The significance of microsurgical varicocelectomy in the treatment of subclinical varicocele

Ju Tae Seo, M.D., Ph.D.,[a] *Kyung Tae Kim, M.D.,*[a] *Min Hoan Moon, M.D.,*[b] *and Won Tae Kim, M.D.*[a]

[a] Department of Urology and [b] Department of Radiology, Cheil General Hospital, Kwandong University College of Medicine, Seoul, South Korea

Objective: To assess the improvement of seminal characteristics and pregnancy rates after microsurgical varicocelectomy in men with subclinical varicocele.
Design: Retrospective study.
Setting: University infertility clinic.
Patient(s): One hundred forty-three patients with a subclinical left-sided varicocele.
Intervention(s): Patients who agreed to microsurgical varicocelectomy (n = 25, surgery group), medical treatment with L-carnitine (n = 93 drug group), and those who did not agree to any treatment (n = 25, observation group) were enrolled.
Main Outcome Measure(s): Semen characteristics were reevaluated twice 6 months after treatment. The natural pregnancy rates were estimated by telephone interview between 1 and 2 years after treatment.
Result(s): In the surgery group, sperm counts improved significantly after microsurgical varicocelectomy. In the drug group, however, sperm parameters did not significantly improve after treatment. Natural pregnancy rates were 60.0% in the surgery group, 34.5% in the drug group, and 18.7% in the observation group. The natural pregnancy rate of the surgery group was higher than the other groups, and there were statistically significant differences among the three groups.
Conclusion(s): Surgical treatment is the best option for management of subclinical varicocele. (Fertil Steril® 2010;93:1907–10. ©2010 by American Society for Reproductive Medicine.)

Key Words: Varicocele, sperm count, pregnancy rate

The term "varicocele" may be defined as elongation, dilatation, and tortuosity of the veins of the pampiniform plexus. In a World Health Organization study, the incidence of varicocele was 25.4% in men with abnormal semen and 11.7% in men with normal semen (1). The prevalence of varicoceles among men attending infertility clinics ranges from 30% to 40% (2, 3). The diagnosis of varicocele is generally made clinically by palpation of the veins in the scrotum with the man in an upright position during the Valsalva maneuver. Although the exact pathophysiology of varicocele formation is not known, varicocele is thought to impair normal testicular function by elevating the scrotal temperature via reflux of warm abdominal blood through incompetent valves of the spermatic veins (4, 5). Varicocele is the most common and easily correctable cause of male factor subfertility, with varicocelectomy resulting in seminal improvement and natural pregnancy in 60% to 80% and 20% to 60% of couples, respectively (6). It was therefore concluded that varicocelectomy improves sperm variables and fertility rates.

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Institutional Review Board approval was not obtained because the surgical treatment (microsurgical varicocelectomy) and medical treatment (L-carnitine) of subclinical varicocele patients are determined by the Korean National Health Insurance Service.
Reprint requests: Ju Tae Seo, M.D., Ph.D., Department of Urology, Cheil General Hospital, Kwandong University College of Medicine, 1-19, Mukjeong-dong, Jung-gu, South Seoul, 100-380, Korea (FAX: 82-2-2000-7787; E-mail: jtandro@cgh.co.kr).

Most clinicians agree that any varicocele that is not palpable on the Valsalva maneuver and that can be identified only with radiographic techniques, such as ultrasound, Doppler imaging, or venography, is subclinical. Fariss et al. (7) found that men with large varicoceles had significantly lower sperm counts than men with small varicoceles, and that those with small varicoceles had nearly the same total sperm count as that of expectant fathers. Given these results, it might be assumed that a subclinical varicocele, which is smaller than a "small varicocele," would have an even higher sperm density, and therefore does not need to be detected or treated. In fact, several groups have reported only a slight improvement in postoperative semen parameters without an increase in the pregnancy rate after removal of subclinical varicoceles (8–10). The role of subclinical varicocele in male infertility is therefore controversial. At present, treatment outcomes following varicocelectomy in subclinical varicocele have not been fully investigated. The purpose of this study was therefore to assess fertility after varicocelectomy in men with subclinical varicocele. We also report on changes in seminal characteristics as a result of subclinical varicocele occlusion.

