



ORIGINAL RESEARCH PAPER

Radio-Diagnosis

ROLE OF TRANS RECTAL AND SCROTAL ULTRASONOGRAPHY IN MALE INFERTILITY.

KEY WORDS:

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ABSTRACT

Introduction: Infertility is known as major problem as life crisis for many couples. Investigation of male infertility is assuming greater importance with male factors implicated as it caused half of the infertile couples. Infertility is defined as infertility is a disease of reproductive system defined by failure to achieve the clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. It is also defined as failure of couple to conceive after 12 months of regular intercourse without the use of contraception in women <35 years; and regular intercourse after 6 months without the use of contraception in women ≥ years. A recent report on the status of infertility in India, states that nearly 50% of infertility is related to the reproductive anomalies or disorders in the male. Male infertility includes pretesticular, testicular and post testicular causes. Common causes may be due to deficiencies in the semen and semen quality is used as a surrogate measure of male fecundity. Testicular causes are mainly cryptorchidism, varicocele exposure to gonadotoxins and post testicular causes which included disorders and obstruction of ejaculation and erectile dysfunction. There are many studies which found that sperm count of less than 10 million per milliliter is also suboptimal for fertility; however there is no cut off value of sperm count that is diagnostic of infertility. The common investigations done in evaluating fertility is Ultrasound examinations of scrotum and semen analysis. Ultrasound is a very useful modality for assessing the testicular size which is also related to condition like epididymo-orchitis, varicocele and undescended testis. **Aim:** The main aim of this study is to determine the use of ultra sonography in the evaluation of male infertility and to compare with clinical and surgical findings. **Material and Methods:** All the patients were referred to the Department of Radiology for transrectal and scrotal ultrasonography with high frequency transducer having a frequency of 7.5 MHz and Color Doppler wherever indicated. In this study all male patients with infertility and abnormal semen analysis and with the case of infertility with coincident scrotal findings on clinical examination were included. Transrectal ultrasound was done by positioning in left lateral decubitus position. On each side testis and epididymis was identified as completely as possible and compared for symmetry, size, texture and vascularity. **Result:** In this study patients with abnormality were found in highest number on clinical palpation and ultrasound was varicocele. In 36 cases Varicocele was detected on clinical examination and 48 cases in ultrasound. In 18 cases Hydrocele was detected in clinical examination and Ultrasound. In 10 cases epididymal cysts were detected in clinical findings and 12 cases were found in Ultrasound Findings whereas 6 cases of epididymitis was found in ultrasound and only 2 case in clinical examination. Therefore the total number of abnormalities was found by ultrasound which was significantly greater as compared to physical examination. The p-value was 0.001 which shows statistically significant. **Conclusion:** Transrectal ultrasound enables high resolution imaging of prostate, seminal vesicles and distal vas deferens and is implicated in diagnosing the cause of obstructive azoospermia. Therefore Imaging plays an important complementary role to clinical examination and laboratory analyses for the detection of precise anatomy and level of abnormality. Hence transrectal and scrotal ultrasound provides valuable information in the diagnostic evaluation of infertile men and pathological conditions can be detected on ultrasound compared to clinical palpation.

BACKGROUND

• Infertility is a major life crisis for many couples. Investigation of male infertility is assuming greater importance with male factors implicated as the cause in up to half of the infertile couples. Infertility is defined as failure of conception after one year of unprotected intercourse. Male infertility is often correctable. It may be a presenting symptom of an occult underlying condition. The primary role of imaging is to identify an anatomically correctable cause of infertility. Imaging is critically important in the detection of testicular position and its abnormalities, as well as in the assessment of causes of obstructive azoospermia. According to a multi-centric study conducted by WHO from 1982 to 1985, 20% of cases were attributed to male factors, 38% to female factors, 27% had causal factors identified in both partners, and 15% could not be satisfactorily attributed to either partner. A recent report on the status of infertility in India, states that nearly 50% of infertility is related to the reproductive anomalies or disorders in the male.

