

Globozoospermia

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ABSTRACT

Male infertility may be due to low sperm concentration, poor sperm motility, or abnormal morphology. Among the factors involved in male infertility, there is a rare morphology disorder called "Globozoospermia". This condition is primarily characterized by the presence of round-headed spermatozoa, absence of acrosomal cap and cytoskeleton defects around the nucleus. The morphological characteristics of globozoospermia are formed during spermiogenesis. We report here a case of male infertility due to morphological disorder Globozoospermia. Assessment of semen by observing macroscopic and microscopic parameters are not sufficient for sperm analysis. In present case, macroscopic and microscopic assessment was within normal range. Morphological assessment showed 80% of spermatozoa with round head and absence of acrosomal cap. The absence of acrosome makes fertilization impossible since these sperm are unable to bind to the zona pellucida. By using Intracytoplasmic Sperm Injection (ICSI), conception is possible; however, the fertilization rate remains very low.

KEY WORDS

Globozoospermia, Male infertility, Morphology

INTRODUCTION

Infertility is estimated to affect 8-12% of couples worldwide and 40-50% of cases of infertility are due to male partner.^{1,2} Normal Sperm has smooth configuration oval head, acrosome covering 40-70% the head and no neck, middle piece or tail defect.³

Among the factors involved in male infertility, there is a rare morphology disorder "Globozoospermia". It is primarily characterized by round-headed spermatozoa without acrosome and cytoskeleton defects around the nucleus.⁴ The pathogenesis of globozoospermia originates in spermiogenesis, especially in acrosome formation and sperm head elongation.⁵ Apart from the affected males suffer from infertility, no other physical characteristics can be associated with the syndrome.⁶

CASE REPORT

A 38 year man and his 35 years wife visited OPD of Bipasana Fertility Center, Rupandehi, Nepal with chief

complaint of primary infertility. Initial verbal investigation showed that they have been married for 13 years and were trying to conceive by unprotected intercourse. On initial investigation of male, FSH and LH was within normal range. His partner Transvaginal examination showed patent fallopian tubes and normal uterine cavity and hormonal assessment was within normal range. After three days of abstinence semen sample was collected in the collection room of centre by masturbation. Macroscopic examination revealed appearance was grey white, volume 2.5 ml, viscosity grade II and pH 8.0. After liquification (40 mins) microscopic examination revealed: progressive motility 70%, non-progressive 20% and non-motile 10%. For morphology assessment, five microliter liquefied semen smear was stained by "Diff-Quik Staining Method".⁷ The stained slide was observed in electron microscope (100x, oil immersion). Out of 100 sperm observed in different fields, 80% of sperm were round head with absence of acrosomal cap (fig. 1). Other deformities were 15-18% and normal sperm was around two percent.

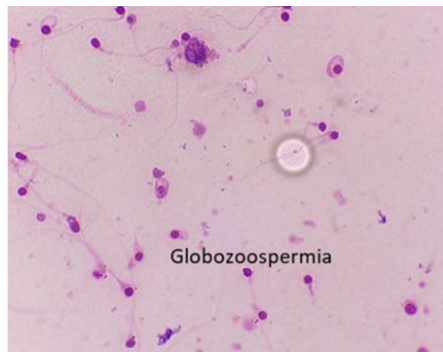


Figure 1. Sperm cell with globozoospermia primarily characterized by the presence of round headed spermatozoa without acrosome. DiffQuik staining were applied to evaluate morphological features for spermatozoa.

DISCUSSION

Globozoospermia is primarily characterized by the presence of round-headed spermatozoa without acrosome and cytoskeleton defects around the nucleus. Singh (1992) classified globozoospermia into type I and type II.⁸ In type I globozoospermia, also known as total globozoospermia, 100% of the spermatozoa have a small, round and acrosome-free head. Contrary, men with type II globozoospermia have both normal and round-headed spermatozoa. In this type of globozoospermia, 20-90% of spermatozoa have no acrosome; therefore, it is also known as partial globozoospermia.⁸ Globozoospermia are also found in normal ejaculates, but there is no definite threshold for the natural population of these spermatozoa in normal ejaculate.⁹

Conventional semen analysis does not reflect the fertility status. Spermatozoa with normal morphology and motility

can also have abnormal DNA. DNA integrity of Spermatozoa is an important marker for normal sperm function and can be a better predictor for fertilization and pregnancy than the common semen parameters. Eight percent of infertile male with normal sperm parameters have high level of DNA damage. Globozoospermia is likely to be related to DNA damage and an abnormal chromatin structure. Disruption of the histone, replacement by protamine during spermiogenesis, high frequency of DNA fragmentation, chromatin abnormalities and chromatin instability was reported in globozoospermic patients.⁶

Intracytoplasmic Sperm injection (ICSI) brings an operative technology in the fields of assisted reproduction technology (ART). Nowadays, this way becomes one of the most important and efficient treatment approaches which is used by infertility clinics. ICSI is a treatment option for these patients, although low fertilization rates after ICSI show a reduced ability to activate the oocyte.

Semen analysis is an inevitable tool for evaluation of male infertility. Though parameters like volume, total count and total motility (progressive and non-progressive) are not sufficient may be within normal range, the male may be infertile due to morphological defects like globozoospermia that was the key factor for infertility in present case. In Nepal, further study is required to find out the possible etiologies of male infertility for management.

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