Value of duplex color doppler sonography in the evaluation of scrotal pathology.

Ahmed M[1] ,Uddin MB[2] ,Akhter F[3]

Abstract

Background: High resolution ultrasound (US) has revolutionized the evaluation of intrascrotal diseases. All the disease process may affect intrascrotal structure can be evaluated with ultrasonography. *Objectives:* To find out the types of scrotal pathology, to observe the clinico-pathological aspects of scrotal diseases. To find out the sensitivity & accuracy of Duplex Color Doppler ultrasound examination in the diagnosis of scrotal pathology. *Materials and method:* This study was carried out in the Department of Radiology & Imaging Dhaka Medical College, Dhaka with the active help of other relevant departments. Cases were collected from outpatient departments of DMCH from July 2004 to June 2005. Fiftytwo patients were selected who presented with different symptoms implying intrascrotal diseases. *Results:* Among 52 patients included in this study 10 patients presented with hydrocele of which primary and congenital hydrocele was the commonest. High resolution US and color flow imaging could not rule out neoplasm in one patient which ultimately proved to be a case of tuberculosis of testis. About the detection of total intrascrotal pathology color flow imaging have played a significant role with the accuracy 96.1%, sensitivity 97.8 %, specificity 80 %, positive predictive value 97.8 % and negative predictive value 80%, whereas the gray scale image had accuracy 80.7 %, sensitivity 84.4 %, specificity 57.1 %, positive predictive value 92.7 % and negative predictive value 36.3 %. *Conclusion:* Predictive accuracy, sensitivity & specificity of Color Doppler in diagnosing scrotal disease were found to be significantly greater than that of gray scale diagnosis. Therefore, the results of the present study suggest Duplex Color Doppler sonagraphy is a useful modality in diagnosing different intrascrotal pathology.

1.Associate Professor, Department of Radiology & imaging, National Institute of Mental Health & Hospital, Dhaka.
2.Assistant Professor, Department of Radiology & imaging, Kurmitola General Hospital, Dhaka.
3.Assistant Professor, Department of Radiology & imaging, National Institute of Mental Health & Hospital, Dhaka.

INTRODUCTION

The scrotum is an integumental pouch of the lower part of the anterior abdominal wall & contains the testes & the lower part of the spermatic cord. It protects the testes from external violence & maintains a temperature which is lower than that of the abdomen. Scrotal disease is a common & embarrassing problem

of male patients. The cause of the scrotal swelling is mainly extratesticular, hydrocele being the commonest. Of the intratesticular causes, infection & tumor are the commonest. Testicular torsion & trauma are the most important causes of painful acute scrotal swelling. (Micallef et al., 2000). Varicocele which causes male infertility is another important cause of scrotal swelling. (Horstman, 1997) Diagnosis of intrascrotal pathologic conditions traditionally has been based upon the clinical history & physical examination. But definitive diagnosis is not possible always especially in patients with acute scrotum and in marked hydrocele rendering the testis impalpable and in case of occult tumor. High resolution ultrasonography examination with greater frequency probe (7 to 13 MHz) can provide information valuable for the differential diagnosis of a variety of disease process involving the scrotum that have similar clinical manifestations (e.g., pain, swelling or presence of mass). The pathologic condition that may be the origin of such symptoms can vary from testicular torsion to infection to malignancy. The ability of color & power Doppler ultrasonogram to demonstrate testicular perfusion aids in reaching a specific diagnosis in patients with acute scrotal pain. (Dogra et al., 2003). Scrotal inflammatory lesions appear as hypervascularity of the testes or epididymis, even though gray scale findings may be normal or non-specific. In one study gray scale examination was normal in 20% of cases of epididymitis and 40% of cases of orchitis and the hyperemia seen with color flow imaging was the only evidence of inflammation (Horstman, 1997). In testicular torsion early diagnosis is very vital because prognosis is good if the patient is operated on within 4-6 hours of the onset of the process. Burks et al., (1990) showed by using the single criterion of presence or absence of identifiable intratesticular flow, Color Doppler was 86 % sensitive, 100 % specific and 97 % accurate in the diagnosis of torsion and ischemia in the painful scrotum. The most common differential diagnosis of torsion of the testis is acute epididymo-orchitis where color flow imaging reveals increased flow and thereby Color Doppler reduces the number of unnecessary scrotal exploration. (Wilbert at el., 1993). The varicocele is the most common surgically correctable cause of male infertility and it is found in approximately 30 % of infertile males. Color flow imaging is highly accurate and non hazardous imaging modality in diagnosing varicocele (Sigman & Howards et al., 1998). The modality also demonstrates Valsalva maneuver-induced venous flow augmentation in varicoceles. Testicular neoplasms account for about 1 -2 % of all malignancies in men & are the 5th most frequent cause of death in man aged 15 to 34 years. (Gorman & Carrol 2005). The principal role of US examination in the diagnosis of testicular cancer is to help distinguish intratesticular from extratesticular lesions, because the majority of extratesticular masses are benign and intratesticular masses are more likely to be malignant. Gray-scale US is highly sensitive for detection of testicular tumors. (Horstman, 1997). There are a variety of benign intratesticular processes, such as hematoma, orchitis, abscess, infarction, and granuloma that mimic testicular malignancy and must therefore be considered in the differential diagnosis. Color Doppler and power Doppler US demonstrate increased vascularity in the majority of malignant tumors and help to better define testicular involvement. (Horstman et al., 1992). Therefore the present study has been designed to evaluate the Value of Duplex Color Doppler sonography in the diagnosis of scrotal pathology; prospective correlation with the clinico-pathological findings.

