

THE EFFECT OF VARICOCELECTOMY ON SPERMIOGRAM AND GONADOTROPIN HORMONE PARAMETERS

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SUMMARY

In this study, to investigate the effects of varicocelectomy on serum follicle stimulating hormone (FSH), testosterone and spermogram parameters and to investigate the relationships between seminal and hormonal variables, gonadotropin hormone levels and spermogram parameters of 146 patients who underwent varicocelectomy were evaluated. The FSH hormone level was found 14.57 mU / mL before surgery and found 10.38 mU / mL after surgery, LH 10.30 and 8.48 mU / mL, and testosterone 4.22 and 5.26 ng / ml was found pre and post of varicocele surgery. Sperm concentration was 11,40 M / ml and 20,68 M / ml before and after varicocele surgery, morphological normal forms (%) 6,74 / 10,25, motile sperm concentration 5,33 / 12,30 M / ml, non -progressive motility (%) 18,85 / 15,41 progressive motility (%) 27,27 / 43,77 sperm count 35,81 / 63,52 M, total motility (%) 45,47 / 58,77 Velocity 6 , 69 / 9,80 (mic / sec) and volume 3,13 / 3,6 ml was found. In conclusion, varicocelectomy supports the Sertoli and Leydig cell functions. An increase in testosterone level leads to an improvement in sperm concentration and motility.

Keywords: Varicocelectomy, FSH, testosterone, Sperm concentration, Sperm motility

INTRODUCTION

Varicocele can be defined as the varicose vein of the pampiniform plexus veins in the scrotum. Varicocele occurs during adolescence and becomes more noticeable in time. Due to the slowing of blood flow, it causes heat increase in the scrotum, and the inverse blood flow from the left adrenal gland can lead to infertility by disrupting the balance of gonadotropins as a result of high testicular toxicity (1). Gonadotropins are hormones that control the axis between the hypothalamus, pituitary and gonads. Sperm production, development and adjustment of testosterone levels are due to these hormones. Therefore, evaluation of serum FSH, LH, testosterone, estradiol and prolactin levels of these patients is guiding in the diagnosis and treatment of varicocele and infertility patients (2,3). Serum gonadotropin levels

in varicocele patients differ according to varicocele progression stages. The hormonal axis deteriorates due to varicocele, deteriorating hormone levels negatively affect sperm production and develop infertility. In the treatment of varicocele-induced infertility, serum FSH, LH, testosterone, estradiol and prolactin hormone levels and biochemical test parameters of spermogram test and steroid hormone biosynthesis should be evaluated before and after varicocele surgery.

As a result of this study, the success of varicocele surgery will be determined by comparing the changes in gonadotropin hormone levels and spermogram parameters before and after varicocele surgery.

METHOD

The spermogram results and gonadotropin parameters of the varicocele patients admitted to our clinic in 2017-2018 were retrospectively evaluated by the ethics committee of Van Regional Training and Research Hospital dated 07/02/2019 and numbered 2019/03. The mean age of the patient group was 26.00 ± 2.67 years and ranged from 18 to 42 years. 146 patients with varicocele were included in the study. The spermogram test was performed by assessing concentration, volume, movement and Kruger parameters in accordance with WHO criteria.

Statistical analysis

Mann-Whitney U and Wilcoxon W were used as non-parametric tests to determine whether the difference between pre- and postoperative values was significant. Kolmogorov – Smirnov and Shapiro-Wilk tests were performed to determine if the data were normal distribution. Power analysis was performed with G-Power 3.1.9.2 software to calculate the number of samples in the study (4). In the study, the patients were selected by paying attention to the evaluation of varicocele cases from each age group. According to the Kolmogorov - Smirnov and Shapiro-Wilk analysis, Mann Whitney U tests were used to determine the difference between the groups in terms of volume, number, concentration, Kruger and motility values and FSH, LH, testosterone, prolactin and estradiol values. The mean and standard deviations of these test parameters are given in Table 1.

RESULTS

Power analysis of the study was performed with GPower 3.1.9.2. 94% (n = 108) for testosterone, 98% for LH (n = 14), 94% for prolactin (n = 46) and 91% for estradiol (n = 33) it was calculated. The mean and standard deviations of spermogram parameters and gonadotropin levels before and after varicocele surgery were compared (Table 1). According to the results of Power analysis it was found that the data used in the study were sufficient.

Table 1. Gonadotropin and spermiogram parameters before and after varicocele surgery

