ERECTILE DYSFUNCTION

Sexual Activity of Patients Undergoing Testicular Sperm Extraction

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ABSTRACT

Introduction: For couples who wish for a baby, sexual activity (through intercourse) is the only way to conceive naturally. However, the sexual activity of men undergoing testicular sperm extraction (TESE) and factors that influence it among affected couples are not clearly understood.

Aim: To examine sexual activity among infertile men undergoing TESE and to identify factors that influenced it.

Methods: Married Japanese male patients undergoing TESE were included. Sexual activity during the previous month was surveyed using a questionnaire, and potential predictive factors influencing sexual activity were examined.

Main Outcome Measures: Two hundred twenty-six married men who answered a questionnaire regarding sexual frequency were reviewed retrospectively.

Results: The patient mean age was 35.8 ± 7.5 years (range 23−67) and the mean age of their partners was 32.9 ± 4.5 years (range 23−44). Most couples (n = 193) were in their first marriage, and 33 were remarried. The mean marriage duration was 52.6 ± 42.2 months (range 1−192). Microdissection TESE and conventional TESE were performed for 152 and 74 patients, respectively. Overall, the mean sexual activity during the last month was 3.6 ± 2.6 times (range 0−15). Marriage duration was negatively correlated with the frequency of sexual activity ($r = -0.23$; $P < .01$). There were no correlations between sexual activity and patient age, partner age, marriage type (first marriage or remarried), testicular volume, or serum total testosterone concentration. Regression analysis showed that marriage duration (odds ratio = 1.01; 95% CI, 1.003−1.019; $P = .009$) and testicular volume (odds ratio = 0.94; 95% CI, 0.88−0.99; $P = .033$) were significant predictors of low sexual activity (0−1 times/month).

Conclusion: The sexual activity of patients undergoing TESE was almost the same as reported previously. Patient age, partner age, testicular volume, and serum total testosterone concentration had no correlation with the reported frequency of sexual activity. **Taniguchi H, Matsuda T, Nakaoka Y, et al. Sexual Activity of Patients Undergoing Testicular Sperm Extraction. Sex Med 2019;8:30−35.**

Key Words: Sexual Activity; Erectile Dysfunction; Infertility; Testicular Sperm Extraction; Testosterone

INTRODUCTION

Childbearing is an important outcome of the sexual relationship for many couples; however, it is estimated that 1 in 8 couples experience some form of infertility when trying to conceive their first child.[1] Infertility is defined as failure to conceive after 12 months of regular, unprotected sexual activity.[1] Around 30% of infertility is attributable to male factors alone,[2] and male factor infertility can cause significant psychological stress and is associated with sexual dysfunction.[3] Some male patients with infertility may be diagnosed with azoospermia. Non-obstructive azoospermia (NOA) is diagnosed in 60% of men with azoospermia, and the diagnosis of NOA has a negative

Received July 5, 2019. Accepted October 15, 2019.

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https://doi.org/10.1016/j.esxm.2019.10.002

impact on health-related quality of life (HRQOL) for both patients and their partners.[4] However, the impact of infertility on the sexual activity of infertile couples is not clearly understood. In the present study, we focused on the sexual activity of patients undergoing testicular sperm extraction (TESE) and identified factors that influenced it among these couples.

METHODS

Between November 2007 and October 2018, males from 341 Japanese couples underwent TESE for the first time in our specialized male infertility outpatient clinic. Of these, 226 married men who completed our original questionnaire were reviewed retrospectively. Five men with ejaculatory disorders were excluded from the analyses. All patients completed our original questionnaire related to the frequency of sexual intercourse (eg, "How many times per month do you have sexual intercourse?") before undergoing an examination when they were first admitted to our clinic. However, all patients were diagnosed with azoospermia at least once before presenting to our clinic. If the patients had the results of only a single semen analysis, we undertook a second semen analysis at the day of admittance. Intervals between the first diagnosis of azoospermia and questionnaire completion varied between patients.

