



# Microsurgical Subinguinal Varicocelectomy in Patients with Recurrent or Persistent Varicocele

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## Abstract

**Introduction:** Varicocele may be treated with many different modalities including radiological and surgical approaches but what is the best treatment remains controversial. The recurrence rate following varicocele repair is up to 45%. The aim of this study is to investigate the efficacy of microsurgical varicocelectomy in varicocele recurrence.

**Methods:** In our clinic, 32 men who treated with persistent or recurrent varicocele were evaluated retrospectively. All patients were treated with artery and lymphatic sparing subinguinal microsurgical technique. Age, pre-operative and post-operative semen parameters, serum testosterone levels, post-operative pregnancy rates, testicular volumes, and complications were recorded and analyzed.

**Results:** Postoperatively, mean serum testosterone levels increased. Median sperm concentrations and motility rates also increased. With a minimum 6-month follow-up, the overall pregnancy rate was 37.5% (n=12) including 18.7% (n=6) of pregnancies achieved through natural intercourse, 9.3% (n=3) of them with IVF/intracytoplasmic sperm injection, and 9.3% (n=3) with intrauterine insemination. No complications such as hydrocele, hematoma, and wound infection were observed during the follow-up period.

**Discussion and Conclusion:** In this study, treatment of recurrent varicocele with subinguinal microsurgical technique seems to be effective method with improving semen parameters and without a significant risk of post-operative complications.

**Keywords:** Microsurgery; recurrent; varicocele.

The most common male infertility factor that can be corrected by surgery is varicocele [1]. In adolescents, physical examination and ultrasonography can reveal varicocele in about 15–18% of the cases [2,3]. Varicocele is seen in 35% of primary infertile men, and its incidence rises up to 81%. If both primary and secondary infertile men are taken into consideration [4,5] although its pathophysiological mechanism cannot be fully understood, the most frequently cited theories are testicular temperature change, venous hypertension, and hypoxia and related deterioration of semen production [6,7].

Varicocele recurrence can be seen in different rates depending on the surgical methods used. At a minimum follow-up period of 6 months, median recurrence rates vary according to the type of varicocelectomy as follows: Retroperitoneal high ligation varicocelectomy (14.97%), microsurgical method (1.05%), macroscopic method (2.63%), laparoscopic method (4.3%), and radiological embolization (12.7%) [8].

In spite of these different recurrence rates, it is still debatable which method to use for the treatment of recurrent varicocele. The aim of this study is to investigate the effi-

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cacy of microsurgical varicocelectomy in the treatment recurrent varicocele.

## Materials and Methods

Our retrospective study population consisted of 32 patients who had been previously operated with the indication of varicocele in our urology clinic, but developed recurrent varicocele detected based on physical examination and ultrasonographic evaluation. However, semen parameters of these patients did not improve for post-operative 6 months so they underwent microsurgical subinguinal varicocelectomy. Age, pre- and post-operative semen parameters, serum testosterone levels, post-operative pregnancy rates of their spouses, testicular volumes, and complications were recorded. Statistical analysis was performed using the SPSS version 20. The comparisons between the two groups were done by paired sample t-test and  $P < 0.05$  was considered statistically significant.

## Results

The median age of the patients was 31 (25–36) years. Post-operative mean serum testosterone levels increased. Median sperm concentrations and motility rates were statistically significantly increased postoperatively, but the rate of normal morphology was not changed according to Kruger criteria (Table 1). The fertility rate was determined as 37.5% ( $n=12$ ) during 6-month follow-up period. While 18.7% ( $n=6$ ) of these pregnancies were spontaneous pregnancies, 9.3% ( $n=3$ ) of them were achieved with in vitro fertilization/intracytoplasmic sperm injection and 9.3% ( $n=3$ ) of them with intrauterine insemination. Hematoma, hydrocele, and infection were not observed during post-operative follow-up.

## Discussion

Depending on the surgical treatment modality and operative method, varicocele recurrence is seen up to 45% of the patients after primary surgery [9]. Ineffective venous ligation or anatomic variations are the main factors that have been implicated in varicocele recurrence due to poorly de-

finied collateral venous circulation during primary surgery [10]. Overlooking small internal spermatic veins, especially during macroscopic surgery which later become dilated, are the disadvantages of macroscopic surgery [11], it is still controversial which treatment is to be preferred for recurrent varicocele. Although microsurgery, embolization, and laparoscopic surgical methods are preferable methods for varicocele recurrence, varicocelectomy with microsurgical method is the recommended treatment modality due to its lesser number of side effects and complications [12–16].

In a study involving 23 patients undergoing macroscopic subinguinal redo varicocelectomy, no recurrence was observed in 91% of the patients, while 82.6% of the patients showed improvement in sperm parameters [17]. In a study with greater number of patients who underwent redo varicocelectomy ( $n=54$ ) by microsurgical method, a significant increase was observed in the post-operative median serum testosterone levels similar to our study, and a significant improvement in the post-operative median semen counts and motility rates of the patients was detected [9]. No recurrence was observed in the patients and at the end of 24-week follow-up period, and pregnancies were noted in 40% of the couples with the aid of assisted reproductive technologies. In one of the largest series in literature, 120 of 207 patients with recurrent varicoceles included in the study had undergone microsurgical subinguinal varicocelectomy, while 90 patients were followed up as a control group. [18] There was a significant increase in total motile sperm counts in the surgery group but a decrease in the control group. Still, a significant increase was observed in total testosterone level in the surgical group. In the surgical group, spouses of 52.5% of these patients had become pregnant (39.7% of them spontaneous pregnancy), while the follow-up group had a pregnancy rate of 39.2% (15.8% of them spontaneous pregnancy).

In a retrospective study of 48 infertile patients with varicocele recurrence, in which the predictive factors of success after recurrence were investigated, patients were divided into three groups as those with ( $n=17$ ) and without ( $n=10$ ) improvement in their semen parameters, and patients who did not prefer surgery ( $n=21$ ), and as a predictive factors of success, low FSH level, low retrograde peak flow, number of ligated veins, and late recurrence period were determined [15].

In a study in which 53 patients underwent embolization due to recurrence, recurrence rate of 4.1% was determined during 6-month follow-up, while in another study where embolization was performed in 93% of patients

**Table 1.** Pre- and post-operative results of serum testosterone and semen analyses

	Pre-operative (median)	Post-operative (median)	p
Serum testosterone (ng/ml)	4.37	4.61	0.02
Sperm concentration (million/cc)	24.3	26.7	0.04
Motility (a+b+c) (%)	24.4	28.6	0.03
Kruger criteria (%)	2.4	2.43	0.87

who underwent embolization or underwent laparoscopy, retroperitoneal, or embolization due to recurrence after inguinal ligation, 28 patients were evaluated. 93% of these patients underwent embolization, and complete resolution was observed in 80%, partial response in 16%, and no improvement in 4% of these patients [19,20]. In both studies, semen parameters and hormonal parameters were not evaluated.

When the studies where antegrade sclerotherapy and retrograde embolization were performed to treat recurrent varicoceles are investigated, the success rates ranged between 92.5% and 77.8% in a limited number of patients [21,22]. In our study, recurrent varicocele treatment with microsurgical method is seen as a successful method thanks to the increase in semen parameters and low side effects. There is no study in literature that determined superiority of one method over others. Prospective randomized controlled trials with greater number of patients with homogeneous distribution are needed to determine the superior method in the treatment of varicocele.

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