Materials and Method:

This prospective study was carried out in 52 patients with intrascrotal disease: The age ranging from 5 years to 75 years. These patients were mostly collected as referred from out patient departments of several hospitals of Dhaka city with representing implying intrascrotal diseases. Then all patients were evaluated by detail history and clinical examination with special emphasis on genitourinary system. The study was carried out in the department of radiology and imaging, Dhaka Medical College Hospital. The study period was form July 2004 to June 2005**.** Researcher himself evaluated the findings of B-mode US & color flow imaging first, then two radiologists confirmed the findings separately to eliminate bias. **Inclusion criteria – 1)** History of Inguino-scrotal pain. 2) Inguino-scrotal / scrotal swelling. **Exclusion criteria** – 1) Lacerated wound in the scrotum. 2) Surface ulcer of scrotum **High Resolution Ultrasonography with color flow imaging.** All the patients underwent high resolution **B**-mode ultrasonography of scrotum. Kidneys were scanned in those patients having varicocele and US of whole abdomen was done in those patients having testicular mass to evaluate metastasis. Color flow imaging was done in every patient. All the above examination was done by SIEMENS SONOLINE G 60 S Color Doppler Ultrasound Machine equipped with L-10-5 multi-frequency linear & C 6F3 convex probes. L-10-5 linear probe was chosen for scrotal ultrasonography and color flow imaging and C 6F3 convex probe for large scrotal swelling. All the patients ware queried regarding testicular symptoms and the scrotum was palpated prior to scanning. This ensured that special attention was given to the area of palpable abnormality. The patient was examined in supine position with a towel placed between his legs and the penis was over the abdomen with the help of patient's left hand. A high frequency 7-10 MHz linear transducer was generally used, although rarely 4 MHz transducer was also used for adequate penetration, patient with thickened scrotal wall and marked hydrocele. Copious gel was used to assure adequate contact. A transverse scan incorporating both testes in the same field of view was used in every case to compare parenchymal echogenicity. Color flow imaging was used in the entire patient. When examining the testicle with color flow, low flow setting with high color Doppler sensitivity was used. In patients with clinical suspicion of varicocele scanning was done in supine position, during valsalva maneuver and in standing position to see change of color flow. In all cases of varicocele kidneys with renal vein were scanned and in cases of testicular mass all the abdominal organs including para-aortic lymph nodes were studied to detect metastasis. At first the researcher preformed the ultrasonogram himself, and then two radiologists confirmed the findings separately to eliminate bias **Sonographic variable: a) Testis:** Size (increased, decreased), Echogenicity (homogeneous, heterogeneous), Testicular mass (size, echogenicity), Fluid in the sac of tunica vaginalis (internal echoes, septations). b) **Epididymis:** Head, Body, Tail, Space occupying lesion. **c) Scrotal wall:** Thickness, Presence or absence of edema **d) pampiniform plexus of veins:** Diameter of vein, Color flow study in supine position, during valsalva maneuver and in standing position. e) **Kidneys:** Mass lesion (present or absent), Invasion of renal vein and /or IVC. f) **Para aortic lymph node:** Enlarged or not. g) **Liver:** Presence or absence of any focal lesion.

Statistical Analysis

Statistical analysis was performed according to the appropriate statistical formulae (Appendix-III) to determine the accuracy, sensitivity, specificity, positive predictive value and negative predictive value of the high resolution gray scale ultrasonography & Color Doppler sonography in the diagnosis of different intrascrotal disease.

Observation & Results:

Fifty two patients were observed in this study who was referred to Radiology & imaging department of Dhaka Medical College Hospital, mainly from out patient department of Dhaka Medical College. High resolution ultrasound examination with color flow imaging was performed upon 52 patients. Findings of all the patients were prospectively correlated with histopathological study &/or clinico-surgical findings along with follow up. Extra testicular pathology was the commonest cause of intrascrotal diseases producing symptoms and vaginal hydrocele was the most common cause of scrotal swelling. After Color Doppler sonography it was observed that varicocele was another most common cause of the scrotal pathology.

PATTERNS OF CLINICAL PRESENTATION

Among 52 patients included in this study 28 patients (53.83%) presented with swelling with pain in the inguinoscrotal region. 16 patients (30.77%) presented only inguinoscrotal swelling. Whereas 8 patients (15.38%) presented only pain in the scrotal region.

Table I

Patterns of clinical presentation (n= 52)

Symptoms/Sign	Number of patient	Percentage (%)
Inguinoscrotal swelling	16	30.77
Pain in the Scrotum	8	15.38
Swelling with pain in the scrotum	28	53.85

Above table showed that only inguinoscrotal swelling is 30.77%, & pain in the scrotum 15.38%, whereas, 53.85 % patient complain both pain & swelling of the scrotum.

