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Chronic Self Medication With Various Antibiotics Induced Oligoasthenoteratozoospermia - A Case Report.

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Abstract

This is a case report on a 32-year-old (hyper-promiscuous bisexual) male paramedic, with severe oligoasthenoteratozoospermia (OATS) presenting with primary infertility and the couple undergoing assisted reproductive treatment, with repeated failures. He approached the pathology department for semen analysis (SA), repeatedly over the past 4 years. His sperm counts, motility, and normal forms deteriorated at every SA. Clinical evaluation showed no evidence of varicocele, epididymitis, STDs, or Anti-sperm antibodies and his semen culture did not show any growth of organisms, including fungi. In beginning, he denied taking any medications, and very late he confessed that he took various antibiotics (self-medication, which he used as a “morning after pill” to prevent STDs, after each extramarital sexual activity), repeatedly for the past 9 years. After abstinence from all medications for about two years, there was an improvement in his SA report. This finding shows that the cause of his OATS was chronic use of various antibiotics, as many antibiotics are found to alter the mitochondrial DNA of sperms.

Keywords: Self-medication, oligoasthenoteratozoospermia, hepatotoxicity, mitochondrial DNA.

Introduction

Male infertility factors are found in about 40 % of infertile couples **[1]**. With the advent of IVF/ICSI, the male infertility factors are almost neglected, except surgically treatable male infertility factors like varicocele, obstruction in vas deference, etc. The common male infertility factors found are oligozoospermia (< 15 million spermatozoa/mL), asthenozoospermia (< 40 % motile spermatozoa), and teratozoospermia (< 4 % normal forms). Quite often, all three pathologies occur simultaneously as an oligo-asthenic-teratozoospermia syndrome (OATS), which is one of the severe male infertility factors **[2]**.

There is much research conducted on OATS and the recent evidence shows that mitochondrial DNA damage and oxidative stress in sperms are primarily the causative factors for the pathogenesis of OATS **[3]**. There are various causes for sperm mitochondrial DNA damage along with free radical damage. Among them, antibiotics are also known to cause mitochondrial DNA damage **[4]**.

Antibiotics kill microorganisms mainly by inhibiting their DNA. And it is known that mitochondria were ancient microbes that commercialized with eukaryote cells. Hence mitochondria got separate circular DNA. Antibiotics that act by damaging microbes' DNA are also known to damage human mitochondrial DNA **[4]**. Sperm motility is mainly dependent on the mitochondria present in its tail. Hence it is found that certain antibiotics do cause decreased sperm motility **[5]**.

Case presentation

A 32-year-old male paramedic approached the pathology department for semen analysis (SA), repeatedly over the past 4 years. He was married for 6 years, and the couple approached the infertility clinic for the past 4 years. They were diagnosed with primary infertility due to severe oligoasthenoteratozoospermia (OATS). They have undergone many (Intra-Uterine Insemination) IUIs and one cycle of (In Vitro Fertilization/ Intra cytoplasmic Semen Injection) IVF/ICSI, but with negative results. The patient who was working in our hospital as a male nurse approached the pathology department for semen analysis (SA), repeatedly for the past 4 years. He was a nonalcoholic and nonsmoker. No history of acquiring any STDs, in the past. His routine hematological tests were within the normal reference range. But his total bilirubin, liver enzymes like AST, ALT, and serum uric acid levels and triglycerides were slightly higher than the normal reference range. His serological tests for HIV, HbsAg, VDRL, and HCV were negative. Clinical evaluation showed no evidence of varicocele, epididymitis, STDs, or Anti-sperm antibodies and his semen culture did not show any growth of organisms, including fungi. His scrotal ultrasonography did not show any significant pathology, except for two spermatoceles at the left testis. He was not on any medications like anti-convulsants etc. Since he learned about his infertility, for the past 4 years, he is doing regular

