Microsurgical and nonmagnified subinguinal varicocelectomy for infertile men: a comparative study

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Objective: To compare semen parameters, pregnancy, recurrence, and complication rates after microsurgical and nonmagnified subinguinal varicocelectomy for infertile men.
Design: Prospective, randomized study.
Setting: Ghodran General Hospital, Kingdom of Saudi Arabia.
Patient(s): One hundred sixty-two infertile male patients with varicocele.
Intervention(s): Eighty-two patients were treated by microsurgical subinguinal varicocelectomy (MSSIV) (group I), whereas 80 patients were treated by conventional, nonmagnified subinguinal varicocelectomy (NMSIV) (group II).
Main Outcome Measure(s): The patients were postoperatively evaluated by physical examination and semen analysis after 4 and 12 months. Pregnancy rate was monitored during the follow-up period.
Result(s): Postoperatively, mean sperm count and motility improved significantly in both groups: 42.7% and 67.1% of the MSSIV group and 23.7% and 33.8% of the NMSIV group showed $\geq$50% improvement in sperm count and motility after 1 year. Patients having bilateral varicocele showed significantly better improvement of sperm count than those with unilateral varicocele after both MSSIV and NMSIV. The pregnancy rate at the end of the follow-up period reached 37.8% in the MSSIV group and 21.2% in the NMSIV group. The recurrence rate was zero in the MSSIV group and 11.3% in the NMSIV group. The rate of hydrocele formation was 1.2% in the MSSIV group and 8.7% in the NMSIV group.
Conclusion(s): Microsurgical subinguinal varicocelectomy has a better improving effect on sperm count and motility, higher spontaneous pregnancy rates, and lower postoperative recurrence and hydrocele formation than conventional subinguinal varicocelectomy in infertile men. (Fertil Steril® 2010;94:2600–3. ©2010 by American Society for Reproductive Medicine.)

Key Words: Infertility, varicocele, varicocelectomy

Infertility is a public health issue affecting approximately 15% of couples of reproductive age (1). Varicoceles are observed in 40% of men presenting with primary infertility and in up to 70% of men displaying secondary infertility (2). Varicoceles are correctable among men with infertility (3). Untreated varicoceles in infertile men with abnormal semen parameters may lead to further deterioration of spermatogenesis, testicular volume, and Leydig cell function (4).

Varicocele surgery is intended to eliminate retrograde backflow from the abdomen to the pampiniform plexus, while preserving the internal spermatic arteries, vas deferens, spermatic cord, and the lymphatics (5).

Varicocelectomy is the accepted treatment for varicoceles associated with infertility. Several methods have been used, such as open surgical ligation, retrograde or antegrade sclerotherapy, and microsurgical and laparoscopic surgical methods (6–9). However, the method of varicocelectomy is still a matter of controversy owing to the complexity and variations of the testicular venous anatomy (10–12). Each approach or method has its own advantages and disadvantages, and conflicting results have been obtained by different researchers.

The most common complications associated with conventional approaches include postoperative varicocele recurrence, hydrocele formation, and injury to the testicular artery, which may exert deleterious effects on semen quality (13, 14). Microsurgical approaches allow clear identification of the testicular artery and lymphatics, minimizing the risk of arterial injury and atrophy or hydrocele formation. An additional benefit is the possibility of in-situ repair if the artery if inadvertently injured (15, 16).

Although the technique of microsurgical varicocele ligation has undergone progressive modification, there are few studies directly comparing the microsurgical technique with the nonmagnified techniques. In this study we evaluated and compared sperm count and motility and pregnancy and complication rates of microsurgical and conventional, nonmagnified subinguinal varicocelectomy in infertile men.

MATERIALS AND METHODS

This prospective, randomized, comparative study was carried out in Ghodran General Hospital, Kingdom of Saudi Arabia between October 2006 and December 2009. Infertile male patients with varicocele were evaluated for study

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TABLE 1

Comparison between preoperative and 4- and 12-month postoperative mean sperm count and percentage motility in both groups.

Variables	Preoperative	4 mo postoperative	12 mo postoperative
Group I (MSSIV)			
Count ($\times 10^6$/mL)	19.4 ± 6.06	25.9 ± 4.18	26.7 ± 3.60
Motility (%)	32.6 ± 7.93	56.7 ± 6.49	63.4 ± 5.14
Group II (NMSIV)			
Count ($\times 10^6$/mL)	19.7 ± 6.70	23.4 ± 4.48	24 ± 3.54
Motility (%)	31.9 ± 13.9	53.8 ± 7.01	60.4 ± 6.17

Note: Values are mean ± SD. $P<.001$.

