Semen quality in the same man before and after spinal cord injury.

Case report

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The fertility of spinal cord injured men is severely impaired due to ejaculatory dysfunction and poor semen quality. No previous reports comparing the semen quality in the same man before and after spinal cord injury have been found in the literature. We present a case of a tetraplegic man who 8 months after his spinal cord injury had a deteriorated semen quality compared to a normal semen quality analysed 16 months before the injury.

Keywords: spinal cord injuries; vibration; ejaculation; semen; fertility.

Introduction

It is well established that fertility is severely impaired in men with spinal cord injury (SCI) and, consequently, children fathered by SCI men are rare.¹ The major causes of infertility are ejaculatory dysfunction and poor semen quality.²

Vibratory ejaculation and electroejaculation have resulted in successful semen recovery from 19 to 100% of SCI men with ejaculatory dysfunction.¹ Linsenmeyer and Perlash² have pointed out seven factors that may contribute to the poor semen quality in SCI men: recurrent urinary tract infections, type of bladder management, stasis of prostatic fluid, testicular hyperthermia, abnormal testicular histology, changes in the hypothalamic–pituitary–testicular axis, sperm antibodies, and long term use of various medications. However, the specific importance of any of these factors is not known.

We present a case history with semen analyses performed before and after SCI enabling comparison of the semen quality. No previous reports on a similar case were found in the literature.

Case report

A 27 year old C3 sensory incomplete, class B according to Frankel *et al.*,³ tetraplegic man was injured in a car accident in March 1990. For the

first 2 months post injury he had an indwelling urinary catheter. Afterwards, bladder emptying was initiated by suprapubic tapping. Only two instances of urinary tract infections occurred post injury, both during the first 4 months, and they were treated successfully with antibiotics. His injury lead to loss of the ability to obtain antegrade ejaculation whereas he was still able to obtain erections. Before the injury he had normal ejaculatory function but because he could not impregnate his wife, who had been found gynaecologically normal, the semen was analysed in December 1988 (16 months prior to the injury) in order to evaluate his fertility. The semen quality (Table I) was at that time within normal limits according to the WHO laboratory standards⁴ for sperm count, volume, motility and morphology.

Eight months post injury he was examined urologically in order to reactivate the ejaculatory function by penile vibratory stimulation. The physical examination revealed normal bulbocavernosus and hip flexion reflexes, and the testicular size was 20 ml each measured by orchidometry. There was no sensibility in the external genital area. Hormonal analyses for follicle-stimulating hormone, luteinising hormone, prolactin, estradiol and testosterone were found to be within normal limits. Penile vibratory stimulation was performed with an amplitude of 2.5 mm and a frequency of 100 Hz. The centre of the vibrator knob was applied to the preputial frenulum and held in the same position at each stimulation. The length of each stimulation was 3 minutes followed by a pause of 1½ minutes. Antegrade ejaculation was obtained the first day in a session with eight stimulations. During the first

Table I Semen quality in the same man before and after spinal cord injury

Time of semen analysis	Total sperm count (millions)	Volume (ml)	Motility (%)	Morphology normal shape (%)
16 months prior to the injury	392	4.5	61	72
8 months post injury	32	1.0	48	49
21 months post injury	31	1.0	61	50
Laboratory standards (WHO) ⁴	> 40	> 2.0	> 60	> 40

three stimulations there was full erection but no antegrade ejaculation occurred. The next four stimulations did not reveal any antegrade ejaculations either, and the erection had disappeared. During the eighth stimulation which lasted for 1 minute, full erection was restored. By suprapubic tapping during the last 30 seconds of the vibratory stimulation antegrade ejaculation was obtained. Semen analysis of the ejaculate as shown in Table I revealed that the total sperm count, volume and motility had decreased below the WHO laboratory standards⁴ whereas the percentage of morphologically normal shapes remained within the laboratory standards. Compared to the quality found before the SCI, the total count of motile spermatozoa per ejaculate had decreased from 239 million (0.61×392 million) to 15 million (0.48×32 million).

The patient entered a home programme of vibratory stimulation. Initially the antegrade ejaculation could be obtained by vibratory stimulation performed by his wife but afterwards also during sexual intercourse. Antegrade ejaculation did not occur without suprapubic tapping whether by vibration or during sexual intercourse being used for stimulation. During a 13-month period he obtained ejaculations approximately every 2 weeks but in spite of using the patient's semen for vaginal insemination at home no pregnancy of his wife was achieved. A new semen analysis (Table I) performed at 21 months post injury, showed that the total sperm count, volume and morphology were nearly unchanged compared to the semen quality found 8 months post injury. The total count of motile spermatozoa per ejaculate increased from 15 million (0.48×32 million) to 19 million (0.61×31 million).

No complications originating from vibratory stimulation were observed or reported including autonomic dysreflexia.

Discussion

Vibratory stimulation of the penis to obtain ejaculation was first described by Sobrero *et al*⁵ in a group of non spinal cord injured men. The first reported use in a SCI man was with a hand massager.⁶ It is largely due to Brindley^{7,8} that the use of vibratory stimulation for ejaculatory dysfunction in SCI men has become rather widespread, especially in Europe. In the United States the use of vibratory stimulation has been limited in favour of electroejaculation.²

The method we have used for vibratory ejaculation is based primarily on the technique described by Brindley.^{7,8} The idea of suprapubic tapping during vibratory stimulation has not been reported previously but originates from our first study on vibratory stimulation in 36 SCI men with ejaculatory dysfunction.⁹ Two patients from this group were able to obtain retrograde but not antegrade ejaculation by vibratory stimulation only. Both patients obtained antegrade ejaculation by suprapubic tapping during vibratory stimulation. Since then we have successfully used this method in another three SCI men without antegrade ejaculation after ordinary vibratory stimulation, including the patient presented in this case report.

Most studies⁸⁻¹³ have shown that the first ejaculate obtained by vibratory stimulation generally exhibits poor semen quality. However, according to some authors^{8,10} there is no correlation between the time since the SCI and the semen quality whereas Amelar and Dubin¹⁴ state in their review

that the semen quality may deteriorate rapidly with the passage of time after the injury. Anticipating that the semen quality found 16 months before the injury remained unchanged until the SCI, this case report demonstrates that 8 months of SCI results in a deteriorated semen quality.

However, improvement^{11,12} of as well as an almost unchanged¹⁵ semen quality in SCI

men after repeated antegrade ejaculations, produced by vibratory stimulation once weekly during 1–6 months, have been reported. In our patient the percentage and total count of motile spermatozoa per ejaculate increased during the period of repeated vibratory ejaculations but the total sperm count, volume and morphology remained nearly unchanged (Table I).

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