Fresh semen quality in ejaculates produced by nocturnal emission in men with idiopathic anejaculation

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Objective: To compare the quality of fresh semen samples collected by nocturnal emission (NE), penile vibratory stimulation (PVS), or electroejaculation (EEJ) from idiopathic anejaculation patients with those collected by masturbation from healthy control subjects.
Design: Retrospective clinical study.
Setting: University medical center.
Patient(s): Ninety-one men with idiopathic anejaculation.
Intervention(s): NE, PVS, EEJ, computer-assisted semen analysis system.
Main Outcome Measure(s): Sperm volume, concentration, motility, and morphology.
Result(s): The mean percentage of motile sperm in the NE group was 30.6% ± 3.5% (range 11.2%–50.9%), which is 1.5- and 1.9-fold higher than that of the PVS (20.5% ± 1.3%, range 6.9%–40.2%) and EEJ (16.1% ± 0.9%, range 3.7%–27.3%) groups, respectively. The percentage of sperm that have normal morphology in the NE group was 61.4% ± 4.8%, which is significantly higher than that in the PVS (38.4% ± 2.8%) and EEJ groups (29.5% ± 1.7%), respectively. However, compared with the healthy control group, the sperm motility and normal morphology in the NE, PVS, and EEJ groups were significantly lower. The sperm concentration in the NE group ($149.4 \pm 16.3 \times 10^6$ mL^{-1}) was similar to that of the PVS group ($143.8 \pm 13.1 \times 10^6$ mL^{-1}) but was higher than in the EEJ group ($96.3 \pm 8.6 \times 10^6$ mL^{-1}) and lower than in the control group ($225.0 \pm 15.0 \times 10^6$ mL^{-1}). Furthermore, the semen volume in the NE group (2.6 ± 0.2 mL) was lower than that of the control group (3.0 ± 0.1 mL).
Conclusion(s): This study is the first to report on the quality of fresh semen obtained by NE in patients with idiopathic anejaculation. Sperm motility and normal morphology were higher in patients who collected sperm by NE than in those who collected sperm by PVS and EEJ. (Fertil Steril® 2013;100:1248–52. ©2013 by American Society for Reproductive Medicine.)
Key Words: Idiopathic anejaculation, nocturnal emission, penile vibratory stimulation, electroejaculation, infertility

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Anejaculation is the inability to ejaculate despite an erection; this condition includes 72% of male factor infertility cases resulting from sexual dysfunction (1). Spinal cord injury (SCI) is the most common cause of anejaculation (2–5), whereas retroperitoneal lymph node dissection (6), diabetes mellitus (7), multiple sclerosis (8), and sperm retrieval before intensive anticancer therapy (9) are the uncommon ones. Most studies on anejaculation have focused more on SCI patients and less on patients with idiopathic anejaculation.

Idiopathic anejaculation is a unique problem. Men who with this problem do not experience ejaculation during either coitus or masturbation, although they may experience erections and nocturnal emissions (NEs) (10–16). Most men with idiopathic anejaculation require penile vibratory stimulation (PVS) or electroejaculation (EEJ) to retrieve their semen. Much is known about the quality of semen collected by PVS and EEJ (11, 13–15, 17); however, the nature of fresh semen collected by NE has yet to be revealed. NE is a type

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of spontaneous orgasm, involving ejaculation during sleep. This is an autonomous reflex mediated by the sympathetic nervous system. NE occurs mostly during adolescence and in the early young adult years, but it may also occur at any time after puberty. NEs are difficult to characterize because they always occur randomly during sleep. Fresh semen samples during NEs need to be collected correctly and sent to the hospital immediately.

After a 5-year investigation of semen quality, our research program has accumulated data on 10 men with idiopathic anejaculation who were able to collect their semen samples via NE. The goal of the present study was to characterize the fresh semen quality in these men. We further compared the ejaculates of these men with the ejaculates of men with idiopathic anejaculation who were able to collect their semen via PVS or EEJ as well as with the ejaculates of healthy men.