MATERIALS AND METHODS

One hundred forty-three patients with no apparent historic or clinical factors associated with infertility for a period of >1 year, a normal hormonal profile, a normal testicular size, no prior treatment for infertility, and a subclinical left-sided varicocele only were included in this study. The reproductive

TABLE 1

Comparison of the age and the size of both testes among the surgical group, drug group, and observation group before treatment (mean ± SD).

	Age (y)		Testicular volume (mL)		
	Patient	Partner	Left	Right	*P* value
Surgery group (n = 25)	32.1 ± 2.1	30.6 ± 1.7	18.6 ± 1.7	18.9 ± 18	.627
Drug group (n = 93)	33.8 ± 4.1	31.5 ± 3.6	18.0 ± 3.5	18.0 ± 3.4	.977
Observation group (n = 25)	32.7 ± 3.5	30.1 ± 3.8	17.6 ± 2.5	17.8 ± 2.6	.772
ANOVA *P*	0.104	0.126	0.476	0.394	

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function of the partners of all patients was either normal or being treated.

Subclinical varicocele was diagnosed by physical examination and color Doppler ultrasonography. Physical examinations were performed in a standing position at room temperature (20°C–25°C), and testicular volume was measured using Prader orchidometry. High-frequency ultrasonography with color Doppler imaging was performed by one experienced examiner (M.H.M.) who used an HDI 5000 unit (Advanced Technology Laboratories, Bothell, WA) with a 5–12-MHz transducer. The pampiniform plexus was scanned in the supine and standing positions before and during the Valsalva maneuver. Varicocele diagnosed only by ultrasonography was defined as subclinical when one or more veins had a maximal diameter of >3 mm during the Valsalva maneuver.

Patients were given a choice of two treatment options for subclinical varicocele: surgical treatment or medicinal treatment. Patients who agreed to surgical treatment (n = 25, surgery group), medical treatment (n = 93, drug group), and those who refused any treatment (n = 25, observation group) were included in this study.

The surgery group was treated with microsurgical varicocelectomy, and the medical group was treated with L-carnitine (3 g/day orally, three times a day, for at least 6 months). The goal of surgery was complete interruption of the internal spermatic venous drainage of the testicle while preserving the internal spermatic artery, the vas deferens and its blood supply, and the spermatic cord lymphatics. All surgery was performed by one of the investigators (J.T.S.) using the inguinal approach under spinal anesthesia and microsurgical techniques. Semen samples were examined at least twice before treatment and reevaluated twice 6 months after treatment. Sperm counts were calculated as the mean of all measurements for each patient. The natural pregnancy rates of groups were estimated 1 to 2 years after treatment by telephone interview.

Student's *t* test and analysis of variance (ANOVA) followed by the Fisher test were used for statistical analyses. Values of $P<.05$ were considered statistically significant. Results are reported as the mean ± SD.

Institutional review board (IRB) approval was waived because the surgical treatment (microsurgical varicocelectomy) and medical treatment (L-carnitine) of subclinical varicocele patients are determined by the Korean National Health Insurance Service.

RESULTS

There were no significant differences in the patients' and partners' age or the size of both testes among the three groups. There was also no significant difference between the right testis size and the left testis size in each group (Table 1).

TABLE 2

A comparison of seminal parameters among the surgical group, drug group, and observation group before treatment (mean ± SD).

	Surgery group (n = 25)	Drug group (n = 93)	Observation group (n = 25)	*P* value
Volume (mL)	2.3 ± 1.0	2.9 ± 1.1	2.8 ± 1.2	.057
Count (million/mL)	39.3 ± 36.0	54.6 ± 33.4	49.3 ± 37.0	.168
Motility (%)	38.5 ± 18.1	43.9 ± 18.6	41.7 ± 21.8	.492
Morphology (%)	52.1 ± 26.0	38.1 ± 35.2	49.0 ± 31.7	.154
Viability (%)	46.0 ± 21.8	33.5 ± 31.9	42.9 ± 28.8	.105

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