Pre- testicular: Acquired endocrino-pathies, Genetic endocrinopathies, Disorders of production or secretion of gonadotrophin-releasing hormone, Disorders of luteinizing hormone, follicle stimulating hormone and androgen function
 Testicular : Varicocele, Genetics, Cryptorchidism, Exposure to gonadotoxins.

Post testicular: Obstruction, Immunologic, infertility Disorders of ejaculation, Erectile dysfunction.

The various causes of male infertility can be sub- categorized as obstructive and non obstructive azoospermia or oligospermia. Nonobstructive disease includes varicocele, endocrinopathy, chromosomal abnormality, cryptorchidism, anabolic steroid abuse, gonadotoxin exposure, primary testicular failure, and ejaculatory disorders. Obstructive disorders include congenital bilateral absence of the vas deferens, ejaculatory duct obstruction, and prostatic cysts.

Transrectal ultrasound enables high resolution imaging of prostate, seminal vesicles and distal vas deferens and is implicated in diagnosing the cause of obstructive

The causes of male infertility include

azoospermia .Obstructive azoospermia manifest because of blockage of sperm transport or abnormalities of epididymis, vas deferens or ejaculatory duct.

Scrotal ultrasound is used for evaluation of testicles, epididymis and proximal vas deferens and demonstrate abnormalities within the testis and para-testicular structures such as varicoceles and epididymal abnormalities as well as visualizing secondary changes caused by distal genital duct obstruction.

Investigation of male infertility is assuming greater importance with male factors implicated as the cause in up to half of the infertile couples. This prospective cross-sectional study aims to establish the role of transrectal and scrotal ultrasonography in male infertility. Besides routine investigations , transrectal and scrotal ultra sonography was performed to detect testicular and post-testicular etiology or abnormality.

AIMS

The aim of this cross-sectional study was to determine the role of transrectal and scrotal ultrasonography in the evaluation of male infertility and to compare the findings of ultrasonography with clinical and surgical findings.

MATERIALS AND METHODS

The prospective cross-sectional study was carried out on 100 patients visiting the ultrasound section of Government medical college, Jammu with complaint of infertility over the span of 2 years. All the patient undergoes transrectal and scrotal ultrasonography with high frequency transducer having a frequency of 7.5 MHz and Color Doppler wherever indicated.

EXAMINATION TECHNIQUE

Transrectal ultrasound was performed with patient positioned in left lateral decubitus position. A high frequency endorectal transducer was used with a condom cover.

A generous amount of gel is put into the sphincter before inserting the probe. Patient asked to try and relax and "bear down" to open the sphincter as transducer is inserted slowly. Systemic evaluation of the terminal vasdeferens, seminal vesicles, ejaculatory duct and prostate are carried out in axial and sagittal planes.

Scrotal ultrasound was performed with the patient supine. A towel was placed over the penis and the patient requested to draw the penis away from the scrotum and to present the scrotum in a suitable position for contact scanning. The testis and epididymis on each side was identified as completely as possible and compared for symmetry, size, texture and vascularity.

A composite assessment of the patient's history, findings on physical examination, laboratory investigations and results obtained from ultra sonography was compiled and analyzed statistically and a provisional diagnosis made.

RESULTS

In this study maximum no of patients were between the age 27 and 40 years of age. Maximum cases had sperm count between 5 and 10 M/ml i.e. 36 no of cases and other 30 cases were suffering from Azoospermia. Of the 100 cases on the physical examination of the patients, 36 cases were varicocele, 18 cases were hydrocele, 10 cases were epididymal cyst, 6 cases were cryptorchidism, 2 case was epididymitis and 2 case having nonpalpable vas deferens were diagnosed as shown in table below.

- Ultrasonographic finding of scrotum reveals out of 100 cases, 48 cases were varicocele, 12 cases were epididymal cysts, 18 cases were hydrocele, 6 cases of

epididymitis, 4 cases of cryptorchidism, 6 cases were testicular microlithiasis and 2 case was bilateral testicular cyst. Apart from the patient who had cryptorchidism, the testis of all the patients were normal in size, site, shape and echo pattern.

