

Case Report

Natural Conception in a Man with Complete Asthenozoospermia: A Case Report

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Abstract

Sperm motility is universally regarded as a critical determinant of male fertility since motile sperm are required to reach and fertilize the oocyte. Men whose ejaculates show complete absence of motility are therefore considered functionally sterile without assisted reproductive intervention. We report an unusual case of natural conception in a man whose semen demonstrated zero motility on multiple assessments. Despite repeated laboratory findings consistent with total asthenozoospermia, his wife conceived spontaneously during a period of very frequent sexual intercourse. DNA paternity testing confirmed biological fatherhood. Extensive laboratory investigation suggested a toxic factor in his seminal plasma and premature acrosome reaction in his sperm, yet confirmed sperm vitality and metabolic integrity. This case illustrates that sperm motility, while essential under most physiological circumstances, may not always be an absolute prerequisite for fertilization and highlights the need for cautious interpretation of semen parameters when assessing male fertility potential.

Introduction

Semen analysis remains the cornerstone of male fertility evaluation. Parameters such as sperm count, motility, and morphology are routinely measured to assess reproductive potential. Among these, sperm motility is perhaps the most crucial, as only motile sperm can traverse the female reproductive tract and reach the oocyte for fertilization.

The diagnosis of total asthenozoospermia, defined as complete absence of sperm motility in the ejaculate, is typically associated with a grave prognosis for natural conception. In such cases, conception is usually achievable only through Intracytoplasmic Sperm Injection (ICSI), where immotile but viable sperm can be directly injected into the oocyte cytoplasm.

However, isolated reports have documented rare instances of spontaneous conception in men with apparently immotile sperm, challenging the long-held assumption that motility is indispensable for fertilization. The present case illustrates one such remarkable instance and provides detailed laboratory insights into the potential mechanisms underlying this unexpected fertility outcome.

Case Description

A couple presented with primary infertility of two years duration. The male partner was in good general health, with no history of testicular trauma, infection, or exposure to gonadotoxic agents. The female partner's reproductive evaluation was unremarkable, and ovulatory cycles were confirmed. Two independent semen analyses, performed several weeks apart, revealed a sperm concentration of 86 and 126 million per ml with zero motility and with normal sperm morphology.

Endocrine assessment showed normal serum Follicle-Stimulating Hormone (FSH), Luteinizing Hormone (LH), and testosterone concentrations. Anti-sperm antibody testing was negative. These findings established a diagnosis of complete asthenozoospermia in the presence of normal spermatogenesis and hormone profile.

Despite the poor prognosis, the couple conceived spontaneously several months later during a period of intense sexual activity, involving multiple acts of intercourse per day. The pregnancy was uneventful and resulted in the birth of a healthy child. Several years later, the couple presented again for secondary infertility evaluation after failing to conceive a second time.

His repeat semen analysis revealed a sperm concentration of 136 million per ml, zero motility, normal sperm morphology, with 40% live sperm percentage by eosin-nigrosine staining (sperm vitality; Hecht and Jeyendran 2022) and 56% HOS positive sperm (sperm viability; Hecht and Jeyendran 2022). Thus, more than half of the sperm were alive but non-motile. Multiple attempts at Intrauterine Insemination (IUI), timed to ovulation, were unsuccessful, prompting further in-depth evaluation of sperm function.

To determine whether the immotility was intrinsic to the sperm or induced by the seminal plasma, a series of incubation studies were performed. The patient's sperm was incubated in Ham's F-10 medium and exhibited 2% motility; when the sperm was incubated in donor seminal plasma, it also displayed minimal motility. Conversely, donor sperm incubated in the patient's seminal plasma showed rapid loss of motility, with almost complete immobility after 30 minutes while the donor sperm incubated in Tyrode's solution maintained normal

The findings were as follows:

Day	Semen Volume (mL)	Sperm Concentration (10 ⁶ /mL)	Sperm Motility (%)	Progressive Sperm motility (%)	Sperm Vitality (%)	Sperm Viability (%)
1	0.7	97.6	0.6	0.6	22	22
2	0.5	49.3	0	0	18	21
3	0.3	41.6	4	2	31	24
4	0.3	23.0	2	0	23	24
5	0.7	10.6	0	0	12	14

motility. These results suggested the presence of a toxic or inhibitory component within the patient's seminal plasma responsible for suppressing motility.