LOCATION OF THE SCROTAL LESION

Extratesticular pathology (67.31%) was the commonest cause of intrascrotal diseases, whereas, 9.62% were testicular lesion & 23.4% showed lesion involved both testis & extratesticular structure. Hydrocele &

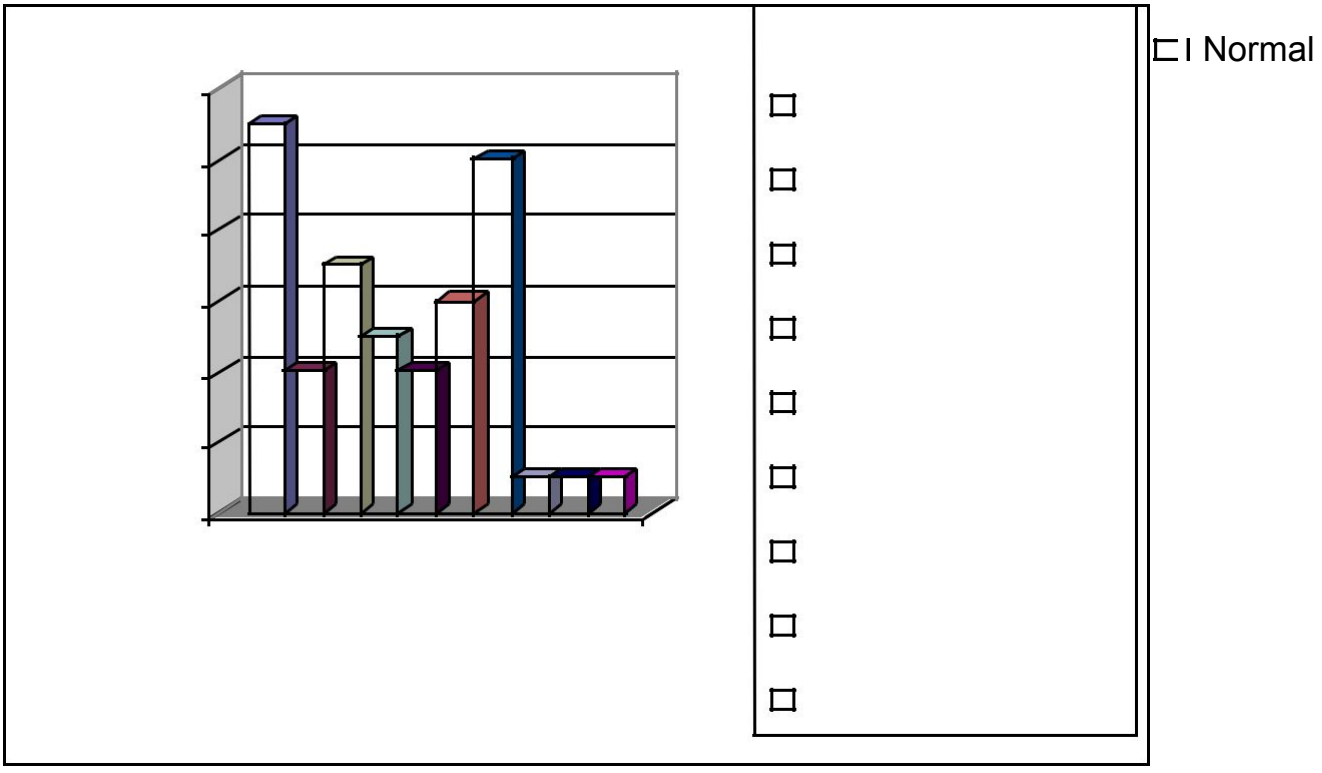
varicocele were most common intrascrotal disease which was extratesticular in location. Epididymo-orchitis was the most common disease that involved both testis & epididymitis.

Table II
Location of the lesion (n= 47)

Location of the lesion	Number of patients	Percentage (%)
Testicular	**05**	10.64
Extratesticular	**35**	**74.45**
Lesion involving both testicular & extratesticular structure	**07**	**14.89**

ULTRASONOGRAPHIC DIAGNOSIS OF SCROTAL PATHOLOGY

TABLE III



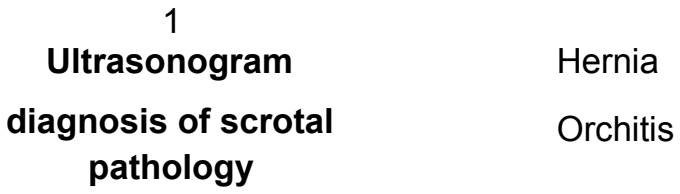


Figure 1: Showing Ultrasonographic diagnosis of scrotal pathology

TESTICULAR ECHOTEXTURE IN 52 CASES

All patients in this study had undergone ultrasonographic examination. Out of 52 patients 41 (78.8%) patients showed normal testicular echotexture, where as, 7 (13.5%) patients showed hypoechoic & 4 (7.7%) patients show heterogeneous testicular echotexture. Though most of the intrascrotal diseases were extratesticular the testis were found normal. In inflammatory condition testis were found hypoechoic.