TABLE-1: FINDINGS ON LOCAL EXAMINATION

Findings	No. of Cases		%age
	Left	Right	
Varicocele	Left	24	24%
	Right	4	4%
	Bilateral	8	8%
	Total	36	36%
Hydrocele	Left	6	6%
	Right	4	4%
	Bilateral	8	8%
	Total	18	18%
Others	Epididymitis	2	2%
	Non-Palpable Vas Deferens	2	2%
	Single Left Testis	2	2%
	Single Right Testis	2	2%
	Epididymal Cyst	10	10%
	Total	18	18%

TABLE-2: SCROTAL ULTRASOUND FINDINGS

Findings	No. of Cases		%age
	Left	Right	
Varicocele	Left	26	26%
	Right	4	4%
	Bilateral	18	18%
	Total	48	48%
Hydrocele	Left	2	2%
	Right	2	2%
	Total	18	18%
Epididymal Cyst	Left	2	2%
	Right	0	0%
	Total	12	12%
Epididymitis	Left	2	2%
	Right	2	2%
	Total	6	6%
Others	Bilateral Testicular Cyst	2	2%
	Left Undescended	2	2%
	Right Undescended	2	2%
	Testicular Microlithiasis	6	6%
	Total	12	12%

- The abnormality found in highest number of patients on clinical palpation and ultrasound was varicocele. Varicocele was detected in 36 patients on clinical examination and 48 patients were found on ultrasound. Hydrocele was detected in 18 patients in ultrasound and clinical examination. Ultrasound detect 12 cases of epididymal cysts and 10 cases were diagnosed on clinical examination. Some ultrasound detects 6 cases of epididymitis and only 2 case of epididymitis was diagnosed on clinical examination. The total number of abnormalities detected by ultra sound were significantly greater as compared to physical examination (p-value 0.001, statistically significant).

TABLE-3: COMPARISON OF CLINICAL AND ULTRASOUND SIGNIFICANT FINDINGS IN INFERTILE MALES

Findings	Clinical Findings		Ultrasound Findings	
	No. of Cases	%age	No. of Cases	%age
Varicocele	36	36%	48	48%
Hydrocele	18	18%	18	18%
Epididymal Cyst	10	10%	12	12%
Epididymitis	2	2%	6	6%
Total	66	66%	84	84%
χ^2	25.81			
p-value	0.001			

