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PREDICTION OF THE EFFICIENCY OF VARICOCELECTOMY IN MALE SUBFERTILITY TREATMENT

Akilov F.A.,
Muxtarov Sh.T.,
Shomarufov A.B.,
Abbosov Sh.A.,
Shavakhabov Sh.Sh.,
Xudoybergenov U.A,
Khudayberdiev Kh.B.,
Kasimov S.S.,
Abdukarimov O.O.
Department of Urology Tashkent Medical Academy
Tashkent, Uzbekistan

ABSTRACT

Varicocele is a common and correctable cause of male infertility. However, varicocelectomy does not always lead to improved fertility in men, most likely due to factors that affect the effectiveness of the correction. The aim of the study was to evaluate the clinical and laboratory factors (predictors) that affect the onset of spontaneous pregnancy after varicocele correction.

Keywords: predictors, varicocelectomy, fertility, normozoospermia, azoospermia.

INTRODUCTION

Varicocele is a common and correctable cause of male infertility [1]. Although the exact mechanism of the relationship between varicocele and male infertility has not yet been identified, recent meta-analyses of randomized clinical trials (RCTs) have shown that correction of varicocele leads to a significant improvement in ejaculate quality and pregnancy rates in patients with abnormal sperm parameters and clinical varicocele according to compared with the observation group [2-3]. It should also be noted that varicocelectomy does not always lead to improved fertility in men, most likely due to factors affecting the effectiveness of the correction. According to many authors, such factors can be the initial parameters of the ejaculate, the age of the patient, the duration of infertility, and others [4-5].

The aim of the study was to evaluate the clinical and laboratory factors (predictors) that affect the onset of spontaneous pregnancy after varicocele correction.

MATERIALS AND METHODS

In accordance with the inclusion criteria (the presence of complaints about the absence of pregnancy in the spouse for 12 months or more, clinically significant varicocele and violations of ejaculate parameters) and exclusion criteria (normozoospermia and azoospermia, the presence of other factors of infertile marriage), 73 men aged 21 to 50 suffering from infertility and varicocele on the left. All patients underwent ligation of the veins of the spermatic cord on

the left by inguinal access (under a magnification of 3.5 times - a modified Marmar operation) in the conditions of the Republican Specialized Center of Urology "(Tashkent, Uzbekistan).
During the study, an anamnesis of the onset of natural pregnancy was collected after 3-12 months. after operation. Postoperative changes in ejaculate parameters such as sperm concentration, the percentage of progressively motile spermatozoa (%), and total sperm motility (%) were also assessed in accordance with the 2010 WHO standards.
The dependence of pregnancy rate on predictors was studied by means of discriminant analysis with stepwise selection, carried out on the basis of IBM SPSS Statistics 21 software. The specific weight (coefficient) of each significant predictor was also calculated. Statistical analysis as a whole was carried out on the basis of statistical packages Microsoft Excel 2016 and IBM SPSS Statistics v.21.0. Data are given as mean and standard deviation. The results were considered significant at $p<0.05$.

RESULTS

The mean age of the patients was 29.3 ± 4.5 years, and the mean duration of infertility was 39.7 ± 11.6 months. (table No. 1).

Table number 1 The main characteristics of the studied patients (n=73)

Patient characteristics	Values
Age, years (M±SD)	29,3 ± 4,5
Duration of infertility, months (M±SD)	39,7 ± 11,6
body mass index, kg/m2 (M±SD)	26,1 ± 7,3
Varicocele: n (%)	
Left-sided Right-sided bilateral	48 (66) 2 (3) 23 (31)
Testicular volume, ml (M±SD)	
Left Right	18,1 ± 2,9 17,9 ± 2,7

The main indicators of the spermogram in the postoperative period (after 3-6 months) improved significantly: the concentration of spermatozoa increased from 57.9 ± 18.4 million/ml to 87.1±27.5 million/ml (p=0.00007), the percentage progressively motile spermatozoa increased from 14.1 ± 9.4% to 25.3 ± 11.4% (p=0.00002), total sperm motility also increased from 31.9 ± 22.2% to 49.3 ± 25.1% (p= 0.00003) (Table 2).

Table number 2. Spermogram parameters in patients before and after varicocelectomy

Periods of observation	Ejaculate volume, mlM±SD	Sperm concentration (in million/ml) M±SD	Progressive sperm motility (a %) M±SD	Total sperm motility (in %) M±SD	Total number of motile spermatozoa (in millions) M±SD
Before surgery	3,3 ± 1,2	57,9 ± 18,4	14,1 ± 9,4	31,9 ± 22,2	60,6 ± 20,4
After surgery	3,2 ± 1,1	87,1 ± 27,5	25,3 ± 11,4	49,3 ± 25,1	127,0 ± 25,2
P*	>0,05	**<0,001**	**<0,001**	**<0,001**	**<0,001**

*- statistical significance of changes.

Spontaneous pregnancy occurred in 22 couples out of 73 (30%). According to the results of discriminant analysis, the onset of natural pregnancy depended on the patient's age (p=0.002) and total sperm motility (p=0.0002). The remaining predictors were excluded from the analysis during stepwise selection. The specificity of the obtained discriminant function was 77.6%, the sensitivity was 72.2%. The predictive ability of the function was 74.8%.

The resulting discriminant function looks like this:

D = a * (-0,24) + b * 0,31 – 5,67;

where, a is the age of the patient, b is the general mobility, 5.67 is a constant. The threshold value of the absence / onset of pregnancy is (-0.242).

If the result is greater than this value, then the probability of pregnancy will be low.

DISCUSSION

Varicocele is the most common surgically corrected cause of male infertility [1]. The relationship between varicocele and spermogram parameters can be different. The disturbance of microcirculation that develops in varicocele leads to an increase in reactive oxygen species in testicular cells and oxidative stress, namely, oxidative stress is currently considered the key pathophysiological mechanism of pathospermia in varicocele [6]. Although the exact relationship between improvements in ejaculate parameters and surgical treatment of varicocele has not yet been established, meta-analyses of recent RCTs have found a significant improvement in ejaculate parameters after varicocelectomy [2]. Our data also indicate the effectiveness of varicocele correction in the treatment of subfertile men.

According to Jungwirth et al. [7] prognostic factors in the correction of male infertility with varicocele are:

- age and fertility of the spouse;
- duration of infertility;
- primary or secondary infertility;
- the initial parameters of the ejaculate.

Many authors consider preoperative ejaculate parameters to be the most reliable factors for predicting the effectiveness of varicocelectomy in infertile men [4,8,9], which is consistent with our data.

Data on the prognostic role of such parameters as a man's age, duration of infertility, degree of varicocele, body mass index (UTI), testicular volume, etc. remain controversial [8–10]. According to our data, the age of a man (a negative coefficient equal to 0.24) has a significant negative effect on natural conception after varicocelectomy. The rest of the above indicators, according to our results, do not have a significant impact on the onset of natural pregnancy after varicocele correction. Also, a significant effect on the natural conception of such a parameter as total sperm motility (positive coefficient equal to 0.31) was revealed.

It should be noted that in our study there are some shortcomings in the form of the lack of complete data on the state of reproductive health of partners (husbands) and a small number of involved patients. However, despite the above shortcomings, the results are statistically significant and reasonable, and, therefore, can be applied to the general sample of patients with varicocele.

CONCLUSIONS

A man's age and overall sperm motility are predictors of natural pregnancy after varicocelectomy. Factors such as duration of infertility, UTI, degree of varicocele, and baseline ejaculate parameters (other than overall sperm motility) have relatively low predictive value.

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