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Assessment of Scrotum in Infertile Male with Abnormality Detected in Ultrasound in Correlate to Semen Analysis and Hormonal Count

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Abstract **Original Research Article**

This was descriptive study done in Sudan Khartoum state in Reproductive Health care center (RHCC) in the period from 2016-2018. The aim of the study was to assess Scrotum in Infertile Male with Abnormality Detected in Ultrasound and Correlate to Semen Analysis and Hormonal Count. The study was done in 150 infertile male with abnormal ultrasound features of testicle in 20-55 years age and found that infertility was more common in age group 36-46 years (41.33%), the mean age of infertility was 36.43±8.50 years, the mean testicular volume for infertile Sudanese male was 16.67± 8.37cm^3, the percentage of primary infertility was more than secondary one 67.3%, the most common pathology associated with male infertility was varicocele in left testicle 22%. The study found that there was significant difference in testicular volume , semen motility, morphology , sperm count ,FSH in primary versus secondary infertility patients ($p < 0.05$ with 95% confidence interval) , while no significant difference between type of infertility testosterone and prolactin ($p > 0.05$ with 95% confidence interval), there was significant positive statistical correlation between sperm count and testicular volume ($r= 0.185, p<0.05$) also statistical significant negative correlation between total FSH count and testicular volume ($r = -0.389$, $p<0.01$).
Keyword: Infertility, FSH, semen count, scrotal Ultrasound.

INTRODUCTION

"Infertility is defined clinically as "a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse [1]". It is also defined by the World Health Organization as "the inability of a sexually active, non-contracepting couple to achieve pregnancy in one year" Approximately 20% of cases of subfertility are due to a male factor only, and in another 27%, the causes can be identified in both men and women. Therefore, male factor subfertility plays a role in approximately 50% of subfertile couples [1, 5].

Causes of male factor infertility be classified into pretesticular, testicular and post-testicular, pretesticular causes are hormonal (It results from decreased production of FSH and LH secondary to hypothalamic or pituitary dysfunction, which leads to failure of spermatogenesis and testosterone secretion by the testes), testicular causes are largely irreversible which calcified into genetic, cryptorchidism or any acquired diseases such as tumors , torsion , injury , orchitis, varicocele or others (Hypergonadotrophic hypogonadism results from testicular failure and leads to oligozoospermia and non-obstructive azoospermia with elevated LH and FSH levels. Also, the finding of normal testosterone and LH levels with an elevated FSH implies isolated spermatogenic failure without Leydig cell damage, post-testicular causes (Hypergonadotrophic hypogonadism results from testicular failure and leads to oligozoospermia and non-obstructive azoospermia with elevated LH and FSH levels. Also, the finding of normal testosterone and LH levels with an elevated FSH implies isolated spermatogenic failure without Leydig cell damage [2].

Semen analysis is important investigation of male infertility, FSH, LH, testosterone and prolactin should be measured in men with sperm counts of <5 x 10^6 ml [2]. Ultrasonography is the primary modality for evaluation of the scrotum. "Its strengths are many including detection, characterization, and localization of scrotal masses, fluid collections, and vascular abnormalities." The grayscale image is enhanced by color and power Doppler to evaluate flow in the testes [3].

A common cause of male infertility is a varicocele. Most varicoceles are palpable, but if a man

has unexplained infertility, it is worthwhile to conduct a sonogram to exclude a varicocele that cannot be felt, They are much more common on the left side than the right side, because the left gonadal vein empties into the left renal vein before coursing into the inferior venacava (IVC), whereas on the right, the gonadal vein goes directly to the IVC [4].

Objectives

The objective of this study was to assess scrotum in infertile male with abnormal ultrasound correlate to semen analysis and hormonal count.

MATERIALS AND METHODS

This was descriptive study done in Reproductive Health care Center (RHCC) in Khartoum state - Sudan in the period from 2016-2018. The sampling includes 150 infertile male with scrotal pathology which was detected by ultrasound selected randomly, laboratory results of semen analysis (motility, count and morphology) and hormonal values of FSH, testosterone and prolactin assessed. Scrotal volume calculated by formula Length X Width X AP X0.523 cm^3, different pathological condition noted, any patients with normal sonographic features excluded from study sampling regardless laboratory results of semen analysis and hormonal profile. The data collected using data collection sheet including variables of study then analyzed by SPSS and excel , t- test and person's correlation was taken to demonstrate relation between variable which was significant if p less than 0.01 and 0.05 respectively.

