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Evaluation of Diagnostic Accuracy of Testicular FNAC in Cases of Azoospermia

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Abstract

Background: Male infertility is one of the common problems that can lead to a detrimental effect on life of couples and roughly contributes to 30-50% cases of infertility. As an alternative to testicular biopsy the fine needle aspiration cytology of the testis is being used increasingly to find out the cause of azoospermia. Aim: The aim of this study was to evaluate diagnostic accuracy of testicular FNAC in cases of azoospermia. **Subjects and Methods:** FNA was performed in 119 patients, aged 20-38 years with zero sperm count (Azoospermia), detailed clinical history and physical examination was performed on each patient and patients having any gross testicular abnormalities were not included in the study. FNA was done by non aspirate method i.e needling using 24G needle after local spray of xylocaine. In each case a minimum 4 slides were prepared from each of testis. **Results:** Of the 119 cases, five (4.2%) were reported as unsatisfactory for interpretation due to scant cellularity. Thus the inadequacy rate for testicular aspiration was 4.2% in our study. Of the remaining 114 cases, 44 (36.9%) were classified as normal maturation (azoospermia due to obstruction). 42 cases of maturation arrest and 22 cases of hypospermatogenesis and six cases of sertoli cell only syndrome. **Conclusion:** FNAC of testis is an alternative to biopsy to find out the cause of azoospermia. It is simple, quick, less invasive, minimal painful method and can be done as a routine procedure. Also it is possible to dispatch a report to a patient within 24 hours of collection of sample.

Keywords: Testicular FNAC, Azoospermia, Male infertility.

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Introduction

Infertility is one of the common problems that can lead to a detrimental effect on life of couples trying to conceive.[1] Studies suggest that males are responsible in 30-50% cases of infertility.[1-5]

In the assessment of male infertility first investigation which is advised by clinician is semen analysis for evaluation of count and morphology of sperm.[6] Azoospermia being the first abnormal finding and requires detailed clinical evaluation and further investigations. It is present in about 10–15% of men evaluated for infertility.[3,4,6-8] Azoospermia is categorized into two types: Obstructive and non obstructive.[9]

Testicular biopsy has been indicated to know the etiology of azoospermia since 19th century.[6,7,10] However, this method is invasive and traumatic, requires anaesthesia which makes this technique difficult to use as a routine procedure.[5,6] Due to these limitations of testicular biopsy, there is increase demand of minimal invasive procedure which can be done in out patients. So as an alternative to testicular biopsy testicular fine needle aspiration (FNA) has gained increasing popularity as a simple, quick, less invasive and minimal painful technique that can help in assessing the testicular function accurately or categorizing the etiology of azoospermia.[1-4,6]

Instead of all these advantages of FNA, this procedure is seldom used in routine practice due to various reasons such as poor compliance and apprehension of the person performing the procedure, limited knowledge of the usefulness of the technique and lack of expert cytopathologists.[5,6,11]

The aim of this study was to evaluate diagnostic accuracy of testicular FNAC in cases of azoospermia.

Subjects and Methods

This study has been carried out in the Sant Villayatrai Diagnostic Centre, Bhopal from January 2014-December 2017. FNA was performed in 119 patients, aged 20-38 years with zero sperm count (Azoospermia), detailed clinical history was recorded and physical examination was performed on each patient after obtaining consent.

Inclusion and exclusion criteria

Patients with history of infertility of more than 1 year

duration were included in the study. Patients with orchitis, vericocele, tubercular orchitis and malignancy were excluded from the study.

FNA was done by nonaspirate method using 24G needle after local spray of xylocaine. Needling was performed 2-3 times and needle was held for 30 seconds each time. In each case a minimum 4 slides were prepared from each of testis. Two of these slides were stained with PAP and Haematoxylene & Eosine. Two were air dried and stained with Giemsa.

If at least 200 cells could be counted on minimum one well spread slide, specimen is considered adequate.[4] Population of sertoli cells and spermatogenic cells were identified and expressed in percentage as described by Agrawal et al.[2]

Also following indices were calculated:

1. Spermatic index: The percentage of spermatozoa per 100 spermatogenic cells was expressed as "Spermatic index".
2. Sertoli cell index: The "Sertoli cell index" was expressed as number of Sertoli cells per 100 spermatogenic cells.
3. Sperm-Sertoli cell index: The "Sperm-Sertoli cell index" was the ratio of spermatozoa to Sertoli cells.

Depending upon the percentage of different types of cells counted, we categorized the interpretation as follows:

- Normal spermatogenesis
- Maturation Arrest
    - Upto primary spermatocytes
    - Upto spermatids
- Hypospermatogenesis
- Sertoli cell only syndrome

Results

The mean age of these cases were 29 years with range of 20-38 years. The testicular aspirate was adequate for opinion in 114 (95.79%) cases out of 119 cases. Five (4.2%) cases were inadequate for opinion due to low cellularity. It was depicted in [Table 1].

[Table 2] shows the total number of cases according to their ages. We had maximum number of cases between 25-30 years (56.3%) of age followed by 20-25 years (24.3%) and 30-38 years (17.6%) of age. We also had 02 cases of very young patients aging 20 years of age.

[Table 3] depicts the number of cases according to their duration of infertility. When we analysed the cases according to the duration of infertility, we had maximum number of cases (52.1%) having infertility between 3-5 years and least common had history of infertility for > 8 years.