The questionnaire collected self-reported data. Each patient answered the questionnaire independently without consulting anyone, and the completed questionnaires were collected immediately afterward. Associations among sexual activity (as reported in the questionnaire) and patient and partner age, marriage type (first marriage or remarried), marriage duration, testicular volume, and serum total testosterone concentration were analyzed. Testicular volume was measured using an orchidometer, and the larger side was recorded. Serum total testosterone concentrations were measured using an electrochemiluminescence immunoassay, and most measurements were done in the morning by a single laboratory on a single machine. One measure of total testosterone concentration was obtained for each patient. Male participants had already had semen analysis on at least 2 separate occasions, according to World Health Organization 2010 criteria.[5] NOA was diagnosed from testicular size, serum concentrations of follicle-stimulating hormone (FSH), and semen analysis after admission to our specialized male infertility clinic. Not all patients diagnosed as having NOA showed abnormal karyotypes or Y-chromosomal microdeletions.

This survey was approved by the ethics committee of the clinic (2019-16) and conducted in accordance with the Declaration of Helsinki. Data are presented as median (range) or mean ± standard deviation. Differences in values were determined using Mann-Whitney nonparametric U tests. Regression analysis was performed to determine predictors of low sexual activity. All statistical analyses were performed using SPSS Statistics 21.0 (IBM Corp; Armonk, NY). A P value $< .05$ was considered statistically significant.

RESULTS

In total, 226 married men were analyzed. Their median age was 34.0 years (range 23−67) and that of their partners was 33.0 years (range 23−44). Most patients (n = 193) were in their first marriage, and 33 had remarried; however, all female partners were in their first marriage. The median marriage duration was 36.0 months (range 1−192).

The characteristics of the patients who underwent TESE are shown in Table 1. The median testicular volume (as measured on the larger side) for all patients was 12.0 mL (range 1.0−26.0). Two patients had undergone unilateral orchiectomy in their childhood: one because of a testicular tumor and the other for unknown etiology. The median serum total testosterone and FSH levels when first admitted to our clinic were 4.00 ng/mL (range 0.11−13.4) and 17.6 mIU/mL (range 1.1−79.8), respectively. Microdissection TESE (micro-TESE) was performed in 152 patients who were diagnosed with NOA, and conventional TESE (c-TESE) was performed in 74 patients who were diagnosed with obstructive azoospermia. The testicular volume of patients treated with micro-TESE (median 8.0 mL, range 1.0−24.0) was significantly smaller than that of patients

Table 1. Male patient characteristics

		TESE		
	Total (N)	Micro	Conventional	*P* value*
Number of patients	226	152	74	—
Age (y), median (range)	34 (23−67)	34 (23−57)	35 (24−67)	.036
Testicular volume (mL), median (range)	12.0 (1.0−26.0)	8.0 (1.0−24.0)	20.0 (8.0−26.0)	<.001
Marriage duration (mo), median (range)	36.0 (1.0−192)	39.5 (1.0−192)	29.0 (2.0−174)	.097
Serum testosterone concentration (IU/mL), median (range)	4.00 (0.11−13.4)	3.65 (0.11−13.4)	4.59 (1.34−10.5	<.001
Serum follicle-stimulating hormone level (IU/mL), median (range)	17.6 (1.1−79.8)	25.8 (2.5−79.8)	4.85 (1.10−23.5)	<.001

TESE = testicular sperm extraction.
*Microdissection TESE vs conventional TESE.

treated with c-TESE (median 20.0 mL, range 8.0−26.0) ($P < .01$). Serum hormone levels also showed significant differences between the 2 groups in terms of total testosterone (micro-TESE median 3.65 ng/mL, range 0.11−13.4 vs c-TESE median 4.59 ng/mL, range 1.34−10.5; $P < .01$) and FSH (micro-TESE median 25.8 mIU/mL, range 2.50−79.8 vs c-TESE median 4.85 mIU/mL, range 1.10−23.5; $P < .01$). In total, 26 patients were diagnosed with Klinefelter syndrome by karyotyping, all of whom underwent micro-TESE.[6]