Table IV: Testicular echotexture(n=52)

Testicular echotexture	Incidence	Percentage
Normal	41	78.8
Hypoechoic	7	13.5
Heterogeneous	4	7.7

LOCATION OF INFLAMMATORY LESION IN THE SCROTUM

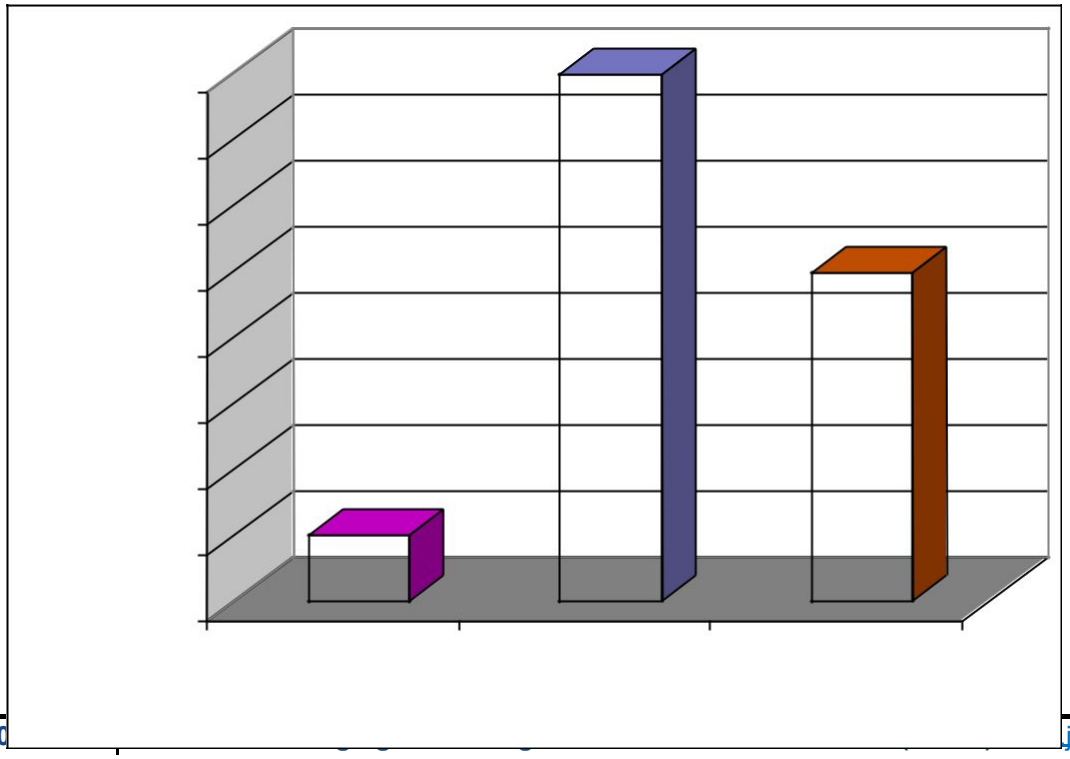


Figure 2: Showing location of the inflammatory lesion

BLOOD FLOW PATTERN IN THE TESTICULAR LESION

All patients in this study had undergone ultrasonographic examination. Among the 52 patient 12 cases had testicular pathology. By color Doppler sonography vascularity of the lesion were evaluated. Out of 12, 8 cases (66.66%) showed increased vascularity of the lesion. Only 3 cases (25 %) showed decreased vascularity & 1 case showed no blood flow within the lesion. Inflammatory & neoplastic lesion of the testis showed hypervascularity. However, one small teratoma & in testicular torsion it showed hypovascularity. Simple testicular cyst showed no blood flow within the lesion.

COLOR DOPPLER DIAGNOSIS OF SCROTAL PATHOLOGY

All patients in this study had undergone Color Doppler ultrasonographic examination by High frequency linear transducer. Out of 52 cases, 11 (21.2 %) cases were varicocele, 10 (19.2%) cases were hydrocele, 8 (15.4 %) cases were epididymitis, 05 (9.6 %) cases were epididymo orchitis, and 04 (7.7%) cases were testicular tumor. Other cases were extra-testicular tumor 7.7 %, orchitis 1.9 %, spermatocele 1.9%, and hernia 1.9%. Among 52 cases 5 (9.6%) were found normal.

