



Comprehensive Semen Analysis: A Single-Centre Audit of 299 Samples

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ABSTRACT

Introduction

Infertility affects 13% to 15% of the couples worldwide. The problem of infertility can have varying effects, depending on the physical and mental health of the couple, ultimately influencing the environment and the overall growth of society. Analysis of a semen sample may lead to various defects in the semen quality and quantity like azoospermia, which means the absence of spermatozoa in the semen ejaculate. Conversely, in oligospermia, the sperm count in the semen ejaculate is low. Micro-organisms, pus cells etc indicate infection in semen and hence can point towards existing infection causing oligospermia. Hence, this study was done to highlight the importance of semen analysis in hospitals and to present a detailed audit of the semen analysed at the tertiary care centre.

Materials and methods

This is a cross – sectional study where data of 3 years from 2020-to 2023 was collected and tabulated under the reported headings - volume, appearance, motility, pus cells, and any other relevant findings at School of Medical Science and Research, Sharda University. A total of 299 semen samples were analysed.

Results

Total number of cases recorded were 299. Out of the total samples, 36.5% of the samples showed reduced motility. 1.7% samples had immotile sperms while reduced motility was seen in 8.4% cases. 24.7% cases showed some degree of abnormal forms (categorised by WHO criteria). 35% cases had pus cells above 5/hpf.

Conclusion

This study has demonstrated that abnormal semen analysis, especially, in terms of sperm quantity, quality, and bacterial infection is a major factor in infertile male having abnormal semen parameters.

Keywords: Infertility, semen analysis, motility, pus cells

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INTRODUCTION

Infertility affects 13% to 15% of the couples worldwide [1]. The problem of infertility can affect in many ways depending on the physical and mental health of the couple and in turn the environment and growth of a society in general [2]. There are mainly two ways in which infertility can be present, it may either be because of Structural uterine abnormalities or infections in the female or they can be male predominant issues like reduction in the quality of sperm or the quantity of sperm in the semen ejaculated. 50% of all infertility cases in India are caused by male factors in which 20% cases are due to female and male factors combined [3]. If a male infertility factor is present, it is almost always defined by the finding of an abnormal semen analysis.

Semen analysis is an essential parameter in giving a definitive diagnosis in infertile males. The advantage of semen analysis lies in its ease of testing and it being a routine outpatient department (OPD) procedure. Hence clinicians rely on a complete semen analysis report for the male gender when treating couples with infertility issues. The common parameters studied while analysing the semen are the volume, quality of sperm, motility of sperms and whether there is presence of pus cells and others such as bacteria. Semen can be biochemically analysed for presence of fructose levels and other biochemical markers.

WHO has adopted cut off levels and threshold for different reporting variables in semen analysis to create a uniformity in the reports issued by different labs as not only is it important for physical and mental health of infertile couple but also can become a

medicolegal issue. Analysis of a semen sample may lead to various defects in the semen quality and quantity- like azoospermia, which means the absence of spermatozoa in the semen ejaculate, while in oligospermia, the count in the semen ejaculate is low. Micro-organisms, pus cells etc indicate infection in semen and hence can point towards existing infection causing oligospermia. Hence, the authors planned this study to highlight the importance of semen analysis in hospitals and to present a detailed audit of the semen analysed at the tertiary care centre.

MATERIAL AND METHODS

This was a cross-sectional study, where data of 3 years from 2020 to 2023 was collected and tabulated under the reported headings - volume, appearance, motility, pus cells, and any other relevant findings at School of Medical Science and Research, Sharda University. A total of 299 semen samples were analysed. The findings were tabulated and a descriptive analysis of the data was presented in the manuscript.

RESULTS

Total number of cases recorded were 299. Out of the total samples, 36.5% of the samples showed reduced motility. 1.7% samples had immotile sperms while reduced motility was seen in 8.4% cases. 24.7% cases showed some degree of abnormal forms (categorised by WHO criteria). 35% cases had pus cells above 5/hpf. All the above factors contribute to male infertility.

