5.36 and p<0.01

[Table 3] Comparison of semen concentration, motility and morphology between group-I (PCR positive) and group-II (PCR negative) groups

- Semen concentration study 36 normal, 17 abnormal chi-square 3.68, DF=1 and p<0.05 (highly significant)
- Progressive motility – 20 Normal, 24 abnormal, total 44 chi-square 0.478, DF 1 and p=0.48 (p value insignificant)
- Morphology of semen – Normal=31, abnormal=13, chi-square=4.302, DF=1, p<0.03 (p value is highly significant)

Table 1: Distribution of demographic factors

Factors	No. of Patients	Percentage (%)
Types of infertility		
Primary infertility	48	84.9
Secondary infertility	8	15.09
Smoking		
Smoker	5	9.43
Non-smoker	48	90.5
Alcohol consumption		
Alcoholic	9	16.9
Non-Alcoholic	44	83.01

Table 2: Comparison of Semen parameters between Bacteriological culture Group I and Group II participants

Parameter	Group I (40) (positive)	Group II (13) (negative)	Test statistic	P Value
Mean volume (ml/SD)	2.58(± 0.34)	1.95 (± 0.15)	t =6.33	P<0.01
Mean PH (SD)	8.11 (± 0.17)	7.68 (± 0.19)	t = 7.47	P<0.01
Median sperm concentration (millions/ ml)	34.4	25	Mann Whitney Z score=5.3645	P<0.01
Median progressive Motility (%)	8.0	7.8	Mann Whitney Z score=1.6538	P<0.05
Median % of normal forms	4.8	7	Mann Whitney Z score=5.3645	P<0.01

Statistically there is significant difference observed in Volume, PH, Sperm concentration, Progressive motility and Normal forms between Group I and Group II participants.

Table 3: Comparison of Semen concentration, Motility and Morphology between PCR Group I and Group II

Parameter	Interpretation	Group I (40) (PCR positive)	Group II (13) (PCR negative)	Total	Test statistic
Semen concentration	Normal	30	06	36	Chi-square = 3.68 DF=1, p=0.05*
	Abnormal	10	07	17	

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	Total	40	13	53	
Progressive Motility	Normal	14	06	20	Chi-square = 0.478 DF=1, p=0.4895
	Abnormal	19	05	24	
	Total	33	11	44	
Morphology	Normal	26	05	31	Chi-square = 4.302 DF=1, p=0.03*
	Abnormal	07	06	13	
	Total	33	11	44	

*indicates significant difference

PCR = Semen polymerase chain Reaction

Statistically there is significant difference in count observed between Group I and Group II participants in semen concentration and Morphology but no significant difference observed in progressive motility count of group I and group II participants.

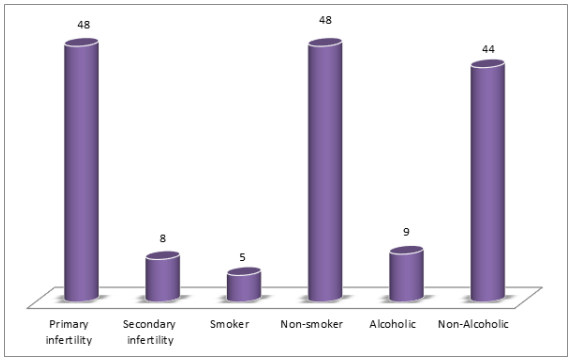

Figure 1: Distribution of demographic factors

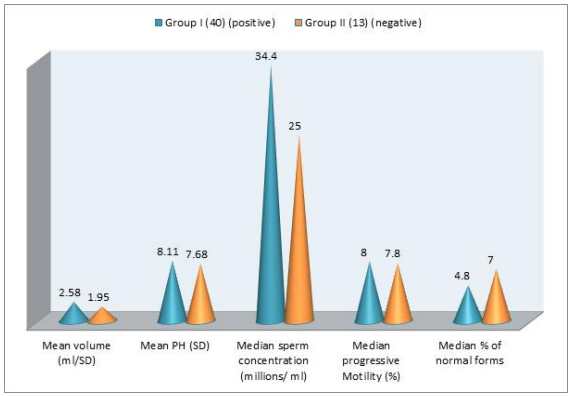

Figure 2: Comparison of Semen parameters between Bacteriological culture Group I and Group II participants

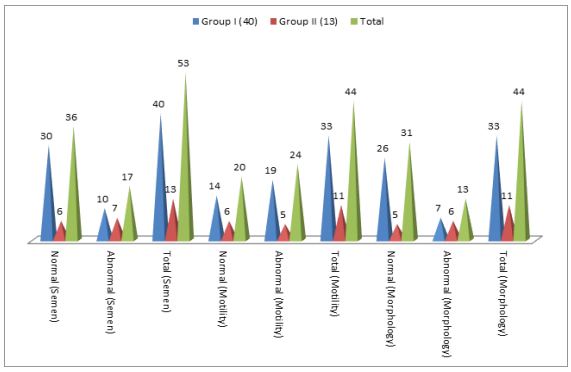

Figure 3: Comparison of Semen concentration, Motility and Morphology between PCR Group I and Group II