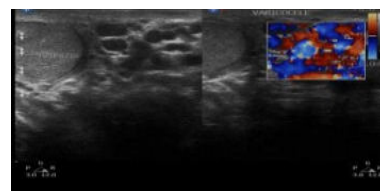


IMAGE 1. MULTIPLE DILATED TORTUOUS ANECHOIC TUBULAR CHANNELS ARE SEEN POSTERIOR TO BOTH

TESTIS. FLOW SEEN IN DILATED VESSELS WHICH INCREASES ON VALSALVA INDICATING BILATERAL VARICOCELE

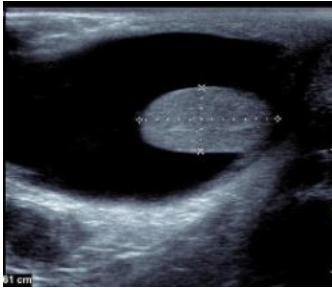


IMAGE 2. LARGE HYDROCELE

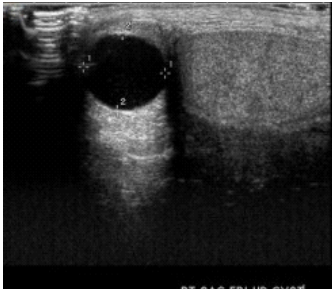


IMAGE 3. EPIDIDYMAL CYST

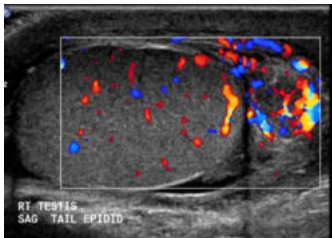
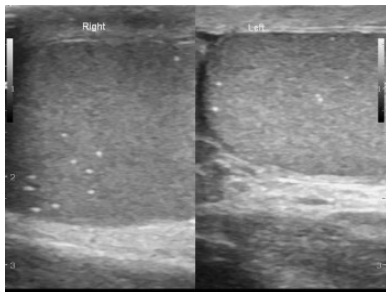


IMAGE 4. EPIDIDYMITIS

IMAGES. TESTICULAR MICROLOTHIASIS



DISCUSSION

Past decade there is rapid development of novel management approaches for male factor infertility has enabled many of these men, previously believed to be infertile, the ability to become fathers. Male infertility contributes to 50% of cases. For early diagnosis and management of infertile male ultrasound of Scrotal and transrectal is an important investigation. However in some cases male fertility can be restored with correction of etiology which is occluding the part of ductal system. In this study the mean age of patients was 27.82+4.63 years with the range of 20-40 years which was comparable to the study of Brunereau et al and Pethiyagoda et al . These may be due to environmental changes as socioeconomic trends of the society in the developed countries which has led to delayed marriage and procreation. In this study showed 36 no of cases with a sperm count between 5 and 10 M/ml whereas other 30 cases were suffering from Azoospermia which showed similar to the study of Goulet et al and Moon et al. According to the study of Eskew et al 34% patients had clinically palpable varicocele and 64% on ultrasound examination which are comparable to

this study. In the studied of Preuthippan and Nicholas et al showed that out of 110 patients, 32 had left sided varicocele, 2 had right sided and 6 patients had bilateral varicocele on clinical palpation which are comparable to this study. In the another study of Gordon et al

showed 34% with varicoceles, 8% with bilateral small testes ,8% with unilateral small testis , 8% with epididymal cysts, 4% with testicular microlithiasis ,2% with testicular tumor and thickened epididymis in one and another study of Jequier et al also showed varicocele in 52% cases, epididymal cyst in 22% cases, testicular microlithiasis in 6% cases, hydrocele in 4% and testicular cancer in 0.4% cases which were comparable to this study.

CONCLUSION

For the evaluation of male infertility, scrotal ultrasound is useful which can detect abnormalities in mediastinum testis, epididymis and proximal vas deferens. Transrectal ultrasound enables high resolution imaging of prostate, seminal vesicles and distal vas deferens and is implicated in diagnosing the cause of obstructive azoospermia. Therefore Imaging plays an important complementary role to clinical examination and laboratory analyses for the detection of precise anatomy and level of abnormality.

Hence transrectal and scrotal ultrasound provides valuable information in the diagnostic evaluation of infertile men and pathological conditions can be detected on ultrasound compared to clinical palpation.

