Original Article

Fine Needle Aspiration Cytology of Testis to Rule Out Obstructive and Non-Obstructive Azoospermia

Raazia Mahmood[1], Ayesha Safdar[1], Maria Khan[1], Faryal Javaid[1], Iqbal Muhammad Khan[1] and Maria Tasneem Khattak[2]

ABSTRACT

Objective: To assess the Fine Needle Aspiration Cytology of Testis to Rule Out Obstructive and Non-Obstructive Azoospermia.

Study Design: Descriptive cross sectional study

Place and Duration of Study: This study was conducted at the Department of Histopathology, Rehman Medical Institute Peshawar from September 2022 to March 2023.

Materials and Methods: This descriptive cross sectional study was carried out at the department of histopathology, Rehman Medical Institute Peshawar. The duration of our study was six months from September 2022 to March 2023. All the data was collected by using a predesigned Proforma.

Results: The research was carried on 35 patients. The average age of these subjects was 32 years while the age ranging from 21 years to 45 years. Thirty patients suffered from primary infertility and five faces secondary infertility.

Conclusion: The results of study depicts that FNA is reliable source in diagnosing azoospermia.

Key Words: FNA, Azoospermia, Testicular cytology

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INTRODUCTION

Infertility is the failure to get pregnant after one year of unsafe sexual activity[1]. A procedure that is just somewhat intrusive is required in order to arrive at the correct diagnosis in cases of male infertility, which is a widespread issue[2]. As a minimally invasive alternative to open testicular biopsy, fine needle aspiration cytology of the testis is increasingly used to evaluate testicular function[3]. this research was to determine how well fine needle aspiration cytology performed in identifying the root causes of azoospermia and to verify that FNAC is a low-risk, outpatient study that produces no adverse outcomes and is cost-effective[4].

[1.] Department of Histopathology, Rehman Medical Institute, Peshawar.
[2.] Department of Histopathology, Rehman College of dentistry / Rehman medical institute (RCD/RMI) Peshawar.

Correspondence: Maria Tasneem Khattak, Associate Professor and Consultant Histopathology, Rehman College of dentistry / Rehman Medical Institute (RCD/RMI)
Contact No: 03339471472
Email: accesstomaria@yahoo.com

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Five to ten percent of infertile males who are tested have azoospermia, or an absence of sperm in the semen[5]. Azoospermia can be either obstructive or non-obstructive (NOA). Diagnosing male infertility requires taking spermatogenesis into consideration. Testicular biopsy has traditionally been the gold standard for this examination since it offers information in situations of suspected blockage as well as failed unobstructed testes[6]. Fine-needle aspiration (FNA) has recently gained popularity in the diagonosis of male infertility. As it is not too invasive, it saves as much testicular tissue as possible and gives both qualitative and quantitative information about how sperm are made[7]. sperm at all are present inside the testes, since with the advancements that have been made in the area of reproductive medicine, even a single sperm may today provide men with NOA an opportunity to experience biological fatherhood[8]. This we used testicular FNA to categorise instances of azoospermia into distinct groups. In this study, we investigated whether this method is capable of accurately conveying the state of spermatogenesis in the testes to the physician, hence allowing the clinician to formulate a more appropriate treatment approach[9].

MATERIALS AND METHODS

This descriptive cross sectional study was carried out at the department of histopathology, Rehman Medical Institute Peshawar. The duration of our study was six

months from September 2022 to March 2023. In this research, 38 individuals with azoospermia participated in a retrospective prospective investigation. Azoospermia was confirmed after semen analysis was performed twice, while preserving a suitable period of abstention. The USG and hormonal results were recorded. A clinical exam was done. For cytological investigation, patients had testes FNA. FNA was conducted using a 22-gauge needle and a 10-milliliter disposable syringe under 1% lidocaine spermatic block. Every testicle had fluid removed in two places. Only a trace of blood was found in the aspirate, which was mostly thread-like. After that, smears were created instantly, air-dried, and wetfixed. The Papanicolaou (PAP) stain was alcohol-fixed before applying it to air-dried smears. After counting at least 2,000 cells in an aspirate, sufficient cells were found. Our analysis was limited to the first 35 instances since three additional aspirates did not meet the sufficiency criterion. The cells were identified using Schenck and Schill's morphologic criteria. To facilitate cell identification, we created the Sperm-Sertoli Index (SSI), which is the number of sperm identified in 100 Sertoli cells. Two cytopathologists investigated each of these 35 instances and compared their results.

RESULTS

This research covered 35 patients in the age of twenty one to forty five years. The average age of these subjects was 32 years. Thirty subjects suffered from primary infertility while five grieved with secondary infertility. USG reports were acquired for seventeen patients among them, 4 exhibited obstructive azoospermia, 1 with occlusion of the epididymis, and 1 with a lack of seminal vesicles. While it was noted that the remaining 11 were not present.

