

## Clinical Study

# The Effect of Varicocelelectomy on Sperm Parameters in Subfertile Men with Clinical Varicoceles Who Have Asthenozoospermia or Teratozoospermia with Normal Sperm Density

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**Background.** To compare preoperative and postoperative sperm parameters such as sperm count, motility, and morphology in patients with normal sperm concentration with teratozoospermia and asthenozoospermia. **Materials and Methods.** Hundred and six patients with varicocele associated with male infertility over a 5-year period were included into the study. Pre- and postvaricocelelectomy seminal fluid parameters evaluation according to the World Health Organization (WHO) criteria was performed at 4–6-month intervals. **Results.** One hundred and six patients met the criteria. The mean age of patients was  $24.53 \pm 8.13$ . The mean duration of infertility was 3.6 years (range: 1.5–6.3). Only the sperm motility of patients with normospermia showed a significant improvement postoperatively. **Conclusions.** No significant improvement in sperm morphology may be obtained in patients with clinical varicocele and preoperative normospermia.

## 1. Introduction

The incidence of infertility is 10–15% among couples trying to conceive, with male infertility contributing to nearly 50% of cases [1]. Although multiple factors may play a role in male infertility, varicocele is the most frequent finding in male infertility, with a prevalence of 19–41% of men with primary infertility and 45–81% of men with secondary infertility [1, 2]. Increased scrotal temperature, reflux of metabolites from the kidney and adrenal gland, decreased volume of blood flow, and anoxia are the supposed mechanisms [3]. Varicocele is also known as the most surgically correctable cause of male infertility, and its repair is the most commonly performed surgical procedure in order to correct male infertility [4]. Previous studies have shown abnormalities in the sperm count, motility, and morphology in varicocele patients and a significant improvement in these parameters following surgi-

cal correction [5]. The postoperative outcomes of varicocelelectomy operation in patients with normal sperm count but with sperms having abnormal morphology and impaired motility have not been studied much. Therefore, in this retrospective study, we compared preoperative and postoperative sperm parameters such as sperm count, motility, and morphology in patients with normal sperm concentration showing abnormal forms and decreased motility pattern.

## 2. Materials and Methods

The study included 106 patients seeking surgical treatment for varicocele in our institution from December 2008 to December 2011. There were no documented diseases that would affect the results. A basic infertility evaluation including a detailed history and a thorough physical examination was carried out. All of the patients were married with primary

TABLE 1: Effect of varicocele on semen parameters in patients with normal sperm density ( $>15$  million/mL).

No. 106	Sperm count	Morphology %	Motility (a) %	Motility (a + b) %
Preoperative	$59.9 \pm 40.2$	$3.6 \pm 1.6$	$15.4 \pm 8.0$	$29.7 \pm 10.7$
Postoperative	$64.7 \pm 43.2$	$3.7 \pm 1.4$	$20.4 \pm 8.4$	$40.3 \pm 10.7$
P value	0.105	0.400	0.000	0.000

infertility and varicocele (grade 1–3) having normospermia either having sperms with decreased normal forms and/or motility (progressive motility and nonprogressive motility). All the patients with varicocele were tested with color Doppler ultrasound which identified it as anechoic tubular structures that dilated on Valsalva maneuver. Volume, pH, sperm density, morphology, and motility were evaluated. The normal semen parameters according to the WHO Manual for Semen Analysis were as follows [5]: volume of semen in adult males: 1.5 mL, sperm concentration:  $15 \times 10^6$ , sperm morphology (normal forms): 4%, progressive and nonprogressive motility (PR+NP): 40%, and progressive (PR): 32%. Subinguinal varicocele was performed for all of the patients by a single urologist. Four weeks after the operation, a Doppler ultrasonography imaging was performed to confirm the improvement of varicocele by the absence of venous back flow. We followed up the patients for 3 and 6 months, and seminal analysis were performed to evaluate changes in the seminal indices.

The data was analyzed using the SPSS 14.0 statistical software for Windows (SPSS, Chicago, IL, USA). For independent variables, we used independent sample *t*-test, and for dependent variables, paired sample *t*-test was utilized. *P* values less than 0.05 were considered statistically significant.

### 3. Results

One hundred and six patients met the criteria. The mean age of patients was  $24.53 \pm 8.13$ . The mean duration of infertility was 3.6 years (range: 1.5–6.3). The pairwise comparison of the preoperative and the postoperative sperm concentrations in all the normospermic patients did not show any significant improvements ( $P = 0.105$ ) after varicocele (Table 1). Asthenozoospermia defined as sperm poor forward motility and represented as PR+NP motile sperms was found in 92 (87%) patients preoperatively. Postoperatively, asthenospermia was found in 42 (40%) of the patients. When the sperm motility of the patients obtained postoperatively was compared with the preoperative values using a paired *t*-test, there was a significant improvement in the sperm motility overall ( $P = 0.000$ ) (Table 1). Teratospermia was defined as normal sperm morphology of less than 4%. Forty-nine (46%) patients were found to have teratozoospermia preoperatively. Following varicocele, teratospermia was seen in 40 (38%) patients. Paired comparison of the preoperative and postoperative semen analyses showed that there was no significant improvement in sperm morphology after varicocele in the overall group ( $P = 0.400$ ; Table 1).

