

## Is Microsurgery Necessary in Grade 3 Varicocele?

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**Purpose:** To compare the results of microsurgical and naked eye varicolectomy in patients with grade 3 varicocele.

**Materials and Methods:** This study was conducted on 84 patients with grade 3 varicocele, between 2007 and 2009. Patients were randomized into two groups, equal in number. Thereafter, microsurgical varicolectomy was performed in the first group, while the other group underwent naked eye varicolectomy. Groups were compared in terms of operation duration, number of ligated internal and external spermatic veins, early and late postoperative complications, and postoperative color Doppler ultrasonography findings. Parametric and nonparametric values were compared using Student's *t* test and Chi-Square test, respectively.

**Results:** The mean duration of surgery was  $19 \pm 2.3$  minutes (range, 12 to 25 minutes) in the naked eye surgery group and  $43 \pm 3.9$  minutes (range, 25 to 75 minutes) in the microsurgery group ( $P = .008$ ). The number of ligated internal and external spermatic veins, the incidence of early and late postoperative complications, and color Doppler ultrasonography findings were not significantly different between the two groups ( $P = .12$ ,  $P = .09$ ,  $P = .17$ , and  $P = .22$ , respectively).

**Conclusion:** In patients with grade 3 varicocele, microsurgery and naked eye surgical methods proved similar results in terms of success and complications. Because the operation time of the classical varicolectomy is significantly shorter, it may be preferred in this subset of patients.

Keywords: varicocele, infertility, microsurgery, postoperative complications

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### INTRODUCTION

Microsurgery is usually recommended as the method of choice in patients with low-grade varicocele referred to infertility clinics. This is due to the difficulty of naked eye dissection of the spermatic veins with relatively smaller diameters in such patients, especially in low ligation methods, because these veins generally present conglomeration.<sup>(1,2)</sup> However, we know that patients with grade 3 varicocele do not encounter problems in diagnosis and dissection during operation due to reduction in the number and

diameter of the spermatic veins.<sup>(3)</sup>

On the other hand, opinions concerning the degree of reflux in patients with varicocele and its effect on the sperm parameters as well as the degree of postoperative reflux and whether it represents clinical recurrence remain unclear.<sup>(2)</sup>

This study compares operation time, postoperative early and late stage complications, the number of ligated internal and external spermatic veins, and the pre-operative and postoperative color Doppler ultrasonography (CDUS)

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findings in patients with grade 3 varicocele who underwent microsurgery and naked eye surgery.

## MATERIALS AND METHODS

This prospective randomized clinical study was conducted on 84 patients between December 2007 and July 2009. All the patients presented with grade 3 varicocele that were observable with inspection on the left side. All the patients were in military service and unmarried. Scrotal swelling and pain were the chief complaints. The indications for varicolectomy were pain and fear of late onset infertility.

We randomized the patients into two groups based on their application number. Even numbered patients were in the naked eye group and odd numbered ones were in the microsurgery group. Each group was composed of 42 patients. Spermography and CDUS were performed in all the patients. No patient had history of pelvic, scrotal, or inguinal operations. Subjects with previous scrotal and inguinal operations as well as bilateral cases were excluded from the study.

All the patients were examined in supine position by using PowerVision 6000 Ultrasonography (Toshiba Inc., Tokyo, Japan) 7.5 MHz linear duplex probe with spontaneous respiration and Valsalva maneuver prior to the operation. Presence and duration of reverse flow in the pampiniform plexus were calculated. Participants with no sign of reverse flow were later evaluated during spontaneous respiration and Valsalva maneuver while standing.

Under general anesthesia, all the subjects were operated by the same surgeon (C.Ş.) with a low inguinal incision. The spermatic cord was suspended and taken off from the incision line in all the operations. We directed to more cephalad position in conglomerate veins to make the dissection easier in the naked eye operation group. We used Muller-Weller® microscope (6 to 10× magnification) for the microsurgery group and recorded the type and number of ligated veins in both groups. Control CDUS was performed 3 months after the operation by a radiologist unaware of the type of operation.

Results were compared in terms of operation

duration, number of ligated internal and external spermatic veins, presence of postoperative reflux, and early (1<sup>st</sup> week) and late (3<sup>rd</sup> to 6<sup>th</sup> months) complications, including bleeding, hematoma, testicular atrophy, and hydrocele formation.

Parametric values were compared using Student's *t* test. All the nonparametric comparisons were done by Chi-Square test. *P* values less than .05 were considered statistically significant at 95% confidence interval (CI).

## RESULTS

Mean age of the patients was  $21.6 \pm 2.7$  years and  $20.8 \pm 2.9$  in groups 1 and 2, respectively. Pre-operative spermography in microsurgery group revealed normal parameters in 28 (66.6%), oligospermia in 11 (26.2%), and oligospermia and low motility in 3 (7.2%) patients versus 32 (76.2%), 8 (19.1%), and 2 (4.7%) subjects in naked eye surgery group, respectively.

The mean duration of surgery was  $19 \pm 2.3$  minutes (range, 12 to 25 minutes) in the naked eye surgery group and  $43 \pm 3.9$  minutes (range, 25 to 75 minutes) in the microsurgery group ( $P = .008$ ).

The mean number of ligated internal spermatic veins was 4.5 (range, 3 to 6) while the number of ligated external spermatic veins was 1 in 26 patients and 2 in 16 subjects in the naked eye surgery group. In the microsurgery group, the mean number of ligated internal spermatic veins was 4.8 (range, 3 to 7) while the number of ligated external spermatic veins was 1 in 28 patients and 2 in 14 subjects. There was not a statistically significant difference between groups in terms of the number of ligated external spermatic veins ( $P = .09$ ).