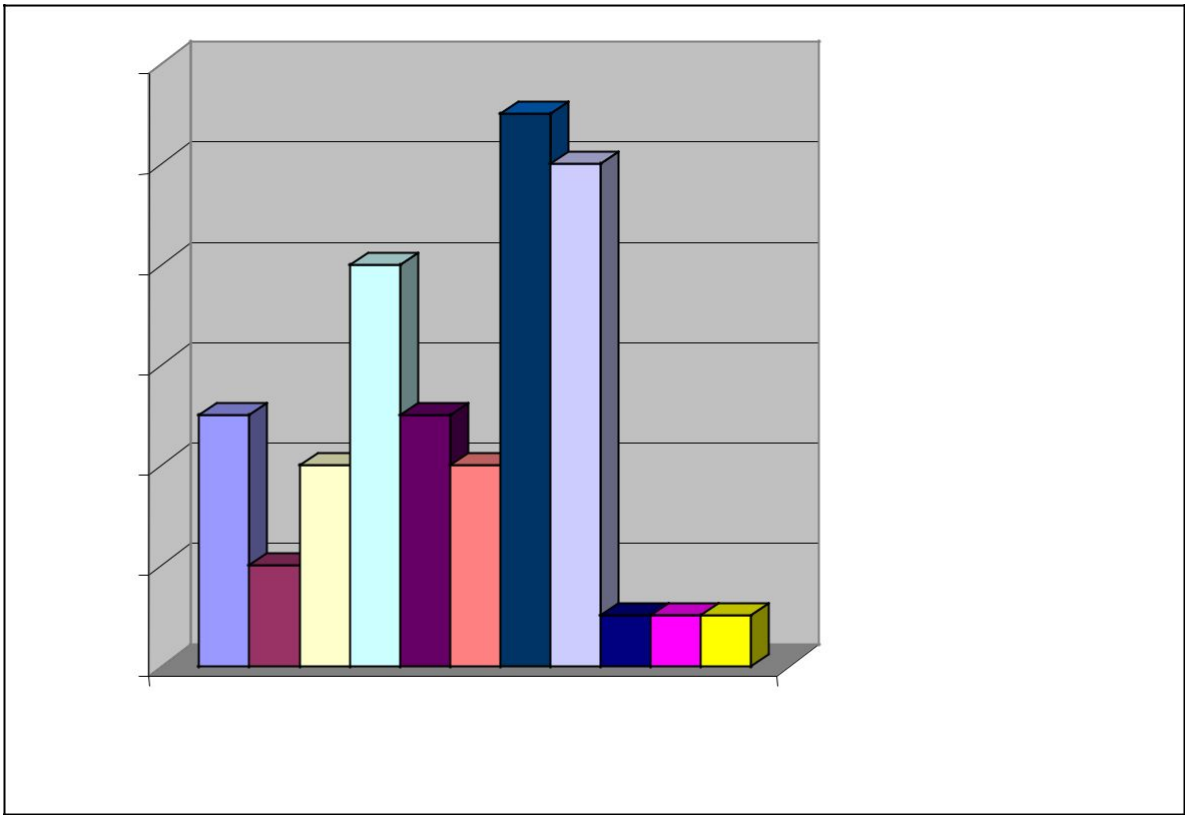
Table V

Color Doppler diagnosis of scrotal pathology (n=52)

Color Doppler diagnosis	Number of patients	Percentage (%)
Normal	**05**	**9.6**

Testicular torsion	**02**	**3.8**
Testicular tumor	**04**	**7.7**
Orchitis	**01**	**1.9**
Epididymitis	**08**	**15.4**
Epididymo-orchitis	**05**	**9.6**
Extra-testicular tumor	**05**	**9.6**
Varicocele	**11**	**21.2**
Hydrocele	**11**	**21.2**
Total	**52**	**100**

COLOR DOPPLER DIAGNOSIS OF SCROTAL PATHOLOGY



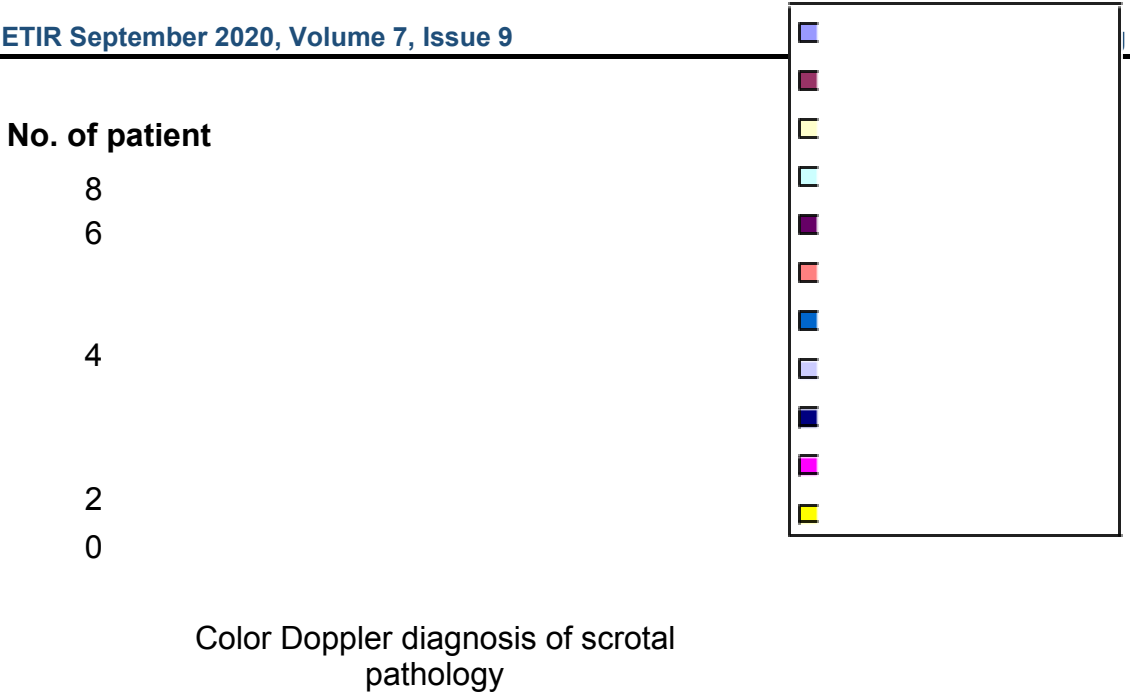


Figure 3: Showing Color Doppler diagnosis of scrotal pathology

Table VI: Discrepancy between Color Doppler diagnosis & Final Diagnosis

Color Doppler Diagnosis	Final Diagnosis	No. of patient
Normal (unknown)	Testicular tumor	1
Testicular Tumor	TB orchitis	1

Table VII

Accuracy, Sensitivity, Specificity, Positive & Negative predictive values of USG & Color Doppler Imaging in the diagnosis of epididymitis, Varicocele & testicular torsion.

