

Sonological evaluation of male infertility at tertiary care hospital

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ABSTRACT

Objectives: The aim of the study was to sonological evaluation of male infertility at pre-testicular, testicular and post-testicular levels. **Material and methods:** This study was conducted in the department of obstetrics and gynecology in collaboration with the department of radiodiagnosis. All the patients are evaluated with history, clinical examination, and appropriate basic investigations like semen analysis. Patients are classified into pre-testicular, testicular, post-testicular and idiopathic groups. Trans scrotal ultrasound (TSU) and doppler, trans rectal ultrasound (TRUS) were done. The observations are tabulated and analyzed. **Results:** The TRUS findings in the testicular group 2 numbers of patients had calcification of prostate. In post testicular group 82.3% (n=14) had seminal vesicle enlargement, 47% (n=8) had ejaculatory duct enlargement. In the idiopathic group 60% (n=3) had seminal vesicle cyst, 20% (n=1) had enlarged prostate and 20% (n=1) had seminal vesicle calcification. The TSU findings in the testicular group 66.6% (n=14) had small testis, 33.33% (n=7) patients had calcification, 30.0% (n=8) had varicocele of testis. In post testicular group epididymal cyst seen in 50% (n=8), epididymal calcification in 31.2% (n=5). In idiopathic group epididymal cyst seen in 22.2% (n=2), epididymal calcification in 22.2% (n=2). **Conclusion:** Imaging modalities are adjuvant to conventional evaluation of male infertility whereas the imaging modalities evaluate the anatomical integrity and normalcy of male reproductive system.

Keywords: TRUS, sonological, male infertility.

Imaging modalities are the third eye of clinician in modern medical analysis. They are useful in providing the anatomical reason for an abnormal physiology. They enhance the sensitivity and specificity of clinical examination. In male infertility evaluation, they are provided abnormal anatomical morphology which may be the cause for pathological seminogram¹⁻³. They also help in planning any corrective surgeries. Internal male reproductive tract assessment by clinician is less sensitive and less specific. TRUS evaluates prostate, seminal

vesicles, ducts. TSU evaluates pampiniform plexus, intra testicular mass. Doppler evaluates the blood flow to testis. Thus they help in accurate diagnosis and appropriate management of male infertility. The review of literature revealed even with the advances in the medical technology, many of the causes of male infertility remains unknown, this lacunae of understanding the etiopathogenesis has stagnated the growth in treatment strategies⁴. This study attempts to evaluate male infertility patients by use TRUS, TSU and trans scrotal Doppler.

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Materials and Methods

This study was conducted in the department of Obstetrics and Gynecology in collaboration with the department of Radiodiagnosis, Institute of Postgraduate Medical Education and Research, and S.S.K.M. hospital, Kolkata from 01-08-2009 to 31-07-2010. Male patients attending infertility clinic, outpatient for treatment of infertility, and those who have abnormal semen analysis were taken. Total 100 numbers of patients were studied. All the patients are evaluated with history, clinical examination, and appropriate basic investigations like semen analysis. All patients should have at least two or three semen analyses (American Urologic Association and the American Society of Reproductive Medicine, 2001). Most specimens were obtained by masturbation. The specimen was examined in the laboratory within 1 to 2 hours of collection. The measurement of follicle stimulating hormone (FSH), leutenizing hormone (LH), thyroid stimulating hormone (TSH), and prolactin were done based on the seminogram report. The patients were classified into pre-testicular, testicular, post-testicular and idiopathic groups. Those with abnormal semen analysis and those with unexplained infertility were subjected to non invasive imaging modalities. Tran's scrotal ultrasound [Model TOSHIBA MAKE XARIO, Linear probe 12 MHz] and Trans scrotal Doppler, Trans rectal ultrasound (Model TOSHIBA MAKE XARIO, Tran's rectal probe 10 MHz) were done. The observations are tabulated and analyzed.