[Table 4] shows the distribution of cases according to their diagnoses. Of the 119 cases, five (4.2%) were unsatisfactory for interpretation due to presence of scant cellularity. Thus the inadequacy rate for testicular aspiration was 4.2% in our study. Of the remaining 114 cases, 44 (36.9%) were classified as 'normal maturation (azoospermia due to obstruction). 42 cases of maturation arrest and 22 cases of hypospermatogenesis and six cases of sertoli cell only syndrome. Various indices were calculated in the above mentioned cases categorized according to cytomorphological features which are as follows:

Normal spermatogenesis – This was the commonest category observed in our study accounting for 44 cases. Most of the cases in this category had history of secondary infertility. In these cases spermatogenic cells in all stages were well presented. Sertoli cells were frequent but less in number as compared to spermatogenic cells.

{Sertoli cell index – (30.2-56.8), Spermatic index – (45.5-68.5)}

Maturation Arrest – It was found in 42 cases. Out of these 30 cases showed maturation arrest at the level of primary spermatocytes and 12 cases showed maturation upto spermatids. (Sertoli cell index - >100)

Sertoli cell only syndrome – We had six cases in this category, characterised by presence of abundance of sertoli cells without any sperm at any level of maturation, so spermatic index is zero.

Hypospermatogenesis – In our study 22 cases comes under this category. In these aspirations spermatogenic cells are decreased in number compared to sertoli cells. Hence, spermatic index found to be lower in cases of hypospermatogenesis.

Table 1: Percentage of adequacy of testicular smears.

Type of sample	No. of cases	Percentage of smears
Adequate	114	95.79
Inadequate	05	4.2

Table 2: Distribution of cases according to the ages of study participants.

Age range	No. of cases	Percentage
20	02	1.6
20-25	29	24.3
25-30	67	56.3
30-38	21	17.6

Table 3: Number of cases according to their duration of infertility.

Duration of infertility	No. Of cases	Percentage
1-3 years	08	6.7
3-5 years	62	52.1
5-8 years	42	35.3
>8 years	07	5.8

Table 4: Distribution of cases according to their diagnoses

Sr. No.	Category	No. Of cases	Percentage
1.	Normal maturation (obstruction)	44	36.9
2.	Maturation arrest at primary spermatocytes (maturation defect)	30	25.2
3.	Maturation arrest at spermatids (maturation defect))	12	10.08
4.	Hypospermatogenesis	22	18.5
5.	Sertoli cell only syndrome	06	5.04
6.	Inadequate for opinion	05	4.2
	Total	119	100

Discussion

Male factor contributes approximately 30-50% cases of infertility.[1-5,7] In assessing the cause of male infertility,

testicular biopsy is well established modality which is performed for decades.[2,6,7,10] However, testicular biopsy is invasive, traumatic, requires anaesthesia and time consuming. Due to these reasons this procedure is difficult to use as a routine method. To overcome these limitations there is increase demand of less invasive procedure that is fine needle aspiration.[2,5,6]

In our study five out of 119 cases showed scant cellularity with presence of few sertoli cells, so we classified these cases as inadequate for opinion. Thus the inadequacy rate for testicular FNA in our study was 4.2%. Inadequacy rate reported by Kurien et al,[1] RC Adhikari,[7] and Basim Ahmed,[3] were 1.2%, 1.9% and 1.1% respectively. In our study various cells were recognized easily as described by Orbant et al,[12] Persson et al,[13] Papic et al,[14] Schenh et al,[15] and Foresta et al.[16]

The most frequent finding in our study was normal spermatogenesis (44/119) which is similar to studies carried out by Kurien et al,[1] Agrawal et al,[2] Basim Ahmed,[3] Prasad et al,[5] and Ahmad et al.[6] They also mentioned that demonstration of normal spermatogenesis in patients of azoospermia denotes obstructive pathology which is surgically correctable. The second most common diagnosis in our study was maturation arrest (42/119) followed by hypospermatogenesis (22/119). While Kurien et al,[1] had more cases of hypospermatogenesis followed by maturation arrest. One of the study carried out by RC Adhikari,[7] had maximum cases of Sertoli Cell Only Syndrome while we had only 6 cases of this.

We had calculated various indices like spermatic index, sertoli cell index and sperm-sertoli cell index. In our study spermatic index is in the range of (45.5-68.5) which is similar to study carried out by RC Adhikari,[7] and Agrawal et al.[12] Spermatic index is zero in cases of Sertoli cell only syndrome. Sertoli cell index is very important index to differentiate between causes of azoospermia, as it is lowest in normal spermatogenesis and progressively increases in maturation arrest, hypospermatogenesis and sertoli cell only syndrome. The sperm-Sertoli index is highest in normal spermatogenesis and progressively decreases in maturation arrest, hypospermatogenesis and sertoli cell only syndrome. Our findings are similar with the findings of RC Adhikari and Agrawal et al.[2,7]

In our study no complications were observed after fine needle aspiration except for minimal pain and tenderness.

Conclusion

The following conclusions were drawn based on our findings:

1. Azoospermia being the first abnormal finding which mandates a detailed clinical work up to know the cause.
2. Although testicular biopsy was an invasive procedure but still performed for many decades. But the main drawback is that it is time consuming and cannot be performed on OPD basis.
3. As an alternative to testicular biopsy, fine needle aspiration cytology of testes has gained popularity as a simple, quick, less invasive and minimal painful method.
4. Compare to testicular biopsy one of the important advantage of testicular FNA is reduction in turnaround time. Thus it is possible to issue reports on the same day of collection of the sample.

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