	USG diagnosis of	Color Doppler diagnosis of

	epididymitis	epididymitis
Accuracy	98 %	100 %
Sensitivity	87.5 %	100 %
Specificity	100 %	100 %
Positive Predictive value	100 %	100 %
Negative Predictive value	97.7 %	100 %

	USG diagnosis of varicocele	Color Doppler diagnosis of varicocele
Accuracy	90.38 %	100 %
Sensitivity	100 %	100 %
Specificity	54.5%	100 %
Positive Predictive value	89.13%	100 %
Negative Predictive value	100 %	100 %

	Color Doppler diagnosis of Testicular torsion
Accuracy	100 %
Sensitivity	100 %
Specificity	100 %
Positive Predictive value	100 %
Negative Predictive value	100 %

Accuracy, Sensitivity, Specificity, Positive & Negative predictive values of USG in the diagnosis of different intrascrotal diseases.

The study was carried out in a total 52 patients. Out 0f 52 patients 42 were correctly diagnosed by Gray scale ultrasonography.

Table VII

Accuracy, Sensitivity, Specificity, Positive & Negative predictive values of USG in the diagnosis of different intrascrotal diseases.

Accuracy	80 %
Sensitivity	84.4 %
Specificity	57.1 %
Positive Predictive value	92.7 %
Negative Predictive value	36.3 %

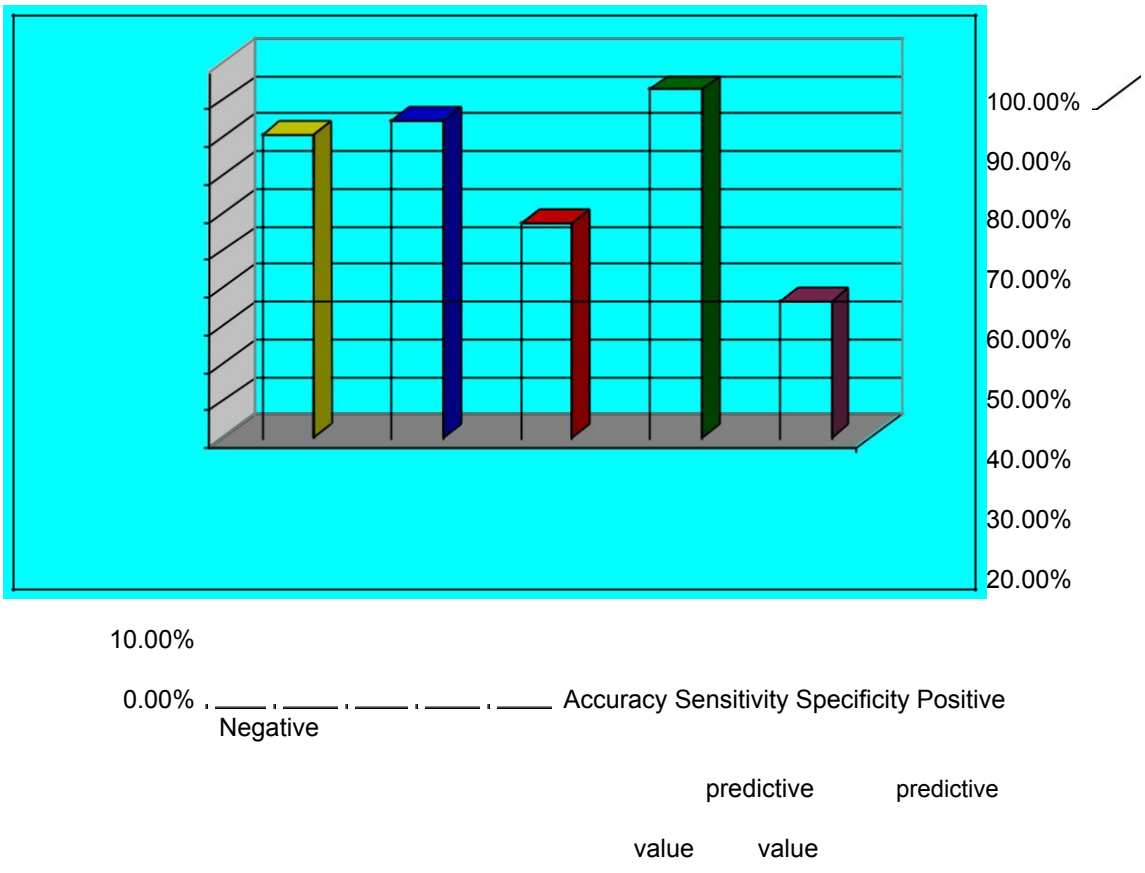


Figure 4: showing the overall Accuracy, Sensitivity, Specificity, Positive & Negative predictive values of USG in the diagnosis of different intrascrotal pathologic condition.

Accuracy, Sensitivity, Specificity, Positive & Negative predictive values of Color Doppler imaging in the diagnosis of different intrascrotal diseases.

The study was carried out in a total 52 patients. Out 52 patients 50 were correctly diagnosed by Color Doppler Sonography.

Table VIII

Accuracy, Sensitivity, Specificity, Positive & Negative predictive values of Color Doppler imaging in the diagnosis of different intrascrotal diseases.

