



Factors Affecting the Success of Varicocele Repair in Subfertile Men

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Abstract

Despite the fact that varicocele has been the subject for numerous studies for more than thousand years there are still a great amount of debatable issues, especially, concerning limited efficacy of varicocele repair in men from infertile couples. There may be a lot of concurrent clinical and laboratory factors that may affect varicocelectomy success. This analysis showed that evidence on factors (predictors) of varicocele repair efficacy are rather controversial, and only initial semen parameters such as sperm concentration and/or TMSC may be the relatively important predictors of varicocelectomy success in male infertility treatment.

Keywords: DNA, Reproductive medicine, Clinical varicocele

Introduction

Varicocele is one of the most frequently identified correctable causes of male subfertility.¹⁻³ According to the recent literature data, among men suffering from primary infertility, the ratio of people with varicocele is 50%, and among those suffering from secondary infertility, it can reach 69%.⁴ Although the exact mechanisms affecting male fertility by varicocele are still widely debated, overall, the study results demonstrate that varicocele have a negative impact on spermatogenesis.^{3,5-9}

Recent evidence suggests that the effects of varicocelectomy are not limited to changes in traditional semen parameters, but also include improved sperm DNA fragmentation and increased rates of spontaneous and assisted reproductive technology (ART) pregnancies.^{10,11} The European Association of Urology (EAU), the American Urological Association (AUA), and the American Society for Reproductive Medicine (ASRM) recommend surgical correction of varicocele in men with clinical varicocele and abnormalities in at least one semen parameter.^{1,12,13}

H Ding,¹⁴ E Persad¹⁵ citing a large number of studies indicated that microsurgical spermatic veins ligation is the most acceptable surgical treatment option for the treatment of clinical varicocele in infertile men in comparison with traditional open (without the use of microscopic equipment), laparoscopic methods, endovascular occlusion of veins. Simultaneously, varicocelectomy does not always lead to improved semen quality and fertility restoration: semen improvement after surgery usually occurs in 60-70% of cases, and natural pregnancies occur in 30-40% of couples.¹⁶⁻²⁰

To date, there are insufficient studies on predicting the effectiveness of varicocelectomy based on a combination of clinical and laboratory characteristics of patients. For example, the results of a study conducted by M Samplaski,²¹ indicate the possibility of predicting the effectiveness of varicocelectomy in practice using special nomograms developed based on the study of clinical and laboratory parameters of subfertile men with varicocele. According to the authors, such information can help both the physician and the patient when deciding on the advisability of varicocele surgical treatment for the treatment of infertility in a married couple.²¹⁻²³

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In this review we tried to analyze the recent evidence concerning factors affecting varicocelectomy efficacy in male infertility treatment.

Semen parameters and other laboratory predictors

According to the results of most studies assessing the prognostic criteria for the effectiveness of varicocelectomy, initial semen parameters, such as sperm concentration and motility, can be reliable predictors of the effectiveness of surgical correction of varicocele in male infertility.²⁴⁻²⁷ According to Shomarufov, total progressively motile sperm count (TMSC) can be the most reliable predictor for semen improvement and also for natural pregnancies after varicocele repair.^{19,20,28} They also showed in their critical evidence analysis that TMSC is accepted as a predictor of varicocelectomy fertility outcomes in many other studies.²⁰ Here we should note that they analyzed the data concerning only microsurgical varicocelectomy outcomes separately for semen improvement and pregnancy.

In some authors' data, peripheral blood parameters may also be predictors of the outcome of varicocele repair.^{29,30} E Ates, based on the results of their study concluded that the ratio of neutrophils to lymphocytes (neutrophil-lymphocyte ratio or NLR) can be an independent predictor of the varicocelectomy success. According to their data, the optimal NLR indicator is 1.98, while the borderline indicator is 0.89.³⁰

There is also data confirming the influence of immune factors on the effectiveness of varicocele treatment. According to Bozhedomov the presence of anti-sperm antibodies (ASAB) in sperm is a predictor of low effectiveness of varicocele repair.³¹ Several studies have found that the initial sperm DNA fragmentation (SDF) level may also play a predictive role in the assessment of varicocelectomy success.³²⁻³⁵ Also, according to other authors data ASAB and SDF do not affect varicocelectomy efficacy in male subfertility treatment.^{36,37}

Clinical and anamnestic parameters

In the literature there are some studies which evaluated initial clinical and anamnestic parameters of men as the predictors of varicocelectomy fertility outcomes. According to some studies, a male age,^{17,19,21,38} varicocele grade,^{21,39} serum gonadotropins and testosterone level,^{17,36,40} infertility duration,^{19,24,32} body mass index (BMI)¹⁷ and testicular volume^{36,40} may be the predictors of varicocele treatment efficacy. At the same time it should be noted that there are studies that decline the prognostic value of the above criteria such as varicocele grade,^{17,20,41} testicular volume,¹⁷ and a male age.^{20,42}

Systematic reviews and meta analyses

Recent meta-analyses provided by Y Niu and N Ou compared unilateral versus bilateral varicocelectomy.^{43,44} The authors agreed that performing bilateral varicocelectomy significantly improved sperm quality and the chances of conception in infertile couples.

The results of other systematic review provided by Asafu Adjei, where they analyzed the literature on the effect of the varicocele grade on varicocelectomy efficacy in subfertile men, demonstrated that the varicocele grade had a direct impact on varicocelectomy success. However, given that the studies included in the review were heterogeneous, the validity of this conclusion may be debatable.⁴⁵

Summary

It is seen from the above despite the numerous studies on varicocelectomy effectiveness in men from infertile couples, as well as predictors that determine its success, the question of ineffectiveness (or lack of effectiveness) of varicocele repair in certain groups of men remains open. According to most studies, only some initial semen parameters (sperm concentration, TMSC etc.) may be the reliable predictors of varicocelectomy efficacy. Further large-scale and good-quality randomized clinical trials and meta-analyses are required to clarify those debatable issues.

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Conflict of Interest

Regarding the publication of this article, the author declares that he has no conflict of interest.

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