RESULTS AND DISCUSSION

The study found that the most affected age of testicular pathology was 36-46 years (41.33%) followed by 26-35 years respectively (34%), the mean age was 36 .43years ±8.50years this result go online with Enighe W Ugboma 2016 in Nigeria who found that the mean age of infertile male was 38.16 ± 4.7 years and the most affected group was 36 - 40 years (39 or 39%)[1]. Primary infertility was more than secondary infertility 67.3% the ratio of primary to secondary 2:1. (Table 1-2).

The study found that 80.7%, 42%, 62%, 94%, 17.3% and 12% had abnormal semen motility, morphology, count, FSH, testosterone and prolactin respectively, 68% infertile male had normal right testicular volume 63.3%, normal left testicular volume, 24.7% had hypoplasia of right one, 28% hypoplasia of left one, 4.7% had hyperplasia of right and 6% had hyperplasia of left one and 2.7% had absent testicles for right or left respectively. (Table 3, Figure1).

The most common pathology detected by ultrasound was extratesticular on left side 41.3% with varicocele is commonest one 22% followed by hydrocele 9.3% in left, this results agree with Hussein S. Qublan 2014 whom found that the most commom pathology caused infertility was varicocele 53% [5], acute condition which on left also more than right 24% versus 16% with epididymorchitis was most commonely one then intratesticular pathology was 10.7% for each testicle, the most common intratesticular pathology was tubular ectasia and microlithiasis each 5.3% with right side more than left one, tumors was detected in 3.4% ,more common in right 2.7% . (Table 5 to 8).

The study found that the mean testicular volume was 16.67± 8.37cm^3 , this result go online with Enighe W Ugboma 2016 in Nigeria who found that the mean testicular volume (MTV) for infertile male was 13.14 ± 5.16 cm3 [1] Table (4).

The study found that there was significant difference in testicular volume , semen motility, morphology , count , FSH in primary versus secondary infertility patients($p < 0.05$ with 95% confidence interval) , while no significant difference between type of infertility testosterone and prolactin ($p > 0.05$ with 95% confidence interval) (Table 9 a- 9 b).

Significant positive statistical correlation was found between sperm count and testicular volume ($r= 0.185, p<0.05$) this results agree with Enighe W Ugboma 2016 in Nigeria who found Astatistically significant positive correlation was noted between the total sperm count and testicular volume ($r=0.397$, $p<0.0001$)[1]. Statistical significant negative correlation between total FSH count and testicular volume ($r = -0.389$, $p<0.0001$). (Figure 2-3 and table 10)

Table-1: frequency distribution of age

Age \years	Frequency	Percent	Valid Percent	Cumulative Percent
20-25	14	9.3	9.3	9.3
26-35	51	34.0	34.0	43.3
36-46	62	41.3	41.3	84.7
47-55	23	15.3	15.3	100.0
Total	150	100.0	100.0	

Table-2: infertility type

Type of infertility	Frequency	Percent	Valid Percent	Cumulative Percent
Primary	101	67.3	67.3	67.3
Secondary	49	32.7	32.7	100.0
Total	150	100.0	100.0	

Table-3: Frequency distribution of semen analysis results and hormone

lab results	semen motility	semen morphology	semen count	FSH	testosterone	prolactin
normal	19.3	57.3	38	6	82.7	88
abnormal	80.7	42.7	62	94	17.3	12

Table-4: Descriptive statistic for volume of testicle of semen analysis results and hormone

	N	Minimum	Maximum	Mean	Std. Deviation
Age	150	20	55	36.43	8.505
Rt volume	150	.0	54.4	16.850	9.7121
Lt volume	150	.0	65.2	16.503	9.7472
Mean testicular volume	150	1.78	43.58	16.67	8.37
Semen count	150	.0	970.0	30.457	85.9093
FSH	150	1.2	243.0	18.925	25.1218
Prolactin	150	7.6	1140.0	200.189	131.4967
Testosterone	150	.0	245.0	19.251	26.5611
Valid N (listwise)	150				