The overall mean reported frequency of sexual activity per month was 3.6 ± 2.6 times (range 0−15). We examined the rate of sexual activity per month using 4 groups: 18% (n = 41) reported 0−1 times/month, 60% (n = 136) reported 2−4 times/month, 14% (n = 32) reported 5−8 times/month, and 8% (n = 7) reported more than 9 times/month (Figure 1). There were no significant differences in sexual activity per month between patients treated with micro-TESE (n = 152; 3.6 ± 2.6 times, range 0−15) and those treated with c-TESE (n = 74; 3.8 ± 2.6 times, range 0−12) ($P = .46$); between those in a first marriage (n = 193; 3.5 ± 2.5 times, range 0−15) and those who were remarried (n = 33; 4.3 ± 3.1 times, range 0−12 times) ($P = .21$); and between patients with Klinefelter syndrome (n = 26; 3.2 ± 2.7 times, range 0−10) and patients who underwent c-TESE (n = 74; 3.8 ± 2.6 times, range 0−12 times) ($P = .33$) (Figure 2). Marriage duration was negatively correlated with sexual activity ($r = -0.23$; $P < .01$), but patient age, partner age, marriage type, testicular volume, and serum total testosterone concentration were not (Figure 3).

Among the 41 couples that reported sexual activity 0−1 times/month, regression analysis showed that marriage duration (odds ratio = 1.01; 95% CI, 1.003−1.019; $P = .009$) and testicular volume (odds ratio = 0.94; 95% CI, 0.88−0.99; $P = .033$) were significant predictors of low sexual activity (Table 2).

DISCUSSION

Here we assessed sexual activity among Japanese couples with male factor infertility undergoing TESE. We found that the mean frequency of sexual activity of couples treated with TESE was 3.6 ± 2.6 times per month (range 0−15), and only marriage duration showed a negative correlation with sexual activity ($r = -0.23$; $P < .01$). Our survey revealed that among couples that wished for a baby in the context of a male infertility factor, patient age, testicular volume, and total testosterone concentration did not affect sexual activity. To our knowledge, this is the first report to investigate the sexual activity of male patients undergoing TESE.

For couples who wish for a baby, sexual activity is the first step to conceiving. Gaskins et al[7] reported predictors of sexual intercourse frequency in a population-based prospective cohort of 501 couples in the United States trying to conceive using the women's reports of sexual intercourse frequency. Their study showed that the median sexual intercourse frequency was 6 times/month (range 0−60); couples with a median sexual intercourse frequency of >9 times/month tended be younger, less likely to have female partners with a college education, and more likely to have male partners who were currently employed compared to couples with a sexual intercourse frequency of ≤9 times/month. Their study also showed that patient age, education, race, and rotation shift work, as well as the patient's exercise routine and mental health, played important roles in sexual intercourse frequency.[7] In the present study, patient age did not show any correlation with sexual activity. It is likely that the couples included here were in good relationships because they visited the infertility clinic together after trying to conceive unsuccessfully. In this context, age might not have affected sexual activity.

The overall mean frequency of sexual activity among patients in this study was 3.6 ± 2.6 times/month, which was less than that reported by Gaskins et al.[7] Piccinino and Mosher[8] also reported that couples 30−39 years of age had intercourse on an average of 86 times per year (7.2 times/month). Some studies have suggested that consideration of racial and cultural differences is necessary when evaluating sexual activity.[9] Nakajima et al[10] conducted an Internet-based survey on the frequency of sexual activity among Japanese men that revealed that married men ages 20−29 years had intercourse 3.23 times/month, which was similar to the results in our study. Their study also showed that the frequency of intercourse in men ages 20−29 years without children was higher than that among men in the same age group with children ($P < .001$), which suggested increasing attempts at this age to have children.[10]