MATERIALS AND METHODS

Patients

We retrospectively reviewed our database of 120 men with idiopathic anejaculation in the Department of Urology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, between 2008 and 2012. The diagnosis of idiopathic anejaculation was based on the inability to consciously ejaculate by masturbation or sexual intercourse. Urine examinations were performed to rule out retrograde ejaculation. The levels of T, FSH, LH, and PRL were within the normal range, and all patients had occasional erections and NEs. Sensory evoked potentials of the penis and an electromyography of the pelvic floor were conducted to exclude any neurological disorders. The control group was made up of healthy men without a history of infertility and with at least one child. All participants signed an informed consent before study participation.

Semen Retrieval Methods

In the control group, semen was collected by masturbation. In the group of men with idiopathic anejaculation, semen was collected according to our sperm retrieval algorithm. The subjects were classified into groups according to their ability to ejaculate. Subjects who were able to ejaculate by NE and send the semen samples (warmed at 37°C) to the hospital within 30 minutes were assigned to the NE group. Subjects who were not able to collect semen by NE but could ejaculate by PVS were assigned to the PVS group. Subjects who were not able to ejaculate by PVS but could ejaculate with EEJ were assigned to the EEJ group. Subjects unresponsive to NE, PVS, and EEJ were excluded from further analyses.

Masturbation Procedure

Semen samples from the control group were collected into sterile glass cups by masturbation and ejaculation after 4–7 days of abstinence. The samples were analyzed on site using a computer-assisted semen analysis (CASA) system (WLJY-9000) within 1 hour of collection.

NE Procedure

Considering the uncertainty of NE, patients who experienced NEs within 3 months were advised to collect semen samples using this method. Patients who did not experience NEs for more than 3 months were advised to collect semen samples using PVS. The procedure was as follows. Every night before bed, patients were asked to wear condoms free of spermicides and lubricants and to fix them at the base of the penis using tape. Immediately after the occurrence of the NE, the semen sample was kept warm at 37°C by placing it in the armpit and then sent to the hospital within 30 minutes. The procedure was repeated until a semen sample was sent to the hospital in time. Patients who were unable to collect semen samples by NE in 2 months were advised to collect semen samples using PVS.

PVS Procedure

Patients who were unable to collect semen by NE underwent PVS. A vibrator (Sensiometer, Laxons Technology Instruments) was applied to the penis frenulum with an amplitude level of 2.5 mm and a frequency of 100 Hz for 2 to 5 minutes, interposed with 1- to 3-minute rest periods. The procedure was finished after 15 minutes of stimulation, regardless of whether antegrade ejaculation did or did not occur. Urine examinations were performed to rule out retrograde ejaculation.

EEJ Procedure

EEJ was done in cases of PVS failure. Patients were placed in lateral decubitus position. A rectal probe (CGS Electroejaculator, Ratek Instruments) was placed against the prostate after lubrication under spinal anesthesia (anesthesia level T8-S5). The initial electrical stimulation given was 2 V. This value was progressively increased by 1 to 2 V every 6 to 10 seconds of stimulation until ejaculation occurred. However, the maximum voltage did not exceed 18 V. The voltage and vital signs of the patients were closely monitored during the entire stimulation. Urine examinations were performed to rule out retrograde ejaculation.

Semen Analysis

Only antegrade specimens, that is, no retrograde specimens, were analyzed in this study to eliminate the variability in sperm motility introduced by the bladder contents. Antegrade specimens were allowed to liquefy for 30 minutes in an incubator at 37°C. Semen samples collected by NE were immediately sent to the hospital within 30 minutes and liquefied at body temperature. Semen volume, sperm concentration, sperm motility, and sperm morphology were determined according to the fourth edition of the *World Health Organization Laboratory Manual for the Examination and Processing of Human Semen* using a CASA system.

Data Collection and Statistical Analysis

Demographic information was collected for all men with idiopathic anejaculation. The following variables were collected from patients with idiopathic anejaculation and control