Sperm Count		Motility			Appearance		Pus Cells		
Normal	Decreased	Progressive motile	Non - progressive motile	Immotile sperm	Normal	Abnormal	<5 /H PF	5-10 /H PF	>10 /HP F

				rm					
18	10	219	25	53	200	74	19	63	43
4	9						1		

Table 1: Audit of WHO defined criteria in 299 samples received in SMSR Pathology Laboratory

DISCUSSION

Subfertility is a common condition affecting at least 15% of couples during their reproductive lives, and in half of these, a male factor is involved [1]. Recent evidence has questioned the clinical value of WHO criteria for basic semen analysis in the prediction of fecundity [8]. We report 453 pregnancies which occurred between January 2004 and June 2009 among 2935 infertile couples evaluated at our institute. In the infertile couples, we applied a standard protocol in terms of investigation and therapeutic management of couples affected by infertility, performed in both partners in a sequential and parallel way. This was achieved by a unified clinical management of the couple, which includes gynaecologists, endocrinologists, and andrologists, with specific interest in the field of human reproduction.

Semen analysis gives the physician indications about the normal or abnormal testicular functioning as well as the integrity of the male genital tract which may help in the treatment of the patient. [6-8]. As seen in one study, out of the total samples analysed, 40 (25.64%) showed significant bacterial growth. Six different species of bacterial organisms were isolated. In a study done on 'Evaluation of bacteriospermia as etiology for oligospermia, Sharique et al found that out of the total samples analysed, 40 (25.64%) showed significant bacterial growth. Six different species of bacterial organisms were isolated. [20]

A sperm count reduction was, in fact, observed in 116 patients (26% of the total pregnancies). 32 patients (27%) within the oligospermic group presented with severe oligospermia showing a sperm count of $3.58 \pm 1.54 \times 10^6/\text{mL}$. An overlap between fertile and infertile patients in sperm concentration was previously reported [4, 6, 7]. Even though Bonde reported a

predictive value for sperm concentration with an increase up to $40 \times 10^6/\text{mL}$ [8], we present a group of severe oligospermic men in couples who conceived spontaneously. Asthenospermia was the most frequent semen abnormality, both when evaluated as isolated or associated with other semen abnormalities. This high incidence is probably due to the high infection rate in our patients [19]. Previous studies on sperm motility as a predictor of infertility have proven contradictory [4, 6, 10, 11, 20]. This data seems to indicate that asthenospermia may be a surmountable condition in infertile couples. A predictive value for normal morphology was previously reported, [4, 6, 7, 10, 20] although only moderate predictive value for spontaneous pregnancy can be given. Conceptions were, in fact, reported by men with teratospermia [7]. Our data underscore the possibility of spontaneous conception also with reduction in normal sperm morphology. When we consider the percentage of normal morphology, it was near the lower end of reference values (22% for isolated teratospermia and 15% for associated teratospermia). Conception did not occur with normal morphology. In order to improve the clinical value of seminal parameters, WHO recently revised its laboratory manual for the examination and processing of human semen [21]. In this edition, the lower reference limit for seminal parameters is given at the 5th percentile in a population of men in couples who conceived within 12 months. The new WHO manual, considering as "normal population" the male of proven fertility, reduces previous reference values and is in agreement with our evidence of spontaneous conception by men with reduced seminal parameters. To date, there is no threshold in semen parameters which detects and predicts male fertility. New molecular insights into sperm properties which make it capable of fertilizing the egg are recently emerging. Increased knowledge of sperm proteome

will allow us to have new predictors of molecular index in male fertility [22].

CONCLUSION

Semen analysis contributes significantly in the overall diagnosis of male infertility. Males contribute towards infertility in couples and therefore, further study and assessment is required to accurately predict its importance. Sperm concentration in our

country is declining as in other parts of the world and there is significant association between sperm concentration and semen parameters. This study has demonstrated that abnormal semen analysis specially in terms of sperm quantity, quality, and bacterial infection is a major factor in infertile male having abnormal semen parameters.

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