We found no significant differences in sexual activity between patients with Klinefelter syndrome and patients who underwent c-TESE ($P = .33$). Klinefelter syndrome is the most common chromosomal abnormality among patients with azoospermia.[6] With regard to sexual activity among such patients, Yoshida et al[11] first reported the chief complaint of male infertility among their Japanese patients with Klinefelter syndrome. They found no significant difference in the frequency of sexual function

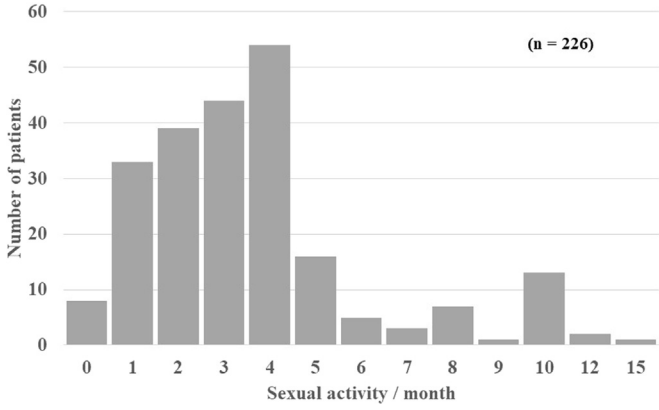

Figure 1. Distribution of sexual activity per month among patients undergoing testicular sperm extraction (N = 226).

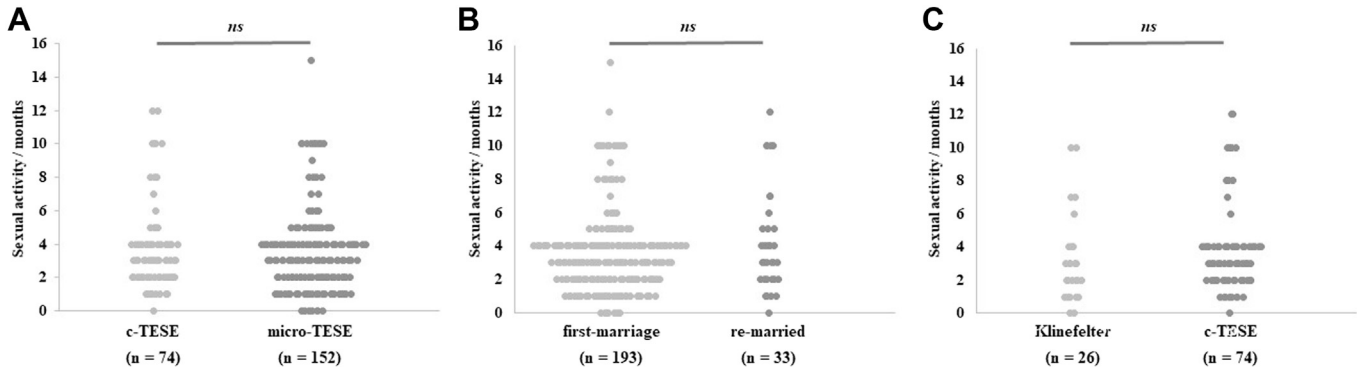

Figure 2. Prevalence of different demographic parameters of sexual activities. (A) Testicular sperm extraction. (B) Marital status. (C) Klinefelter syndrome with micro-TESE or patient with c-TESE. c-TESE = conventional TESE; micro-TESE = microdissection TESE; TESE = testicular sperm extraction.

disturbances between men with Klinefelter syndrome (n = 40) and the control group (n = 55) ($P = .45$). Moreover, the mean frequency of sexual intercourse per month in patients with Klinefelter syndrome was significantly higher than in the control group (4.4 ± 2.8 vs 3.3 ± 1.6) ($P < .05$).[11] Raboch et al[12] also reported no significant difference in coital activity between patients with Klinefelter syndrome and patients with a varicocele who were investigated for infertility. Consistent with our study, those studies indicate that Klinefelter syndrome does not affect sexual activity in patients of reproductive age who wish for a baby.

