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Testicular Biopsy in Male Infertility

Authors
Dr P Lekshmi Ammal, Dr S. Krishna Das
Corresponding Author
Dr P Lekshmi Ammal
Associate Professor, SRMC & RC, Trivandrum

Abstract
Background: *The evaluation of the infertile male includes a thorough history taking, physical examination Semen analysis, hormonal array and search for anti sperm antibody. Additional tests include Trans rectal ultrasound, vasography and testicular biopsy. The latter is particularly useful in cases of azoospermia or oligozoospermia and normal endocrine function.*
Objective: *To identify and categorize various histopathological findings seen in testicular biopsies of men with infertility.*
Materials and Methods: *This is a retrospective study were data was collected from the case records of infertile couples who attended my clinic. Semen analysis was done for all infertile couples and those with azoospermia underwent testicular biopsy. Histopathological results were classified into seven categories.*
Results: *Out of 200 infertile couples included in this series 75 had semen abnormalities. Out of this 55% (41 cases) were azoospermia. 24 men underwent testicular biopsy. Maturation arrest constituted 37.5% of cases followed by sertoli cell only syndrome (29%).*
Conclusion: *According to the present study maturation arrest is the commonest pattern in testicular biopsies taken from azoospermiac male.*
Keywords: *Testicular biopsy, Hypospermatogenesis, maturation arrest.*

Introduction

The combination of testicular biopsy and clinical evaluation for male infertility is becoming progressively more important. Lots of new technologies allow men previously considered infertile to father children. Although a basic male infertility evaluation requires comprehensive history and physical examination along with semen analysis, a testicular biopsy can provide valuable information by further categorizing men with azoospermia for the purpose of prognosis and treatment. The testicular biopsy can help predict the chances of finding sperms on micro dissection of testicles. In a group of 135 men, sperms were found in 51% men with fertile cell only pattern, 83% in men with maturation arrest and 100% of men with Hypo spermatogenesis [1].

Testicular biopsy is usually an office based procedure involving removal of a small piece of tissue from the testis while the man is under conscious sedation. The tissue is assessed microscopically for the presence of sperms and whether the sperm production is normal. An accurate biopsy interpretation is critical in determ-

ining both reproductive prognosis and therapeutic considerations for men with azoospermia.

For men with azoospermia, testicular biopsy is done to determine if a blockage is present or if primary testicular failure is the cause.

In Vitro fertilization or Intra cytoplasmic sperm injection has become a major reproductive treatment option if testicular sperm can be retrieved, for obstructive azoospermia testicular sperm retrieval is simple. For patients with non – obstructive azoospermia, the presence of sperms within the testis is not guaranteed. These men may benefit from more comprehensive procedures like micro dissection sperm extraction procedures. A properly interpreted diagnostic testicular biopsy is critical because it helps with pre - operative counseling. Based on histopathology, patients can be educated about the chances of successful sperm retrieval with micro dissection testicular sperm extraction.

The indications for testicular biopsy have expanded during the last several decades. Previously azoospermic men with serum FSH concentration greater than two to three times normal were designated as having severe testicular failure not amenable to conventional therapy and a diagnostic testicular biopsy was considered unnecessary. However Intra cytoplasmic sperm injection using sperm harvested through testicular micro dessection has become a viable treatment option for many of these individuals. Biopsy is not warranted for cases in which the cause of azoospermic can detected on clinical grounds such as Klinefelter's syndrome or pre – pubertal gonadotropin insufficiency.

The objective of this study was to identify and categorize various histopathological findings seen in testicular biopsies of males with infertility.

Materials and Methods

In this retrospective study, data was collected from 200 infertile couples registered in the clinic. Clinical data of semen analysis results were extracted from the records. Testicular biopsy was done for azoospermic males and the histopathology results collected. Histopathology findings like the number and lumen size of seminiferous tubules in each biopsy, germ cell or sertoli cell ratio, basement membrane thickening, presence or absence of seminiferous tubule hyalinization and the number of Leydig cells were noted.

All testicular biopsies were classified histologycally and tabulated into seven categories as follows.

