Advances in Social Sciences Research Journal – Vol.7, No.2
Publication Date: Feb. 25, 2020
DoI:10.14738/assrj.72.7856.
Saeed, I. O., Awad, I. A., & Eltyib, H. E. H. (2020). Ultrasound Evaluation for Varicocele and its Relationship with Sperm Characteristics through Semen Analysis. *Advances in Social Sciences Research Journal, 7(2)* 263-267.

Ultrasound Evaluation for Varicocele and its Relationship with Sperm Characteristics through Semen Analysis

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ABSTRACT

The safety of the reproductive organs has a great positive impact on the human psyche, so early and accurate diagnosis of scrotal disorders by ultrasound was one of the necessities that puts the individual in the correct path of treatment. This study was conducted to evaluate the significance of ultrasound imaging technology in the diagnosis of varicocele and its relationship with sperm characteristics through semen analysis. We retrospectively reviewed a total of 281 male patients who underwent scrotum ultrasound at King Abdul-Aziz University Hospital-Radiology Department between 2017 and 2019 with age range of (11-76) years. Ultrasound result showed 119 (42.3%) had varicocele. Semen analysis was performed for 143 patients and the results showed a significant correlation between sperm characteristics and varicocele disorder ($p < 0.001$). Imaging of the scrotum by ultrasound is of great importance in diagnosing various andrology diseases, including varicocele, which have clear effects on sperm count and motility.

Keywords: Varicocele, ultrasonography, semen, Infertility

INTRODUCTION

A varicocele is an abnormal dilatation of venous pampiniform plexus within the scrotum [1,2] they may affect sperm production and cause male infertility [3,4,5,6]. Varicoceles can also cause testicles to shrink [6]. A strong correlation between presence of varicocele and infertility has been reported in various studies [7].

The incidence of varicocele in the general population is approximately 15%, while 19- 41% of male presenting for infertility investigation demonstrates varicocele [2,8,9]. Non-palpable varicocele's present in 44 % fertile men and about 60 % of infertile ones [1,10,11]. Physical examination is an essential diagnostic tool in assessment of varicocele that rarely causes pain [12]. Varicoceles can be classified into; Subclinical where no evidence of a varicocele with physical examination, Grade I: not visible and palpable only with a Valsalva maneuver, Grade

II: also not visible but palpable without a Valsalva maneuver and Grade III: In which the varicoceles can be palpable through the scrotum without a Valsalva maneuver [13,14].

Ultrasound is the modality of choice in diagnosing varicocele, [15,16]. Colour Doppler ultrasonography provides simultaneous display of tissue morphology in grey scale and blood flow in color and facilitates the detection of small intratesticular vessels.

The aim of the present study was to evaluate the significance of ultrasound imaging technology in the diagnosis of varicocele and its relationship with sperm characteristics through semen analysis

METHODOLOGY

Over a period of two years starting from (January 2017 to January 2019). 281 patients were retrospectively reviewed with age range 11 to 76 years, they were referred to radiology department of King Abdu Aziz university Hospital (KAUH) for scrotal ultrasonography with different clinical indications such as painful scrotum, hydrocele, infertility, scrotal swelling, testicular cancer and other symptoms . After obtaining local ethic approval, patients clinical information were collected from picture archiving and communication system (PACS), Phoenix system and sectra on the basis of the patient medical record number (MRN), age, clinical indications and ultrasound findings. All patients underwent scrotal ultrasonography, semen analysis was performed for 143 patients.

Statistics

Statistical package for social sciences (SPSS) software version 16 was used for data analysis and the results were illustrated accordingly.

ANALYSIS OF RESULT AND DISCUSSION

Study group included patients of different ages who suffered scrotal disorders -Table 1

Table 1: Distribution of age group for 281 Patients

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 20	6	2.1	2.1	2.1
	20 to 30	77	27.4	27.4	29.5
	30 to 40	86	30.6	30.6	60.1
	40 to 50	51	18.1	18.1	78.3
	50 to 60	33	11.7	11.7	90.0
	60 and above	28	10.0	10.0	100.0
	Total	281	100.0	100.0	

Looking at table 1, we note that the age group (30 to 40) years reflects a higher incidence of scrotal disorders more than other groups. This may be due to the small size of the study group, because scrotum disorders affect patients of all ages and cause many clinical symptoms, ranging from pain to other diseases that can be diagnosed with ultrasound.