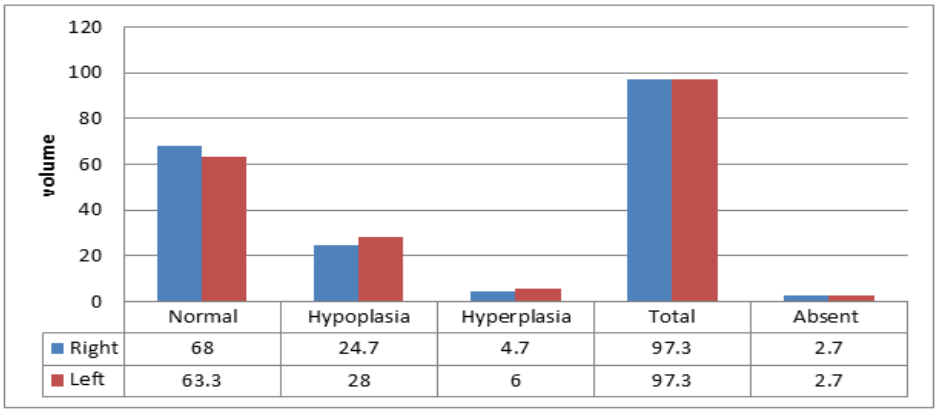

Fig-1: Frequency distribution of testicular volume

Table-5: Frequency distribution of pathology detected by ultrasound in infertile male

Causes	causes	right	left	both
Extratesticular pathology		22	41.3	
Intratesticular pathology		10.7	10.7	
Undesending testicle		0.7	3.3	1.3
Atrophy		0.7	2	4
Absent		2.7	2	
Masses		2.7	0.7	
Acute condition		18	16	

Table-6: Frequency distribution of etratesticular pathology detected by ultrasound in infertile male

Extratesticular pathology	right	left
Varicocele	8	22
Hydrocele	6.7	9.3
Pyocele	1.3	1.3
Epididydmal cyst	4	4
Spermatocele	0.7	2
Chronic epididyemitis	1.3	1.3
Hematocele	0	1.3
total	22	41.3

Table-7: Frequency distribution of acute condition

Acute condition	Left	right
Torsion	0	0.7
acute epidydimitis	6.7	8.0
epydidymorchitis	9.3	9.3
Total	16.0	18.0

Table-8: Frequency distribution of intratesticular pathology

Intra -testicular pathology	right	left
Tubular ectasia	4	3.3
Microlithiasis	4	5.3
Cyst	2	1.3
abscesses	0.7	0.7
total	10.7	10.7

Table-9A: Independent sample t-test to compare mean in different type of infertility

	Type of infertility	N	Mean	Std. Deviation	Std. Error Mean
Right testicle volume	Primary	101	15.029	8.3925	.8351
	Secondary	49	20.605	11.1665	1.5952
Left testicle volume	Primary	101	14.892	9.5058	.9459
	Secondary	49	19.824	9.4841	1.3549
Semen count	Primary	101	13.622	26.4274	2.6296
	Secondary	49	65.157	140.1052	20.0150
Semen motility	Primary	101	23.601	23.6241	2.3507
	Secondary	49	48.163	21.6567	3.0938
Semen morphology	Primary	101	26.287	21.2581	2.1153
	Secondary	49	34.306	8.7350	1.2479
FSH	Primary	101	22.921	28.7079	2.8565
	Secondary	49	10.690	11.8010	1.6859
Prolactin	Primary	101	211.017	152.0849	15.1330
	Secondary	49	177.869	68.7967	9.8281
Testosterone	Primary	101	18.561	24.7374	2.4615
	Secondary	49	20.673	30.1998	4.3143

Means; t-test for Equality of Means

Table-9B

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Right testicle volume	-3.414-	148	.001	-5.5759-	1.6334	-8.8038-	-2.3480-
	-3.097-	75.202	.003	-5.5759-	1.8006	-9.1626-	-1.9891-
Left testicle volume	-.983-	148	.003	-4.9323-	1.6537	-8.2002-	-1.6644-
	-.985-	95.321	.004	-4.9323-	1.6524	-8.2126-	-1.6521-
Semen count	-.580-	148	.000	-51.5354-	14.3965	-9.9847-	-3.0860-
	-.553-	49.664	.014	-51.5354-	20.1870	-2.0890-	-0.9817-
Semen motility	-.133-	148	.000	-24.5623-	4.0050	-2.4766-	-6.6480-
	-.321-	102.949	.000	-24.5623-	3.8855	-2.2684-	-6.8562-
Semen morphology	-.535-	148	.012	-8.0190-	3.1630	14.2695-	-1.7685-
	-.265-	145.102	.001	-8.0190-	2.4559	-2.8730-	-3.1650-
FSH	2.863	148	.005	12.2310	4.2716	3.7898	20.6722
	3.687	145.116	.000	12.2310	3.3169	5.6753	18.7867
Prolactin	1.453	148	.148	33.1474	22.8080	-1.9239-	78.2188
	1.837	147.485	.068	33.1474	18.0444	-2.5115-	68.8064
Testosterone	-.456-	148	.649	-2.1121-	4.6365	-1.2744-	7.0502
	-.425-	80.254	.672	-2.1121-	4.9671	-1.9964-	7.7722