1) **Normal Spermatogenesis:** Tubules having thin basement membrane and tunica propria as well as normal germinal epithetlium showing orderly progression from spermatozoa to spermatocytes with groups of spermatids of mature spermatozoa.
2) **Hypo spermatogenesis:** The cellularity of germinal epithelium was reduced in general.
3) **Germ cell maturation arrest:** The process of spermatogenesis was arrested at a specific stage mostly at the primary or secondary spermatocytes.
4) **Sertoli cell only syndrome:** Tunica propria and basement membrane was not thickened appreciably and the tubules were normal and contained only sertoli cells, but no other cells involved in spermatogenesis.
5) **Seminiferous tubule hyalinization:** Tubules were smaller in diameter with thick basement membrane and tubular collagenization. The germinal epithelium was lost in these cases.
6) **Mixed pattern:** more than one pathological patterns seen in same testicular biopsy,
7) **Discordant Pattern:** Right and left testicular biopsies showed different pattern. The number of percentage of each pathological pattern was calculated.

Results

In the present study, out of the 200 infertile couples, 75 men were found to have abnormal semen parameters. The incidence of male infertility in this study is 39%.

Out of the 75 men with semen abnormalities, 41 cases (55%) had azoospermia. Of their 41 cases, testicular biopsy was done for 24 cases. In the present study, Maturation arrest constituted 37.5% of cases and sertoli cell inf syndrome constituted 29% cases.

Table 1 Distribution according to Testicular Pathology

Sl No	Type of testicular	Number	Percentage
1	Maturation arrest	9	37.5
2	Hypospermatogenesis	4	16.6
3	Normal Spermatogenesis	3	12.4
4	Sertoli cell only Syndrome	5	20.8
5	Mixed Pattern	2	8.3
6	Seminiferous tubular Hyalinization	1	4.6

Discussions

In men with non obstructive azoospermia, spermatazoa can be harvested from the testis in 50 – 60% [2]. Previous attempts to predict sperm retrieval from testis of men with non – obstructive azoospermia, based on clinical parameter such as testicular volume or reproductive hormones have failed [2].

Sperm retrieval is usually good in men with Hypo spermatogenesis and limited in men with sertoli cell only syndrome. In men with Klinefelter syndrome, the successful rate of sperm retrieval using testicular sperm extraction has ranged from 27 to 69% [3]. In men with with signs of testicular dysfunction in ultrasound, such as inhomogenous testicular architecture and testicular microlithiasis, a biopsy may show carcinoma- in-situ of the testis, the precursor of testicular cancer.

In the present study, normal spermatogenesis was found in 12.4% cases which indicates direct obstruction to the course of infertility. Jamal and Mansoor reported normal spermatogeneres in 15% cases[4]. Some studies showed a very low incidence of normal spermatogenesis as that by Meinhard et al who reported 5% [5]. 35% cases of normal spermatogenesis was reported by Al-Rayees et al [6] and Thomas J [7].

In this series, Hypo spermatogenesis was seen in 16.6% of cases. Thomas [7] reported 19% and Al –Rayees[6] reported 13% of Hypo spermatogenesis. In cases Hypo spermatogenesis, there is a great chance of isolating viable and intact spermatozoa which are capable of fertilization.

Maturation arrest is usually due to genetic or some secondary influences such as antibiotics, chemotherapy or radiotherapy or liver or kidney disease [8].

In the present study, maturation arrest was seen in 37.5% cases. Al – Rayees et al [6] reported 11% of maturation arrest. There is a great variation in incidence of maturation arrest in various studies. Haddad et al reported only 1.7% [9].

Sertoli cell only syndrome was reported is 20.8% cases in the present study. Rasheed et al reported 34% of sertoli cell only syndrome [10] and Al – Rayees et al [6] reported 23.5% cases. Sertoli cells only syndrome which can be due to irradiations, cytotoxic drugs, cryptorchidism or even consanguinity [11]. Tubular hyalinization was noted only in 4.6% in the present series.

Conclusion

Testicular biopsies can be performed for a diagnostic and therapeutic reason. Since testicular spermatozoa can be successfully used for Intra cytoplasmic sperm injection, it is strongly recommended to perform Cryo preservation of testicular tissue for future Intra cytoplasmic sperm injection if spermatozoa are available. In this study, the most frequent pathology seen in patients with Azoospermia is maturation arrest.

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