There is some controversy regarding the effect of serum total testosterone concentrations on sexual activity. Testing of such levels is recommended for men with a decreased capacity for spontaneous erections, or reduced sexual desire and activity, because testosterone decline has been associated with a decrease in libido and increased erectile dysfunction.[13,14] Conversely, Satkunasivam et al[15] reported that serum testosterone concentration was not significantly associated with erectile dysfunction among men with infertility. In that study, 1,750 men presenting for evaluation of infertility completed questionnaires and were retrospectively assessed and evaluated using multivariable logistic regression analysis. The findings showed that neither total testosterone nor bioavailable testosterone was significantly associated with the symptoms of erectile dysfunction (Sexual Health Inventory for Men score < 22). The authors suggested that the primary etiology for erectile dysfunction in younger infertile men was not related to testosterone deficiency.[15] Yoshida et al[11] also reported no significant differences in the incidence of sexual function disturbances between a group with decreased testosterone concentrations and those with normal testosterone concentrations. Similarly, our study showed no correlation between s-

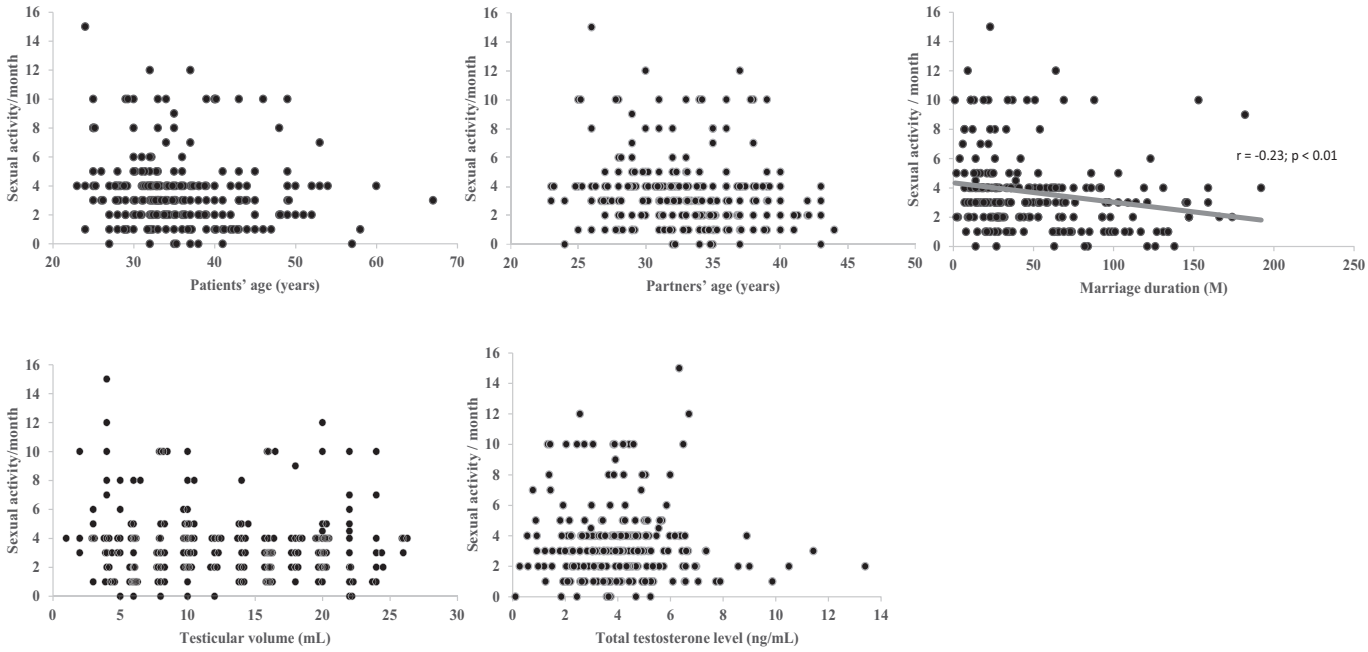

Figure 3. Relationship between sexual activity per month and factors related to sexual activity (N = 226). Only marriage duration had a negative correlation with sexual activity ($r = -0.23$; $P < .01$).