		Mean	Std. Deviation	N
FSH (mU/MI)	Preop.	14,57	5,33	146
	Postop.	10,38	5,29	146
	Total	12,48	5,70	292
LH (mU/mL)	Preop.	10,30	4,93	112
	Postop.	8,48	3,27	108
	Total	9,41	4,28	220
Testosteron (ng/ml)	Preop.	4,22	2,37	144
	Postop.	5,26	2,43	146
	Total	4,74	2,45	290
Prolactin (μ g/L)	Preop.	12,83	6,71	124
	Postop.	12,58	6,11	125
	Total	12,71	6,40	249
Estradiol (pg/ml)	Preop.	17,90	8,79	80
	Postop.	19,27	9,93	85
	Total	18,61	9,39	165
Sperm Conc. (M/ml)	Preop.	11,40	2,17	146
	Postop.	20,68	1,95	146
	Total	16,04	5,09	292
Kruger (Morph. Norm. Forms (%))	Preop.	6,74	3,18	137
	Postop.	10,25	4,07	144
	Total	8,54	4,06	281
Motile sperm conc. (MSC (M/ml))	Preop.	5,33	2,38	143
	Postop.	12,30	4,09	145
	Total	8,84	4,83	288
Nonprog. Motility (NP) (%)	Preop.	18,85	5,27	143
	Postop.	15,41	3,96	145
	Total	17,12	4,96	288
Prog. Motility (PR) (%)	Preop.	27,57	15,42	143
	Postop.	43,77	16,82	145
	Total	35,73	18,04	288
Sperm Count (Sperm # (M))	Preop.	35,81	20,27	143
	Postop.	63,52	29,65	145
	Total	49,76	28,93	288
Total Motility (Total Motility (PR+NP) (%))	Preop.	45,47	18,32	146
	Postop.	58,77	18,49	146
	Total	52,12	19,54	292
Velocity (mic/sec)	Preop.	6,69	2,57	134
	Postop.	9,80	2,61	142
	Total	8,29	3,02	276
Volume (ml)	Preop.	3,13	1,57	146
	Postop.	3,06	1,39	146
	Total	3,09	1,48	292

According to Mann-Whitney U and Wilcoxon W analysis showing whether the difference between gonadotropin and spermiogram parameters before and after surgery of varicocele patients is significant; FSH ($p = 0,000$), LH ($p = 0,011$) and testosterone ($p = 0,000$), sperm concentration ($p = 0,000$), morphological normal forms ($p = 0,000$), motile sperm concentration ($p = 0,000$), non-progressive motility ($p = 0,000$), progressive motility ($p = 0,000$), sperm count ($p = 0,000$), total motility ($p = 0,000$) values differed before and after the surgery. However, there was no difference between prolactin ($p = 0,845$) and estradiol ($p = 0,401$) and sperm volume ($p = 0,982$) values before and after surgery.

DISCUSSION

Agarwall et al. (5), Nagler et al. (6) and Witt et al. According to the studies of (7), varicocele is responsible for 45-80% of male infertility. Czaplicki et al. (8) found varicocele in patients with azoospermia in a rate of 4.3-13.3% (9). Similarly, the effect of varicocele operations on sperm parameters and gonadotropin levels was investigated by Nuhoğlu et al. (10), Enatsu et al. (10), Boğatekin et al. (11), Yurdakul et al. (12), Olandini et al. (13), İnce (14) and Ateş et al. (15) 's current studies are available. The first research on this subject is the work of Tulloch in 1952. In this study, bilateral varicocelectomy was applied to a azoospermic patient, the number of sperm was determined as 27 million / ml at 3 months and spontaneous pregnancy development after 9 months was accepted as a turning point in the treatment of varicocele (16). Although varicocele causes disorders in number, motility and morphology in semen, it affects motility most.

According to the descriptive statistics of spermogram parameters in this study, sperm concentration was 11,40 / 20,68 M / ml, morphologically normal forms (%) 6,74 / 10,25, motile sperm concentration before and after varicocele surgery, respectively. 5,33 / 12,30 M / ml, non-progressive motility (%) 18,85 / 15,41 progressive motility (%) 27,27 / 43,77 sperm count 35,81 / 63,52 M, total motility Velocity 6,69 / 9,80 (mic / sec) and volume were found to be 3,13 / 3,6 ml. According to the results of this study, spermogram parameters were improved after varicocele surgery. Similarly, in this study, Pryor and Howards' analysis of 2466 cases including 15 studies revealed improvement in semen parameters in 66% of patients, while 70% motility, 51% sperm count and 44% sperm morphology improved (17). Parsch et al. Reported significant improvements in sperm count, regardless of varicocelectomy technique (18). Vermeulen and Vadeweghe reported no significant improvement in sperm count after varicocelectomy in their studies (19). It was reported that there was no significant improvement in sperm count but significant improvements in motility were observed in Baker's study (15, 21).

According to the descriptive statistics of gonadotropin levels, FSH hormone level was 14.57 and 10.38 mU / mL, LH 10.30 and 8.48 mU / mL, testosterone 4.22 and 5.26 ng / ml, respectively, before and after varicocele surgery (Table 1). Su et al. (1995) and Çayan et al. (1999) were found similar result with this study, it was observed that FSH level decreased after varicocele surgery and testosterone level increased (22,23).

CONCLUSION

Varicocele, as a result of the varicosity of the veins of the pampiniform plexus in the scrotum, causes an increase in the temperature of the scrotum due to the slowing of blood flow. Varicocelectomy surgery improves testicular functions by correcting blood circulation of the testes. After the surgery, the stage of the spermogram parameters are improved and the level of testosterone hormone increases and therefore the FSH decreases to its normal level. To prevent infertility of varicocele patients, should be decided surgery before testicular hypotrophy and dysfunctions progression.

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