REFERENCES

- Guttmacher AF. Factors affecting normal expectancy of conception. *J Am Med Assoc* 1956;161:855-60.
- Ammar T, Sidhu PS, Wilkins CJ. Male infertility: the role of imaging in diagnosis and management. *Br J Radiol*. 2012 Nov;85 Spec No 1:S59-68. doi: 10.1259/bjr/31818161. Epub 2012 Jul 4.
- Zegers-Hochschild F, Adamson GD, de Mouzon J, Ishihara O, Mansour R, Nygren K, et al. International Committee for Monitoring Assisted Reproductive Technology (ICMART) and the World Health Organization (WHO) revised glossary of ART terminology, 2009. *Fertil Steril* 2009;92:1520-4.
- Practice Committee of the American Society for Reproductive Medicine. Definitions of infertility and recurrent pregnancy loss. *Fertil Steril* 2008;90 5 Suppl:S60.
- Mascarenhas MN, Cheung H, Mathers CD, Stevens GA. Measuring infertility in populations: Constructing a standard definition for use with demographic and reproductive health surveys. *Popul Health Metr* 2012;10:17.
- Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment seeking: Potential need and demand for infertility medical care. *Hum Reprod* 2007;22:1506-12.
- World Health Organization. Infecundity, Infertility, and Childlessness in Developing Countries. DHS Comparative Reports No 9. Calverton, Maryland, USA: ORC Macro and the World Health Organization; 2004.
- Parsons RB, Fisher AM, Bar-Chama N, Mitty HA. MR imaging in male infertility. *RadioGraphics* 1997; 17:627-637
- Spitz A, Kim ED, Lipshultz LI. Contemporary approach to the male infertility evaluation. *Obstet Gynecol Clin North Am* 2000;27:487-516
- Collins JI, Woodward PJ. Radiological evaluation of infertility. *Semin Ultrasound CTMR* 1995;16:304-316
- Brugh VM, Lipshultz LI. Male factor infertility: evaluation and management. *Med Clin N Am* 2004;88:367-385
- World Health Organization. Infecundity, Infertility, and Childlessness in Developing Countries. DHS Comparative Reports No 9. Calverton, Maryland, USA: ORC Macro and the World Health Organization; 2004.
- Talwar PP, Go OP, Murali IN. Prevalence of infertility in different population groups in India and its determinants. *Statistics and Demography*. New Delhi: National Institute of Health and Family Welfare and Indian Council of Medical Research; 1986.
- Unisa S. Childlessness in Andhra Pradesh, India: Treatment-seeking and consequences. *Reprod Health Matters* 1999;7:54-64.
- Zargar AH, Wani AI, Masoodi SR, Laway BA, Salahuddin M. Epidemiologic and etiologic aspects of primary infertility in the Kashmir region of India. *Fertil Steril* 1997;68:637-43.
- Sadock BJ, Sadock VA. *Kaplan and Sadock's Symptoms of Psychiatry Behavioral Sciences Clinical Psychiatry*. 9th ed. Philadelphia: Lippincott Williams and Wilkins; 2003. p. 872-4.
- Kumar N, Singh AK. Trends of male factor infertility, an important cause of infertility: A review of literature. *J Hum Reprod Sci*. 2015 Oct-Dec; 8(4):191-6. doi: 10.4103/0974-1208.170370.
- Cooper TG, Noonan E, von Eckardstein S, Auger J, Baker HW, Behre HM, et al. World Health Organization reference values for human semen characteristics. *Hum Reprod Update* 2010;16:231-45.
- Sabanegh E, Agarwal A. Male infertility. In: Wein AJ, ed. *Campbell-Walsh Urology*. 10th ed. Philadelphia, Pa: Saunders Elsevier; 2011: chap 21.
- Guzick DS, Overstreet JW, Factor-Litvak P, Brazil CK, Nakajima ST, Coutifaris C, Carson SA, Cisneros P, Steinkampf MP, Hill JA, Xu D, Vogel DL. National Cooperative Reproductive Medicine Network; Sperm morphology, motility,

and concentration in fertile and infertile men. *N Engl J Med.* 2001 Nov 8; 345 (19):1388-93

21. Diamond DA, Paltiel HJ, DiCanzio J, Zurakowski D, Bauer SB, Atala A, Ephraim PL, Grant R, Retik AB. Comparative assessment of pediatric testicular volume: orchidometer versus ultrasound. *J Urol* 2000, 164 (3 Pt 2):1111-4.
22. Fuse H, Takahara M, Ishii H, Sumiya H, Shimazaki J. Measurement of testicular volume by ultrasonography. *Int J Androl* 1990, 13(4):267-72.
23. Patel PJ, Pareek SS. Scrotal ultrasound in male infertility. *Eur Urol.* 1989; 16 (6): 423-425
24. Baker HW. Male infertility. *Endocrinol Metab Clin North Am.* 1994; 23: 783-793