Table 2. Factors influencing low sexual activity (0–1 times/month) in patients with testicular sperm extraction

	Sexual activity/month				
Factor	2 or more times (n = 185)	0–1 times (n = 41)	OR	95% CI	*P* value
Patient's age (y), median (IQR)	34 (23.0–67.0)	37 (24.0–58.0)	1.04	0.97–1.11	.29
Partner's age (y), median (IQR)	33 (23.0–43.0)	34 (24.0–44.0)	0.98	0.88–1.09	.69
Marriage type, n			0.64	0.19–2.19	.48
First marriage	157	36			
Remarried	28	5			
Marriage duration (mo), median (IQR)	33 (1.0–192)	72 (8–138)	1.011	1.003–1.02	.009
Testicular volume (mL), median (IQR)	14.0 (1.0–26.0)	10.0 (3.0–24.0)	0.935	0.88–0.995	.033
Serum testosterone (ng/mL), median (IQR)	4.0 (0.27–13.4)	3.75 (0.11–9.87)	1.082	0.90–1.31	.41

IQR = inter quartile range; OR = odds ratio.

erum total testosterone concentration and sexual activity. Participants in the present study were patients undergoing TESE, and most with low serum testosterone concentrations underwent micro-TESE because of NOA. These results suggest that the serum testosterone concentration did not affect sexual activity for patients with congenital low serum testosterone concentrations. However, predictive factors of low sexual activity (0–1 times/month) included marriage duration and testicular volume. In this study, testicular volume was not correlated with serum testosterone concentration (data not shown). Further research is needed to evaluate the relationship between sexual activity and testicular volume or serum testosterone concentrations.

This study had several limitations. First, we did not evaluate the participants' characteristics in detail. Some characteristics (eg, education level, working status, income, frequency of physical activity) have been reported previously to be predictive factors for sexual intercourse frequency.[7,16,17] Several comorbidities (eg, hypertension, diabetes, hyperlipidemia, ischemic heart disease) can also affect sexual function, although these causes are uncommon among young men of reproductive age. Second, we did not include a validated specific questionnaire related to sexual dysfunction, anxiety, or depression symptoms and therefore did not fully assess the relationship between sexual activity and HRQOL.[18] Diminished sexual function or poor libido may be related to sexual activity among men undergoing TESE for infertility. The evaluation of the relationship between actual sexual frequency and sexual dysfunction or HRQOL would be informative for physicians and infertility care staff.[4]

Third, the number of patients with Klinefelter syndrome was relatively low and should be confirmed in larger studies; however, the results of our study regarding Klinefelter syndrome were consistent with previous studies. Fourth, we chose only one measurement of serum total testosterone concentration, and not all measurements were controlled with morning-only draws. Serum total testosterone concentration varies with the circadian rhythm and is typically higher in the morning and lower in the afternoon. Fifth, changes in sexual activity after TESE were unclear, including whether these were the result of sperm extraction or whether finally conceiving would affect sexual activity among infertile couples. For men with NOA, a negative TESE result may be perceived as the end of any hope of becoming a father, which might cause psychological distress. Despite these limitations, a strength of this study was that we included patients with a unique background and evaluated sexual activity among men undergoing TESE. To address the above-mentioned limitations, a large-scale long-term prospective study is necessary to assess sexual activity and sexual dysfunction or HRQOL related to infertility.

CONCLUSION

We found that the sexual activity of couples with male factor infertility undergoing TESE was almost the same as that previously reported for the general population. Patient age, partner age, testicular volume, and serum total testosterone concentration had no correlation with sexual activity. To our knowledge, this is the first report to evaluate sexual activity among male patients undergoing TESE.

ACKNOWLEDGMENTS

We thank James Cummins, PhD, from EDANZ Group (www.edanzediting.com/ac) for editing a draft of this revised manuscript.

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Conflict of Interest: None.

Funding: None.

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