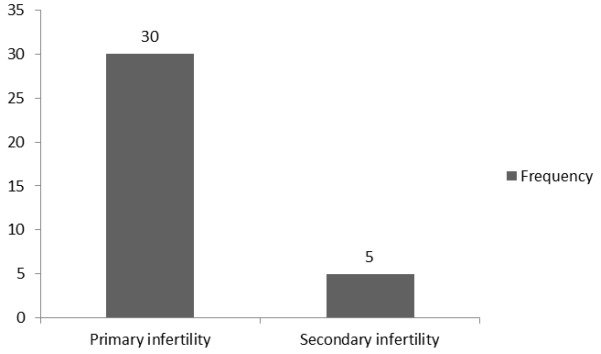

Figure No.1: Frequency of infertility

During the hormonal examination, blood FSH levels were taken from 11 patients, and all of those values were found to be within the normal range. Normal spermatogenesis hypo-spermatogenesis maturation arrest (early or late) SCOS were observed in the aspirates. In ten of the instances, cytological examination revealed that spermatogenesis was occurring normally. All types of spermatogenic cells could be seen in the aspirates. Spermatogenic cells were found more than Sertoli cells, and the majority of the population consisted of fully developed sperm. The mean value of SI was 52.1, whereas the mean value of SEI was 29.9. Therefore, SSI was always greater than 1. In eight of the instances, hypo-spermatogenesis was noted. At this location, there were a smaller number of sperm than spermatids, and there were a greater number of Sertoli cells than the total number of spermatogenic cells. SI had a mean of 29.67, while SEI was more than 100.

Maturation Arrest. In eight of the instances, there was no sign of any mature sperm at all, despite the presence of other spermatogenic cells. These were given the diagnosis of "maturation arrest" due to the fact that the lack of fully developed sperm indicates a halt in the maturation process. The majority of the population consisted of sertoli cells. Two of these eight instances were categorised as having an early maturation arrest since there were no spermatids present, which is an indication that meiosis did not take place. These cases were designated as such. The remaining six showed signs of late maturation arrest, with spermatids present in each one. In every one of these instances, the SEI was higher than 100. The syndrome of only having Sertoli cells. Because Sertoli cells were the only kind of cell that was seen in these six instances, they were classified as SCOS because there was no evidence of any spermatogenic cells whatsoever.

The other four instances each had a unique pattern in one of the testicles, with one testicle displaying hypo-spermatogenesis and the other testicle displaying maturation arrest. Two of the five patients that were categorised as having obstructive azoospermia on USG were found to have normal spermatogenesis, two of the cases were found to have hypospermatogenesis, and one of the cases was identified as having SCOS. Out of the 15 instances of NOA, four of the patients had normal spermatogenesis, two of the patients had hypo-spermatogenesis, six of the patients had maturation arrest, and three of the patients had SCOS.

On FNAC, four of the ten instances in whom FSH levels were available had normal spermatogenesis, two of the cases had hypo-spermatogenesis, three of the cases had maturation arrest, and one of the cases had SCOS. When it came to determining whether or not mature sperm were there, the two cytopathologists came to almost identical conclusions. This was particularly true when it came to determining whether or not mature sperm were present".

DISCUSSION

Since the beginning of the 20th century, diseased human tissue from a variety of organs has been evaluated using FNA cytology[10]. FNA of the testes has been shown to be beneficial in the diagnosis of testicular cancers as well as diseases of the testes that

are not neoplastic and inflammatory[11]. However, its greatest utility is in the evaluation of spermatogenesis in azoospermic males, especially in NOA, since doing so may lead to the tissue of an organ that is already failing being preserved[12]. This is particularly important in cases where NOA is present. It has been used successfully over the last 40 years as an alternative to open testicular biopsy to aid in the characterization of states of human male infertility caused by abnormal spermatogenesis[13]. Our research participants ranged in age from 22 to 48 years old, and had experienced infertility for more than two years at the time of the study. This conclusion is comparable to the findings of Agarwal et al[14] all discovered that the age range of 20–50 years was the one that was most often engaged. It's possible that this is due to the fact that many couples are starting their families during this time period. Thirty of the patients reported that they had primary infertility, while the remaining five patients stated that they had secondary infertility[15]. One of the possible conclusions to draw from this is that primary infertility is more prevalent. Four of the five patients that were found to have obstructive azoospermia on USG had sperm on the smear, while the fifth instance did not and exhibited SCOS when it was examined with FNA. Because of this, the accuracy of the USG's labelling of obstructive azoospermia, also known as NOA, is called into doubt[16]. The researchers observed that out of 10 instances of clinically confirmed obstructive azoospermia, six of the patients had hypospermatogenesis and four of the patients had maturation stoppage. Even in cases when all of the other indicators point to obstructive azoospermia, the dependability of FNA is shown by both their research and ours[17]. As a result, serum FSH cannot be used to detect normal spermatogenesis since it may be normal in individuals with these conditions. All 11 of the instances in our research in which FSH measurements were obtainable revealed that those values were within the parameters of what is considered to be normal. On FNA, there was normal spermatogenesis in 5 of the individuals, hypo-spermatogenesis in 2 of the subjects, maturation arrest in 2 of the subjects, and SCOS in 1 of the subjects.

CONCLUSION

It is possible to more easily and accurately identify testicular cells by using cytological smears since the morphology of all testicular cells is adequately retained on these slides. It is feasible to evaluate the state of spermatogenesis using FNA cytology, which allows one to avoid more intrusive methods of investigation. Cell indices such as SI, SEI, and SSI are very useful tools for determining the level of spermatogenesis. Because discordant findings might help select which testicle to focus on for sperm retrieval, bilateral sampling is vital. Multiple aspirations can be more representative in measuring the stage of spermatogenesis. In today's ever-increasing issue of infertility, testicular FNA plays a very essential role in the diagnosis, treatment, and prognosis of patients. This is because of the function that testicular FNA plays in the diagnosis of patients.

Author's Contribution:

Concept & Design of Study:	Raazia Mahmood
Drafting:	Ayesha Safdar, Maria Khan
Data Analysis:	Faryal Javaid, Iqbal Muhammad Khan, Maria Tasneem Khattak
Revisiting Critically:	Raazia Mahmood, Ayesha Safdar
Final Approval of version:	Raazia Mahmood

Conflict of Interest: The study has no conflict of interest to declare by any author.

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