Accuracy	96.1 %
Sensitivity	97.8 %
Specificity	80 %
Positive Predictive value	97.8 %
Negative Predictive value	80 %

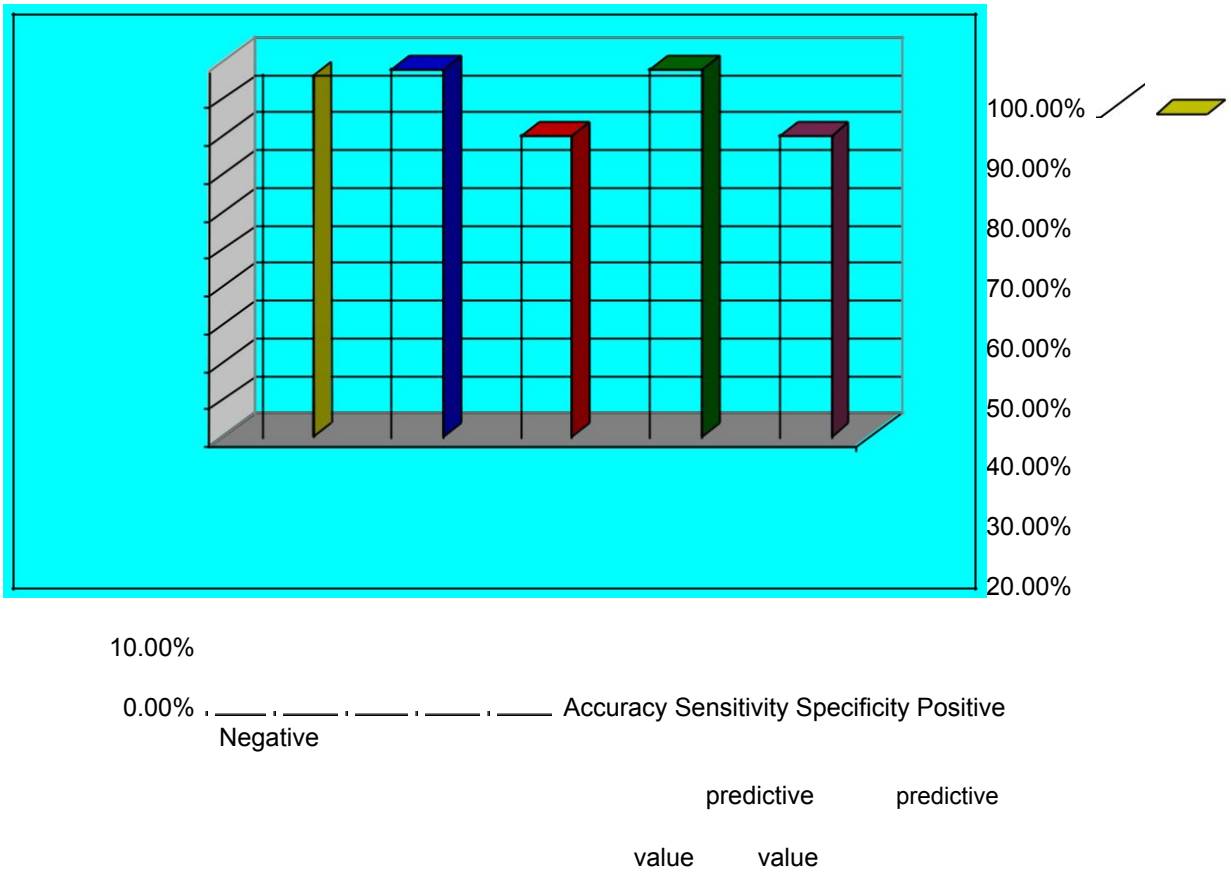


Figure 5: showing the overall Accuracy, Sensitivity, Specificity, Positive & Negative predictive values of Color Doppler Imaging in the diagnosis of different intrascrotal pathologic condition.

Table IX

Comparative Study of Accuracy, Sensitivity, Specificity, Positive & Negative predictive values of USG & Color Doppler imaging in the diagnosis of different intrascrotal diseases.

	USG diagnosis	Color Doppler diagnosis
Accuracy	80.7 %	96.1 %
Sensitivity	84.4 %	97.8 %
Specificity	57.1 %	80 %
Positive Predictive value	92.7 %	97.8 %
Negative Predictive value	36.3 %	80 %

