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.
cacy of microsurgical varicocelectomy in the treatment re-
current 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 ul-
trasonographic evaluation. However, semen parameters of
these patients did not improve for post-operative 6 months
so they underwent microsurgical subinguinal varicocelec-
tomy. 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 consid-
ered statistically significant.

Results
The median age of the patients was 31 (25–36) years. Post-
operative mean serum testosterone levels increased. Me-
dian sperm concentrations and motility rates were statisti-
cally 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/intra-
cytoplasmic sperm injection and 9.3% (n=3) of them with
intrauterine insemination. Hematoma, hydrocele, and infec-
tion were not observed during post-operative follow-up.

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

| Table 1. Pre- and post-operative results of serum testosterone and semen analyses |
|---------------------------|---------------------------|---------------------------|
|                          | Pre-operative (median)    | Post-operative (median)   |
| 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                     |

fined collagenous 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 recur-
rent 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 ob-
served 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 signif-
icant increase was observed in the post-operative median
serum testosterone levels similar to our study, and a sig-
nificant 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 varicoce-
lectomy, 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 surgi-
cal 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 varico-
cele 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 fac-
tors 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 deter-
mined during 6-month follow-up, while in another study
where embolization was performed in 93% of patients
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 were 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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