### 4. Discussion

Testicular varicose veins cause reduction in function and number of the testicular cells which is reflected as an altered sperm parameter [6]. Surgical treatment is indicated in men with varicocele when the semen analysis shows oligospermia, asthenospermia, teratospermia, or coexistence of these abnormalities. To date, previous studies have demonstrated a beneficial effect of varicocele in subfertile men with varicocele who have poor sperm quality [7]. It is also known that several patients with clinical varicocele have isolated abnormalities such as sperm motility or morphological parameters in the semen analysis and varicocele is carried out in these patients as well. However, it has not been studied much whether varicocele is beneficial in such patients. In this study, we tried to examine the changes in the semen parameters after varicocele among the patients who have normal sperm count associated with asthenospermia and/or teratospermia.

Evidence suggests that men with normospermic varicocele respond to varicocele differently from those patients who have oligospermia preoperatively due to a different pathophysiological mechanism [8]. Two important studies evaluated the postoperative outcomes of varicocele correction in normospermic patients. In one, isolated teratospermia did not show any significant improvement following varicocele; in the other, neither asthenospermia nor teratozoospermia showed improvement [7, 9]. Additionally, authors claimed that performing varicocele exposes this group of patients to the risk of oligozoospermia. Our data also demonstrated that these patients with preoperative normospermia did not show significant improvement in teratozoospermia; the only benefit of surgery is at sperm motility.

The possible explanation is that the poor morphology observed in varicocele patients with normal sperm density may not be only due to the presence of varicocele. Varicocele in these patients may lead to an unknown alteration or damage to the semen physiology and subsequently morphological abnormalities. With the evidence of the present and previous studies, it may therefore be recommended that normospermic subfertile men with clinical varicocele and poor sperm motility or morphology should undergo assisted reproductive techniques rather than surgical varicocele ligation.

There are also limitations to our study; first, it is a retrospective study; second, there is lack of data concerning pregnancy outcome.

In conclusion, normospermic subfertile men with clinical varicocele and teratozoospermia may not show statistically

significant improvement in sperm morphology following varicocelectomy. We think that varicocelectomy choice for normospermic patients with teratospermia should be at least carefully considered. Comprehensive multi-institutional studies are necessary to confirm the present findings.

## Conflict of Interests

The authors have no conflict of interests to declare in this study.

## References

- [1] M. Cocuzza, M. A. Cocuzza, F. M. P. Bragais, and A. Agarwal, "The role of varicocele repair in the new era of assisted reproductive technology," *Clinics*, vol. 63, no. 3, pp. 395–404, 2008.
- [2] A. Agarwal, F. Deepinder, M. Cocuzza et al., "Efficacy of varicocelectomy in improving semen parameters: new meta-analytical approach," *Urology*, vol. 70, no. 3, pp. 532–538, 2007.
- [3] C. G. Blumer, A. E. Restelli, P. T. D. Giudice et al., "Effect of varicocele on sperm function and semen oxidative stress," *BJU International*, vol. 109, no. 2, pp. 259–265, 2012.
- [4] A.-F. Abdel-Maguid and I. Othman, "Microsurgical and non-magnified subinguinal varicocelectomy for infertile men: a comparative study," *Fertility and Sterility*, vol. 94, no. 7, pp. 2600–2603, 2010.
- [5] *WHO Laboratory Manual for the Examination of Human Semen and Sperm-Cervical Mucus Interaction*, Cambridge University Press, Cambridge, UK, 5th edition, 2010.
- [6] D. A. Paduch and J. Niedzielski, "Repair versus observation in adolescent varicocele: a prospective study," *Journal of Urology*, vol. 158, no. 3, pp. 1128–1132, 1997.
- [7] L. Okeke, O. Ikurowo, I. Chiekwe, B. Etukakpan, O. Shittu, and O. Olapade-Olaopa, "Is varicocelectomy indicated in subfertile men with clinical varicoceles who have asthenospermia or teratospermia and normal sperm density?" *International Journal of Urology*, vol. 14, no. 8, pp. 729–732, 2007.
- [8] A. Mancini, E. Meucci, D. Milardi et al., "Seminal antioxidant capacity in pre- and postoperative varicocele," *Journal of Andrology*, vol. 25, no. 1, pp. 44–49, 2004.
- [9] A. Maciejko, P. Kim, T. Jang, R. E. Brannigan, and W. W. Lin, "Isolated teratospermia: is varicocelectomy indicated?" *Journal of Urology*, vol. 173, supplement 4, p. 369, 2005.