The acrosome reaction, which involves the release of enzymes necessary for zona pellucida penetration, was assessed using the method of Bielfeld et al. (1990). The patient's sperm showed >90% acrosome-reacted cells, compared with <35% in donor control samples. This premature acrosome reaction likely compromised the sperm's ability to fertilize an egg.

Testing for Lactate Dehydrogenase X (LDHX), a sperm-specific isoenzyme involved in glycolytic energy metabolism, confirmed its presence, indicating intact metabolic potential. Freeze-fracture electron microscopy revealed normal flagellar ultrastructure and mitochondrial morphology, excluding structural defects as the cause of immotility.

Sperm Penetration Assay (SPA) using denuded hamster oocytes (Holmgren et al., 1990), and Hemi-Zona Binding Assay (HZBA) using human zona pellucida halves (Lanzendorf et al., 1992) yielded negative results, showing no sperm penetration or binding activity, thereby confirming the absence of fertilizing capacity under laboratory conditions. Given that natural conception had occurred during a period of frequent intercourse, we hypothesized that repeated ejaculation might deplete older, immotile sperm stored in the epididymis and promote the appearance of fresher sperm with transient motility. In order to test this hypothesis, the couple was instructed to have intercourse at least twice daily for five consecutive days, while also providing a semen sample each morning for analysis.

The transient appearance of minimal motility (up to 4%) on day 3 suggested that a small population of functional sperm might occasionally appear, possibly explaining the previous treatment-independent conception.

A DNA-based paternity test confirmed a 99.95% probability of fatherhood, establishing that the patient was indeed the biological father of the naturally conceived child.

Discussion

Several animal studies have demonstrated that sperm motility, while ordinarily considered crucial, is not strictly essential for fertilization, such as when viable sperm are directly introduced into the oocyte cytoplasm. Viable offspring have been produced via ICSI using immotile but live sperm from bulls, horses, and rabbits. For example, live foals were born following ICSI using immotile stallion sperm selected by the Hypo-Osmotic Swelling (HOS) test. The landmark study by Kimura and Yanagimachi (1995) conclusively showed that motility is not essential for fertilization if the sperm head is physically injected into the oocyte. This discovery laid the foundation for the widespread clinical success of ICSI in humans.

Our case presents a biological paradox. All laboratory findings, including complete sperm immotility, toxic seminal plasma, premature acrosome reaction, and failed fertilization assays were consistent with absolute infertility. Yet, unassisted conception occurred. Transient restoration of motility in a small subpopulation of sperm shortly after ejaculation or removal of inhibitory seminal factors by cervical mucus or uterine secretions, thus allowing limited sperm activation within the female tract, may be a possible explanation for the occurrence of natural conception.

Our case also underscores the limitations of laboratory-based fertility prediction. Semen analysis, while invaluable, provides only an approximation of functional fertility potential and may not fully reflect in vivo reproductive capability or be a reliable predictor of fertility potential over time.

Clinically, the findings emphasize that patients with total asthenozoospermia should not be considered absolutely infertile. In cases where viable sperm are identified, confirmed by vitality or hypo-osmotic swelling tests, ICSI remains the treatment of choice, offering excellent success rates. However, this report also provides a reminder that nature can defy expectations, and spontaneous conception, although rare, remains possible even under seemingly impossible conditions.

Conclusion

This rare case of natural conception in a man with complete sperm immotility demonstrates that the relationship between sperm motility and fertility is more complex than previously believed. The presence of viable, metabolically active sperm, even if immotile, may permit fertilization under optimal physiological circumstances.

While such cases are exceptional, they highlight the need for individualized evaluation and cautious interpretation of semen parameters in male infertility diagnosis. Ultimately, fertility depends not only on measurable laboratory metrics but also on biological variability and the intricate interactions between sperm, seminal plasma, and the female reproductive environment.

References

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