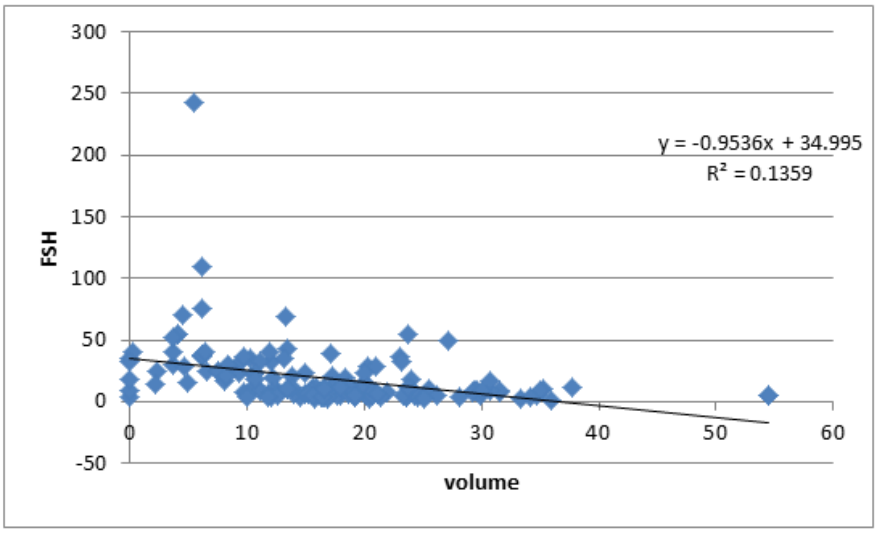

Fig-2: Relationship between FSH and mean volume

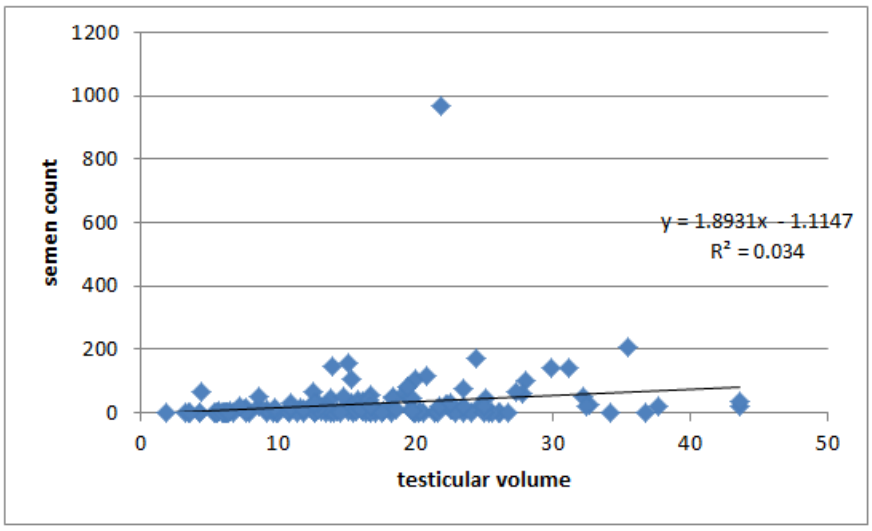

Fig-3: Relationship between count and mean volume

Table-10: Correlation means volume with semen analysis and hormonal count

		Sperm count	Sperm Motility	Sperm morphology	FSH	Prolactin	Testosterone
Volume of testicle	Pearson Correlation	.185*	.120	.131	-.389**	-.014-	.061
	Sig. (2-tailed)	.024	.145	.109	.000	.865	.460
	N	150	150	150	150	150	150
*. Correlation is significant at the 0.05 level (2-tailed).							
**. Correlation is significant at the 0.01 level (2-tailed).							

CONCLUSION

The study concluded that ultrasound was good modality in detect different pathological condition in infertile male, it can assess the size of scrotum, the most common pathological condition cause male infertility was varicocele which occurs more common on left side, mean testicular volume in infertile male was 16.67± 8.37 cm3 , there was significant positive correlation between testicular volume and sperm count and significant negative correlation between FSH and testicular volume in infertile male with abnormal ultrasound findings, finally The study found that there was significant difference in testicular volume, semen motility, morphology, count, FSH in primary versus secondary infertility patients, no significant difference between type of infertility in prolactin and testosterone as testicular volume ,semen motility, morphology, count and testosterone less in primary infertility than secondary one while FSH and prolactin was more in primary than secondary infertility.

Recommendations

For future another study should be done included the infertile male with normal ultrasound finding

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