Two patients in the naked eye surgery group developed peritesticular hematoma in the 1<sup>st</sup> week. None of the participants in the microsurgery group developed early postoperative complications. We did not identify a statistically significant difference in terms of early stage complications between the two groups ( $P = .17$ ).

Prior to the operation, all the patients with grade 3 varicocele were identified to have reflux for longer than 5 seconds in CDUS, asserted with

spontaneous respiration and Valsalva maneuver. The CDUS examination conducted 3 months after the operation did not find reflux for more than 5 seconds in any of the operated participants. There was no sign of hydrocele or testicular atrophy in any of the patients in both groups six months after the operation.

## DISCUSSION

Varicocele is one of the most frequent causes of infertility among men referring to infertility clinics. Clinically, varicocele can be classified into three grades. In grade 3, the presence of dilated varicose veins can be seen by observation alone. In grade 2, the presence of veins can be felt by palpation without the need for Valsalva maneuver. In grade 1, on the other hand, the presence of the scrotal veins can only be felt by palpation with the Valsalva maneuver.<sup>(4)</sup>

In low ligation methods, as the grade of varicocele drops, the diameter of the spermatic veins declines whilst their numbers increase revealing conglomeration with each other. It might be difficult to maintain the integrity of testicular artery and lymphatic veins when performing naked eye dissection in these conditions. Research suggests that microsurgical varicocelectomy is not only beneficial, but also necessary, especially in these cases. Actually, it is recommended that a microscope should be used instead of dilating loop.<sup>(2,5)</sup> The demand for experience, preparation stage for the operation, and prolonged operation durations involved in microsurgical varicocelectomy are undesirable factors, especially in clinics with heavy workload.

The surgical duration of a varicocele operation is directly related to the experience of the surgeon, number of veins to be ligated, and development of potential peri-operative complications, such as hemorrhage during the procedure. In our study, there was a statistically significant difference in operation periods between the two groups ( $P = .008$ ). This difference is associated with longer times required by microsurgery as well as equipment preparation and orientation for the operation area.

The reason behind the popularity of low ligation

methods is the fact that external and internal veins can only be observed with this approach.<sup>(1)</sup> No statistically significant difference between our groups concerning the number of ligated external spermatic veins demonstrates that these veins are observable by the naked eye.

Compared to grades 1 and 2 varicocele, the number of internal spermatic veins in grade 3 is lower whilst vein diameters are larger.<sup>(1,6)</sup> This fact not only makes it easier to notice the veins, it also makes their dissection simpler. However, we came across very fine veins presenting conglomeration in low-grade varicocele, especially in patients with subclinical varicocele that were operated according to CDUS findings. This characteristic makes the dissection of fine veins more difficult. Sometimes the total ligation of vein clusters in such cases calls out for the formation of testicular atrophy or hydrocele. Microsurgical varicocelectomy is the undisputed recommendation for such conditions. However, the benefit of varicocelectomy on sperm parameters in these cases should be opened to debate.<sup>(2,7)</sup> The number of internal ligated veins among our patients was similar in both groups ( $P = .12$ ). Spermatic veins displaying pronounced tortuosity and larger vein diameters might explain this condition. We observed that the number of veins ligated in the study by Orhan and colleagues is higher than ours (range, 3 to 14). This finding may be explained by inclusion of more grades 1 and 2 varicocele in their study.<sup>(6)</sup>

Anticipated complications in varicocele surgery include wound infection, scrotal hematoma, testicular atrophy, inadequate venous ligation (recurrence), and hydrocele formation.<sup>(4)</sup>

Only 2 patients undergoing naked eye varicocelectomy developed minimal hematoma in the early postoperative stage; however, it was spontaneously reabsorbed within ten days in both subjects. Hydrocele and testicular atrophy did not develop in any patients.

Clinical examination is fundamental in the diagnosis of varicocele. Additional screening methods are unnecessary in grade 3 varicocele.<sup>(2)</sup> Color Doppler ultrasonography is applied especially to diagnose subclinical varicocele and reveal the presence of recurrences. Although

studies suggest that subclinical varicocele does not benefit greatly from surgery, in clinical practice, it is not uncommon for these patients to be advised and being subject to surgery.<sup>(8)</sup> We performed CDUS on all the patients to investigate whether their clinical findings correlate with Doppler findings and if this correlation persisted following both surgical methods. We tried to find out if the presence of pathological reflux is an anticipation of poor surgical results. Reflux presence in patients with clinical varicocele can reach upto 90%.<sup>(6,7)</sup> This ratio was determined to be 100% in our study. This condition was explained by the presence of high-grade varicocele in all of our patients. Although there is some controversy whether reflux is an indicator of recurrence in the postoperative period, we did not come across reflux during controls in the postoperative 3<sup>rd</sup> months. This condition was interpreted as effective ligation of the spermatic veins in both groups.

## CONCLUSION

In conclusion, naked eye and microsurgical varicocelectomies reveal similar results in terms of postoperative complications and recurrence rates amongst grade 3 varicocele. Because the number of the spermatic veins to be ligated is less and the vein diameter is greater in both methods. We are convinced that shorter surgical periods can be a motive for preferring naked eye varicocelectomy in grade 3 varicocele.

## CONFLICT OF INTEREST

None declared.

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