exercises; he wore loose cotton garments and also stopped using cosmetics. On comparing his previous SA reports, we found that his sperm counts, motility, and normal forms deteriorated at every SA. Interestingly, the patient gives a history of his past girlfriend becoming pregnant (by him), before his marriage, which was later aborted. Hence again he was questioned about any recent infections, trauma to the scrotum, medications, etc. In beginning, he denied taking any medications, and very late he confessed that he took various antibiotics, repeatedly for the past 10 years, though he did not suffer from any infections. Later, he revealed that he consumed these antibiotics as "morning after pill" as he had contact with multiple sexual partners (both male and female). He was afraid of acquiring HIV and other STDs. Hence he developed a kind of an obsession with taking various antibiotics as he repeatedly suffered from throat infections and urinary tract infections at the beginning of sexual activities. Then he made a habit of taking them after each sexual act, even though he used condoms. He was taking a combination of an anti-retroviral drug, a fluoroquinolone, an anti-parasitic drug, and occasionally oral antifungal if he develops itching around his perineum. He consumed these combinations of antibiotic drugs, on an average of thrice a month, for the past 9 years.

After explaining the adverse effects of these antibiotics and their interactions and explaining the pain that his wife has to undergo during infertility treatment, he was convinced and made up his mind to not consume these antibiotics (also abstinence from extramarital sexual activities). After Two years of "abstinence" from these antibioticcombinations (and also from extramarital sexual activities), his SA was repeated. The patient denied psychological evaluation and counseling, for suspected obsessive compulsory disorder for his self-medications and also for his (bi)sexual hyper-promiscuity (sexual obsessions).

Results

Table: Showing Semen Analysis parameters, before and after abstinence from [chronic self-medication] antibiotic drugs:

Parameter	**Normal range** (WHO criteria as per 5th edn., 2010)	**2017**	**2018**	**2021** (After 2 years without any medications)
Semen volume (ml)	1.4 – 1.7	1.4	1.6	1.6
Total sperm number (10^6 per ejaculate)	33 - 46	11	10	27
Sperm concentration (10^6 per ml)	12 - 16	4	3	9
Total Motility (PR + NP, %)	38 - 42	2	2	19
Progressive motility (PR, %)	31 - 34	0	0	15
Vitality (Live spermatozoas,%)	55 - 63	26	21	38
Sperm morphology (Normal forms %)	3.0 – 4.0	1.0	1.0	5.0 (adequate for IVF)

Discussion

Self-medication is a very less discussed topic, though it is extensively practiced in society. Self-medication is very common in medical and paramedical personnel [**6**,**7]**. Self-medication with antibiotics resulting in drug resistance is well known. Antiretroviral drugs especially NRTI, cause mitochondrial damage through oxidative stress [**8]**. Even certain antibiotics like erythromycin, tetracyclines, fluoroquinolones, nitroimidazoles, antiviral and (imidazoles and triazoles) antifungal drugs are known to alter mitochondrial DNA along with free radical damage **[9-11]** and thus resulting in hepatotoxicity [**12]** and poor semen quality.

In this case, a combination of fluoroquinolone, nitroimidazole, imidazole, and an NRTI drugs was consumed as a "morning after pill" for the past 9 years, by a bisexual hyper-promiscuous paramedic male, to prevent STDs. All the above drugs are known to damage DNA and imidazole is known to cause oligozoospermia **[4]**. Hence in combination, these drugs might have synergistically caused hepatotoxicity and OATS (acquired male infertility). His previous SA reports were not even suitable for IVF/ICSI. Studies have shown that mitochondrial DNA damage persists longer than nuclear DNA damage **[13]**.

As per our advice, the patient maintained strict abstinence from all types of medications for about two years and followed a healthy lifestyle. His SA parameters improved and he was suitable for IVF procedure.

Conclusion

More awareness about the adverse effects of self-medication has to be brought into society. Infertile male patients should be properly screened for the factors responsible for poor semen quality. Safer antibiotics and other drugs for infertile men have to be prescribed.

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