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participation after providing informed, written consent. All patients underwent thorough history-taking and examination; semen analysis (at least twice), taken after 3 days of abstinence and at least 1 month apart; hormonal assessment (serum FSH, LH, T, and PRL); and scrotal color Doppler ultrasound. All varicoceles were diagnosed and graded (grade 1, 2, or 3) on the basis of physical examination and color Doppler ultrasound. Patients with subclinical varicocele, congenital urogenital abnormalities, or abnormal hormonal profile and patients with normal results on spermogram were excluded. Normal results on gynecologic assessment of the patient's partner were ensured before inclusion in the study. Patients were randomly divided into two groups through a computer randomization program: group I, the microsurgical subinguinal varicocelectomy (MSSIV) group (n = 82); and group II, the conventional nonmagnified subinguinal varicocelectomy (NMSIV) group (n = 80). The study protocol was approved by the Ethics Committee of Ghodran General Hospital, Kingdom of Saudi Arabia.

Under spinal or general anesthesia, the institutional standard technique was performed in all patients. The spermatic cord was approached through a 2-cm transverse skin incision centered over the external inguinal ring. The incision was deepened, and the spermatic cord was then grasped with a Babcock clamp, delivered, and placed over an artery forceps. Gentle pressure was applied onto the ipsilateral hemiscrotum to engorge the spermatic veins. All identifiable external spermatic veins were ligated and divided. After opening the spermatic fascia, the internal spermatic veins were separated, ligated, and divided. The only identified artery (or arteries) and lymphatics were preserved. In microsurgical subinguinal varicocelectomy, the operative microscope was brought into the operating field and all steps done under 8–15-power magnification. All patients were discharged on the day of operation.

Patients were followed with visits at 1-week intervals for 1 month, then at 4 and 12 months. Patients were encouraged to visit the clinic at any time if they had any problem. Semen analysis was done at 4 and 12 months. We compared the improvement of semen parameters in the two groups by mean value and percentage changes. An increase or decrease in sperm count and motility ≥50% of the preoperative value was considered significant. Postoperative recurrence of varicocele and hydrocele formation were detected by physical examination and confirmed by color Doppler ultrasound. The pregnancy rate was monitored during the follow-up period.

Statistical Analysis

Quantitative variables were expressed as mean ± SD. Qualitative variables were expressed as frequency and percentage. Quantitative parametric variables were compared between the two groups using the unpaired Student *t*-test, and quantitative nonparametric variables were compared using the Mann-Whitney test. Qualitative variables were compared using the χ^2 test or Fisher exact test when the criteria for using χ^2 were not sufficient. The power used was 0.80, and the level of significance was 0.5%.

RESULTS

In group I, MSSIV was done in 82 patients (left unilateral varicocelectomy in 49 patients and bilateral varicocelectomy in 33 patients). The mean age of the patients and their partners was 34 ± 8.51 years and 27.7 ± 6.63 years, respectively. In group II, NMSIV was done in 80 patients (left unilateral varicocelectomy in 46 patients and bilateral varicocelectomy in 34 patients). The mean age of the patients and their partners was 33.7 ± 8.77 years and 25.7 ± 8. 15 years, respectively.

In group I patients with a left unilateral varicocele, the grading was grade 1 in 10, grade 2 in 24, and grade 3 in 15 patients. In group II patients with a left unilateral varicocele, it was grade 1 in 15, grade 2 in 18, and grade 3 in 13 patients. In group I patients with bilateral varicoceles, the grading was grade 1 in 6, grade 2 in 17, and grade 3 in 10 patients on the left side and grade 1 in 9, grade 2 in 11, and grade 3 in 13 patients on the right side. In group II patients with bilateral varicoceles, it was grade 1 in 8, grade 2 in 14, and grade 3 in 12 patients on the left and grade 1 in 11, grade 2 in 15, and grade 3 in 8 patients on the right side.

There were no statistically significant differences between the two groups in terms of patient age, partner age, laterality, and grade of varicocele ($P<.05$).

There was a statistically significant increase in the mean value of sperm count and motility at 4 and 12 months postoperatively in both groups. The increase in mean sperm count and motility was in favor of the MSSIV group, with a significant difference (Tables 1 and 2). Additionally, when comparing patients with ≥50% increase in

TABLE 2

Comparison between group I and II in regard to mean sperm count and percentage motility after 4 and 12 months.

Variable	Group I (MSSIV)	Group II (NMSIV)	*P* value
Postoperative sperm count ($\times 10^6$/mL)			
4 mo	25.9 ± 4.18	23.4 ± 4.48	<.001[a]
12 mo	26.7 ± 3.60	24 ± 3.54	<.001[a]
Postoperative sperm motility (%)			
4 mo	56.7 ± 6.49	53.8 ± 7.01	<.001[a]
12 mo	63.4 ± 5.14	60.4 ± 6.17	<.001[a]

Note: Values are mean ± SD.
[a] Statistically significant.

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