Results

In this study TRUS showed normal study in 100% (N=7) pre-testicular cases, 92.5% (N= 25) testicular cases, 37% (N=10) post-testicular cases and 87.1 % (N=34) idiopathic cases. Trans scrotal ultrasound showed normal study in 100% (N=7) pre-testicular cases, 10.4% (N=11) of testicular cases, 40.7% (n=11) of post-testicular cases and 76.9% (n=30) of idiopathic cases (Table 1). In this study there is no abnormality in the TRUS findings in the pre testicular patient's. In the testicular group 2 numbers of patients had calcification of prostate. In the post testicular group 82.3% (n=14) had seminal vesicle enlargement, 47% (n=8) had ejaculatory duct enlargement, 18.5 % (n=5) patients had midline cysts,

Table 1: Distribution of normal TRUS and TSU findings in various groups of infertility (N=100)

Categories	No of cases	Cases having normal findings in TRUS Number (%)	Cases having normal findings in TSU Number (%)
Pre-testicular	7	7(100%)	7(100%)
Testicular	27	25(92.5%)	6(10.4%)
Post-testicular	27	10(37%)	11(40.7%)
Idiopathic	39	34(87.1%)	30(76.9%)

seminal vesicle cyst in 14.8 % (n=4) of patients. In the idiopathic group 60% (n=3) had seminal vesicle cyst, 20% (n=1) had enlarged prostate. 20% (n=1) had seminal vesicle calcification. In the post testicular group each

Table 2: Abnormal TRUS findings in various groups of infertility

Categories	Type of abnormalities	Number (%)
Pre-testicular group (N=0)	-	-
Testicular group (N=2)	Calcification of prostate	2(100%)
Post-testicular group (N=17)	Seminal vesicle enlarged	14(82.3%)
	Ejaculatory duct enlargement	8(47%)
	Mid line cyst	5(18.5%)
	Seminal vesicle cyst	4(14.8%)
Idiopathic group (N=5)	Seminal vesicle cyst	3(60%)
	Enlarged prostate	1(20%)
	Seminal vesicle calcification	1(20%)

patient had more than one abnormal finding. This explains the discrepancy in column percentages (Table 2). In this study there were no abnormalities in the TSU findings in the pre-testicular patients. In the testicular group 66.6% (n=14) had small testis, 4.7% (n=1) had absent testis, 33.33% (n=7) patients had calcification of testis, 30.0% (n=8) had varicocele, 9.5 % (n=2) of the patients had avulsion of testis. In post-testicular group epididymal cyst seen in 50% (n=8), epididymal calcification in 31.2% (n=5), 12.5% of patients had thickened epididymis, 12.5% of patients had an echoic lesion, 6.2% of the patients had fluid around the testis. In idiopathic group, epididymal cyst seen in 22.2% (n=2), epididymal calcification in 22.2% (n=2), 22.2% of patients had testicular cyst, 11.1 % (n=1) had small testis, 22.2% (n = 2) had testicular

Table 3: Distribution of abnormal TSU findings in various groups

Categories	Type of abnormalities	Number (%)
Pre-testicular group (N=0)	-	-
Testicular group (N=21)	Small testis	14(66.66%)
	U/L non visualization of testis	1(4.7%)
	Testicular calcification	7(33.3%)
	Anechoic lesion	1(4.7%)
	Varicocele	8(38.09%)
	Avulsion of epididymis	2(9.5%)
Post-testicular group (N=16)	Epididymal cyst	8(50%)
	Epididymal calcification	5(31.2%)
	Thickened epididymis	2(12.5%)
	Anechoic lesion	2(12.5%)
	Fluid around the testis	1(6.2%)
	Vas dilated	4(25%)
Idiopathic group (N=9)	Epididymal cyst	2(22.2%)
	Testicular cyst	2(22.2%)
	Small testis	1(11.1%)
	Epididymal calcification	2(22.2%)
	U/L non visualization of testis	2(22.2%)
	Testicular calcification	2(22.2%)

