

Correlation between diameter of the pampiniform plexus in millimeter measured by scrotal Doppler ultrasound with the seminal fluid parameters

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Abstract

The study involves 158 infertile persons suffering from primary or secondary infertility. This study aimed to correlate between diameter of pampiniform plexus veins measured by scrotal Doppler ultrasound with parameters of seminal fluid analysis. There was negative correlation between diameter of pampiniform plexus veins and the concentration of sperms/ml, TPFS, sperm normal morphology, and the active sperm movement, while the correlation was positive the abnormal sperms, sluggishly moved, and non motile sperms, this correlations were statistically significant. According to this study, the seminal fluid parameters are correlated significantly with the diameter the spermatic cord veins measured by Doppler ultrasound.

Key word: seminal fluid, correlation, varicocele. Doppler ultrasound.

Introduction

The dilation and tortuosity of the pampiniform plexus known as varicocele, which present in 15% of the male population, and in approximately 40% of men presenting with infertility¹.

Testicular temperature elevation and venous reflux appear to play an important role in varicocele- induced testicular dysfunction, although the exact pathology of varicocele induced damage is not yet completely understood^{2,3,4}.

In a study of 200 men with varicocele, a mean sperm density of less than 20×10^6 sperm/ml, and low motility in 90% of patients, a shift of sperm shape from oval to tapered and amorphous, and an increase in immature sperm forms⁵. Total potentially functional spermatozoa (TPFS)-an index of total count multiplied by percentage of actively motile sperms multiplied by normal morphology- is affected deleteriously by varicocele⁵.

Varicocele was considered significant when it has a diameter of 3mm or greater and retrograde flow on Doppler ultrasound examination. The reversal flow characteristic of varicocele is confirmed by prolonged flow augmentation within a flow area depicted as reversing (i.e. changing color) on real-time imaging. Two or more tortuous, sonolucent tubular structure with a caliber of 3mm or more are seen as the hallmark finding in varicoceles⁶.

Color Doppler imaging has a sensitivity of 93% in detection of venographically diagnosed varicoceles as compared with 71% using physical examination⁷. Ultrasound was found to have a 95% sensitivity in the detection of subclinical varicoceles⁸.

The aim of the study is to correlate between the diameter of the pampiniform plexus and seminal fluid parameters.

Patients and Methods

The study involves 158 patient with history of primary or secondary infertility (patient with azoospermia were excluded). Referred to the urology clinic in Tikrit teaching hospital and private clinic between January 2006 to January 2008. Evaluation of patients includes detailed history, physical examination, seminal fluid analysis, and colored Doppler study.

Doppler study done for measurement of the diameter of the veins of the pampiniform plexus (with valsalva maneuver) in millimeters. Statistical analysis and correlation between the results of Doppler study and the parameters of seminal fluid parameters was done by using Person's formula.

Results

Patients were aged between 20-64 years old, 93 (59%) of them suffered primary infertility and 65(41%) had secondary

infertility with a duration of infertility ranged from 1-21 year.

As seen in table (1), the diameter of both right and left pampiniform plexus veins had negative correlation with concentration, total potentially functioning sperms, normal morphology and active motile sperms. These correlations were statistically significant ($p < 0.05$). In contrast, the correlation was positive for both right and left pampiniform plexus with abnormal morphology, sluggishly and non motile sperms. These correlation was statistically significant ($p < 0.05$).

Total potentially functioning sperms, normal morphology, and concentration had the more negative correlation (-0.292, -0.273, and -0.266 respectively) with the diameter of right plexus veins than the correlation with left vein diameter with the same variables these were (-0.249, -0.27, and -0.226 respectively).

Non motile and sluggishly motile sperms had more positive correlation with right (0.285, and 0.272 respectively), than with the left pampiniform plexus diameter (0.22, and 0.269 respectively). The abnormal morphology had more positive correlation with the left plexus than the right (0.253, and 0.209 respectively).

Discussion

In this study we didn't take the varicocele as a variable in the study instead we analyze the diameter of the veins and this include the normal and all the grade of the varicocele.

There was a weak but significant negative correlation with concentration, total potential active sperms, highly active sperms, and normal morphology, while the correlation was positive (though weak but significant) with the sluggish and non motile sperms as well as abnormal sperms. These correlation can be explained by the deleterious effect of the dilated veins on the sperm count, morphology and activity⁽⁵⁾.

Many studies had been published concerning the role of the varicocele in male infertility, but the issue is still controversial. The exact action mechanism of the varicocele's negative effect on sperm function and fertility is not resolved⁽⁹⁾. A study conducted by the WHO in 1992

showed a decrease in testicular volume, and total sperm per ejaculate in those with varicocele, however; the other sperm characteristics of motility and morphology were not influenced by the presence of varicocele⁽¹⁰⁾. Other study showed that all sperm parameters were found to be significantly lower in patient with varicocele than fertile subject without varicocele, but no correlation was found with the varicocele grade⁽¹¹⁾.

Much of the human data studying the underlying mechanisms of varicocele-related infertility are derived by measuring parameters in men with and without varicocele and between men pre and post varicocelectomy. However, none of these associations is able clearly to explain the variable effect of varicocele or directly explain the mechanism(s) involved, especially for the bilateral effect. The etiology may be multifactorial, and may even include a pre-existing genetic disposition, which may account for variable effect of varicocele on spermatogenesis and infertility seen in human⁽¹⁾.

There is no doubt that large scale, carefully designed and controlled studies must be conducted to elucidate the role of varicocele in infertility, and to clarify which sperm function test are associated with reduced fertility potential so that those who may benefit from correction of varicocele can be identified⁽⁹⁾.

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Table (1): Correlation between the diameters of pampiniform plexus measured by scrotal Doppler ultrasound with the parameters of the seminal fluid analysis (concentration, total potential functioning sperms, morphology and motility).

	Conc.	TPFS	Morphology		Motility		
			Normal	Abnormal	Active	Sluggish	Non
Rt. vein	-0.266	-0.292	-0.273	0.209	-0.2	0.272	0.285
Lt. vein	-0.226	-0.249	-0.27	0.253	-0.279	0.269	0.22