Table 2- summarizes the symptoms and signs for the study group patients

Table 2: Symptoms and Signs for 281 Patients

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Painful scrota	62	22.1	22.1	22.1
	infertility	79	28.1	28.1	50.2
	scrotal swelling	43	15.3	15.3	65.5
	testicular cancer	5	1.8	1.8	67.3
	testicular pain	38	13.5	13.5	80.8
	hydrocele	8	2.8	2.8	83.6
	Others	46	16.4	16.4	100.0
	Total	281	100.0	100.0	

It could be seen from (table 2) that Infertility was one of the most common clinical symptoms with frequency of 79 (28.1%) followed by scrotal pain (22.1%). This result was in agreement with (Annoni F. et al -1988) who reported that (there is a strong correlation between presence of varicocele and infertility that has been reported in various studies)

(Table 3) illustrates the pathologic findings of ultrasound for the (281) patients

Table 3: U/S Pathologic Findings Through 281 Symptomatic Patients

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	normal	28	10.0	10.0	10.0
	varicocele	119	42.3	42.3	52.3
	hydrocele	29	10.3	10.3	62.6
	cyst	47	16.7	16.7	79.4
	epididmoorchitis	18	6.4	6.4	85.8
	micro calcification	9	3.2	3.2	89.0
	masses	8	2.8	2.8	91.8
	inguinal hernia	6	2.1	2.1	94.0
	absent testis	7	2.5	2.5	96.4
	atrophied testis	9	3.2	3.2	99.6
	torsion	1	.4	.4	100.0
	Total	281	100.0	100.0	

According to the data analysis in (table3), 119 patients (42.3%) were found to have varicocele which was the most common disorder among the study group followed by cyst 47 (16.7%), and the less common was torsion (0.4%). Our result reflects the efficiency of ultrasound in diagnosing varicocele and agree with the authors (Kozakowski KA. et al 2009), (Schiff JD. et al 2006) and (Tomasz Lorenc. et al. 2016) [15, 16, 19] who reported the same result and confirm the effectiveness of ultrasound in diagnosing varicocele cases.

It should be noted that all cases of varicocele (119) were in the left side, this result confirms the report done by (Pauroso S1. et al. 2011)[20], that (the left testicle is affected much more

commonly compared to the right testicle may be due to the shorter course of the right testicular vein and its oblique insertion into the Inferior vena cava which creates less backpressure).

Semen analysis for 143 patient and correlation between sperm and varicocele are presented in Tables (4 & 5)

Table 4:Varicocele * sperm Crosstabulation

Count					
		sperm			
		Normal	weak	azo	Total
Varicocele	normal	18	10	5	33
	mild	33	24	14	71
	moderate	8	23	1	32
	severe	1	6	0	7
Total		60	63	20	143

Table 5:Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.930[a]	6	.001
Likelihood Ratio	23.482	6	.001
Linear-by-Linear Association	1.311	1	.252
N of Valid Cases	143		

As seen in (Tables 4&5) semen was analyzed for 143 patients, and according to the severity of the varicocele ; 60 had normal sperms, 63 had weak sperms while 20 had no sperms, this result showed that varicocele was associated with reduced sperm count and sperm motility, indicating a strong relationship between varicocele and sperm characteristics ($p < 0.001$), our results agree with (Ashok A. et al. Effect of varicocele on semen characteristics according to the new 2010 World Health Organization criteria: a systematic review and meta-analysis. 2016) [21], who concluded (varicocele was found to be a significant risk factor for decreased sperm count, motility, and morphology). Our result confirms the importance of detection and treatment of varicocele in order not to affect sperm count and its important vital functions in the reproductive process.

CONCLUSION

Reproductive diseases in men are among the most common diseases that cause a lot of psychological pain for the patient, so there must be a great awareness regarding this issue in order for the patient to avoid many complications that can affect the characteristics of sperm, which is one of the complications of varicocele. On this issue, we agree with many authors that ultrasonography is the most effective imaging modality in diagnosis of varicocele and other scrotal disorders; in addition, it is available, cheap and safe modality.

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