Table 4: Distribution of abnormal scrotal doppler findings in various groups

Categories	Doppler findings	Number (%)
Pre-testicular group (N=1)	Central flow reduced with peripheral flow increased	1 (100%)
Testicular group (N=6)	Central flow reduced with peripheral flow increased	1 (16.6%)
	Non pulsatile flow	5 (83.3%)
Post-testicular group (N=0)	-	-
Idiopathic group (N=1)	Central flow reduced with peripheral flow increased	1 (100%)

calcification, 22.2% (n=2) had absent testis. In this study each patient had more than one abnormal finding. This explains the discrepancy in column percentages (Table 3).

In this study trans-scrotal doppler showed normal study in 85.7% (n=6) pre-testicular cases, 77.7 % (n=21) of testicular cases, 100% (n= 27) of post-testicular cases and 97.4% (n=38) of idiopathic cases. Reduced central flow with increase peripheral flow seen in 100% (n=1) in pre-testicular group, 16.6% (n=1) in testicular group and 100% (n=1) in idiopathic group. In testicular group 83.3% of patients had non pulsatile flow.

Discussion

In this study TRUS showed normal study in 100% pre-testicular cases, 92.5% testicular cases, 37% post testicular cases and 87.1% idiopathic cases. Vignera also observed similar normal TRUS in pre-testicular cases.⁵

In this study there were no abnormalities in the TRUS findings in the pre-testicular patient's. In the testicular group two patients had calcification of prostate that accounted for 100% abnormality in this group. TRUS is the initial investigation tool used to locate and visualize the presence of calcifications that may contribute to the obstruction⁶.

In the post-testicular TRUS group 82.3% had seminal vesicle enlargement, 47% had ejaculatory duct enlargement, and 18.5% patients had midline cysts, seminal vesicle cyst in 14.8 % of patients. In the post testicular group each patient had more than one abnormal finding. This explains the discrepancy in percentages. In the idiopathic group 60% had seminal vesicle cyst, 20% had enlarged prostate. Study conducted by Xu Chen et al⁷ with TRUS found that obstructive azoospermia is one of the common causes of male infertility. In this study, it was observed that dilatation of ejaculatory duct (29%, 374/1249) was the most common cause of obstructive azoospermia, followed by seminal vesicle abnormalities (28.5%, 356/1249). The study conducted by Vignera was found congenital absence of vas in 34%, bilateral ductal occlusion by fibrosis 16%, congenital unilateral absence of vas 11%, obstructing cysts in ductal system 9%, ductal obstruction due to calculi 4%.¹

Scrotal US is considered the primary imaging modality for the evaluation of scrotal abnormalities^{6, 8}. Scrotal US can be helpful in determining whether

azoospermia is non-obstructive or obstructive, because it can directly detect abnormalities in the testis, mediastinum testis, epididymis, and the proximal vas deferens. In this study Tran's scrotal ultrasound showed normal study in 100% pre-testicular cases, 10.4% of testicular cases, 40.7% of post testicular cases and 76.9% of idiopathic cases. In the testicular group 66.6% had small testis, 4.7% had absent testis, 33.33% patients had calcification of testis, 30.0% had varicocele, 9.5% of the patients had avulsion of testis and 4.7% of the patient had anechoic lesion in the testis. Evaluation of testicular volume with scrotal US are helpful in differentiating obstructive from nonobstructive azoospermia in infertile men. Testicular volume measured is higher for obstructive azoospermia than for nonobstructive azoospermia⁹. Cocuzza M et al¹⁰ mention in their study that Varicoceles are the most dominant physical finding in infertile men; indeed, they may be responsible for nearly one-third of cases of male infertility.

Conclusion

Evaluation of infertile men thoroughly is mandatory to identify the patient with potentially correctable pathology such as obstructive from nonobstructive azoospermia to eliminate unnecessary investigations and interventions.

Conflict of interest: None. **Disclaimer:** Nil.

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