DISCUSSION

The present study of culture and the sensitiveness of semen in infertility cases in the Telangana population – In the demography profile study, 45 (84.09%) had primary infertility, 8 (15.09%) had secondary infertility, 5 (9.43%) were smokers, and 9 (16.9%) were alcoholics [Table 1]. In the comparative study of bacteriological culture, the mean volume of semen, the mean PH of semen, the median sperm concentration, the median progressive motility, and the median percentage of normal forms had significant p values ($p<0.001$) [Table 2]. In comparison of PCR groups I and II, semen concentration had chi-square 3.68, DF = 1, and $p<0.001$. I progressive motility of sperm, chi-square 0.473, DF = 1, and $p<0.48$ (p value is insignificant) because motility in both groups was more or less same. Morphology of sperm had chi-square=4.302 and p0.03 p value, both of which are highly significant (p0.003). These findings are more or less in agreement with previous studies.[6-8]

Male genital tract infections are difficult to detect as they are symptomatic and often remain undiagnosed unless the patient seeks treatment for specific symptoms. Infections are potentially treatable causes of male infertility, and resistance to common antibiotics and poor compliance may impede the efficacy of antibiotics in resolving complicated UTIs or restoring fertility.[9]

It is reported that, leukocytes frequently appear in ejaculates, even in fertile men. Leukocytes are powerful producers of reactive oxygen species (ROS) and may have detrimental effects on sperm function and DNA integrity. It is pointed out that, asymptomatic leukospermia may be indicative of early or silent genital tract infections.[10]

It is estimated that, more than one million sexually transmitted infections are acquired every day throughout the world. The most prevalent sexually transmitted pathogens in uncomplicated UTI include C-trachomatis, Urea plasma, Urealtticum gonorrhoea, and Mycoplasma homins, with the exception of E., considered the most common cause of non-sexually transmitted uro-genital tract infection, particularly in epididymoorchitis or prostatis. In addition, a host of viral infections, including mumps, human papilloma virus, herpes simplex virus, and HIV virus, also contribute to increasing leukocyte concentrations.[11]

Apart from broad spectrum antibiotic therapy, antioxidants can manage ROS, and E. coli is aerobically treated with gram negative antibiotics.

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Limitation of study: Owing to the tertiary location of the research centre, the small number of patients, and the lack of the latest techniques, we have limited findings and research.

CONCLUSION

Present study of the culture and sensitiveness of semen in the Telangana population. There were significant results in PCR and the bacteriological profile It will be helpful to clinicians to treat infertile men, but such clinical trials must be conducted on a large number of patients in a Hi-tech hospital where the latest techniques are available to confirm these significant results.

REFERENCES

1. World Health Organisation, Infertility A tabulation of available data on the prevalence of primary and secondary infertility (WHO 1991, pages 1–60)
2. S L Weng, C M Chle – Bacterial communities in semen from men reveal relationships of seminal microbiota to semen quality PLOS ONE 2014, vol. 9 (10), 35–42.
3. Dicmer, P Huwe – Urogenital infection and sperm motility," Andrologia 2003, 35 (5); 283-287.
4. R. Ochsendorf – Sexually transmitted infections impact male fertility Andrologia 2008, vol. 40 (2): 72–75
5. World Health Organisation (WHO) laboratory manual for the examination and processing of human semen, Geneva. Switzerland, 5th edition 2010.
6. T Owolabi, OD Fasubaa – Semen quality of male partners of infertile couples in Ile-Ife, Nigeria: Nigerian J. of Clinical Practise, vol. 16 (1); pp. 37–40.
7. K. Deka and S. Sharma – Psychological aspects of infertility British Journal of Medical Practitioners 2010, vol. 3 (30; 49–53)
8. Prabha, R Sandhu S, Kaur – Mechanism of Sperm Immobilisation by E. coli," Advances in Urology 2010, vol. 5 (1); pp. 52–57.
9. Damiraya Khian MA, Perezpelacz M, Jayendra RS – Antibiotic susceptibility of prostate vesicular fluid isolates," Infertility 1987, vol. 10; 95–101.
10. Esfandiari M, Saleh RA – Positive bacterial culture of semen from infertile men with asymptomatic leukocyte spermia Int. J. Fertile Women's Med. 2002, vol. 47; 265-70.
11. Umapathy E, Simbini T – Sperm characteristics and accessory sex gland functions in HIV infected men Arch Androl. 2001, vol. 46; 153–58.

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