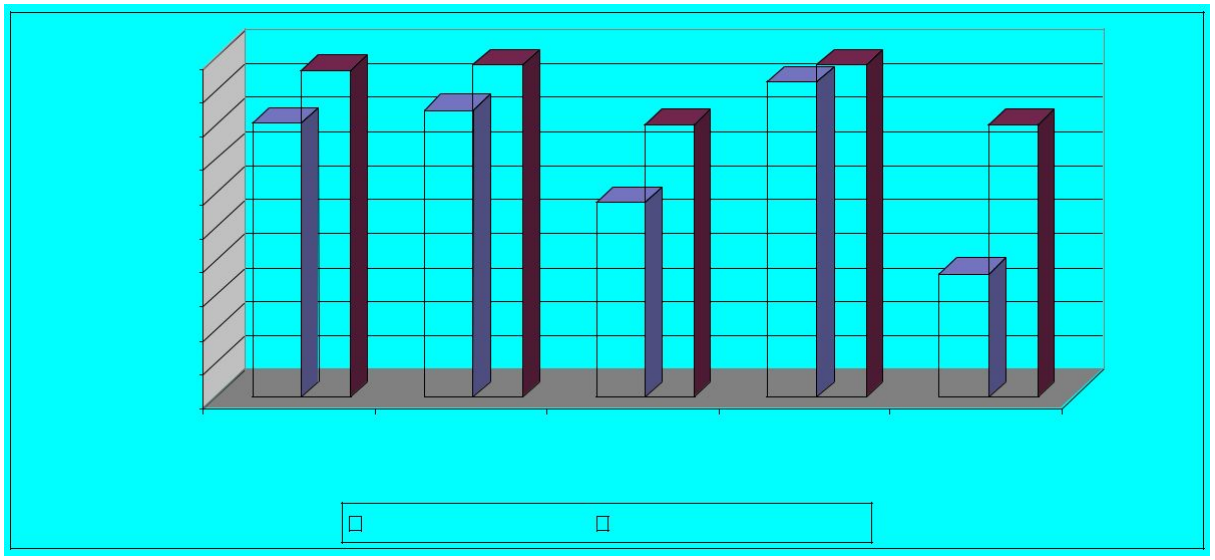


Figure 6: Showing comparative study of Accuracy, Sensitivity, Specificity, Positive & Negative predictive values of Gray scale imaging & Color Doppler imaging in the diagnosis of different intrascrotal diseases.

DISCUSSION

Ultrasound is the only imaging modality that is most commonly used to evaluate different intrascrotal pathologic conditions. It has improved substantially the clinical evaluation of scrotal diseases. The primary objective of this study was to assess the effectiveness of Duplex Color Doppler sonography in the diagnosis of different intrascrotal pathology. The procedure is non-invasive, having no radiation hazard & requires no special preparation. Although many intrascrotal pathology can be diagnosed by clinical examination but it is not always possible to examine the patient properly because of large hydrocele or tenderness in the testis. Several intrascrotal diseases present with similar symptoms. Epididymo-orchitis and testicular tumor both may present with scrotal pain. Tumors of the testis are frequently misdiagnosed in the initial examination of younger patients especially as epididymitis.

Palpable scrotal masses are always detectable with US, which allows them to be categorized as intra or extratesticular. This may not always be clinically obvious. Solid intratesticular masses are usually malignant with few exceptions, whereas extra testicular masses are most often benign (Dewbury, 2000). In this study findings of 52 cases were analyzed, the age ranging from 5 years to 75 years. The mean age was 35.71 $\pm$ 2.03 years (mean $\pm$ SE). The results were correlated with histopathological study, surgical findings or clinical outcome in appropriate clinical settings. The most common cause of scrotal swelling found by ultrasonogram in this study was hydrocele (about 19.2%). In one study Hendrikx et al., (1997) found 45 patients of hydrocele out of 215 cases i.e. about 20.8%. This finding nearly corresponds well with present study.

Importance of US examination in hydrocele is to demonstrate that underlying testis is normal. A hydrocele is usually clinically obvious & is easily diagnosed by gray scale imaging as fluid appears anechoic. However, presence or absence of echogenic particles or debris differentiate between simple and complicated hydrocele i.e. pyocele. In complicated hydrocele gray scale imaging showed echogenic particles in hydrocele fluid and transillumination test is negative. Thus clinical history and US examination are needed to differentiate this condition from complicated hydrocele. In this study epididymitis was the most common intrascrotal inflammatory disease. Eight patients (57%) out of 14 with inflammatory lesions were diagnosed to have epididymitis. Micallef et al., (2000) found that 64 % of all infection was epididymitis. These findings nearly corresponds with the present study.

In inflammatory disease gray scale ultrasound showed enlargement and hypoechogenicity of the involved epididymis and testis and Color Doppler ultrasound showed increase visible blood in the affected epididymis and testis.

Clinical diagnosis of 11 patients out of 52 patients differed with USG diagnosis which was ultimately confirmed by final diagnosis. Five patients with clinically diagnosis of epididymo-orchitis were found to have no organic lesion on Color Doppler imaging. Three patients diagnosed as normal by USG examination but on Color flow imaging those patients diagnosed as mild degree of varicocele. Two patients of epididymo-orchitis & one patient of epididymitis diagnosed as normal by USG, where as color flow image showed increase blood flow.

Ultrasound diagnoses of 8 patients out of 52 patients were different from Color Doppler diagnosis. Three normal diagnosed by USG were diagnosed as mild degree of varicocele. Two normal diagnosed by USG were diagnosed as epididymo-orchitis. One patient diagnosed as epididymitis on color flow imaging, where as on USG it was diagnosed as normal. Two patients diagnosed by USG as epididymo-orchitis but on Color flow imaging the testis show remarkably less blood flow within the testis & diagnosed as testicular torsion on Color Doppler imaging.

Color Doppler diagnoses of 2 patients out of 52 patients were different from Final diagnosis. One patient had a hypoechoic lesion in the left testis was diagnosed as a case of neoplasm but finally that was proved to be a case of focal TB orchitis by histopathology. Another patient had isoechoic diffuse Leydig cell tumor which could not be diagnosed by USG & Color flow imaging and that was finally diagnosed by histopathology.

In the present study 12.5% patient with epididymitis and 40% patient with epididymo-orchitis had normal findings with gray scale imaging where color flow imaging revealed hyperemia. In a study conducted by Horstman in 1997, 20% of epididymitis and 40% of orchitis had normal findings in gray scale imaging and hyperemia seen with Color Doppler sonagraphy was the only evidence of inflammation. These findings nearly correspond with the present study. An intratesticular mass is highly suspicious for an underlying testis neoplasm. High resolution US with color flow imaging is highly sensitive to detect intratesticular focal lesion. All the tumors studied appeared as hypoechoic than normal testicular tissue with focal hyperechogenicity or cystic areas. Color flow imaging revealed hyprevascularity in 2 of the 3 cases of tumor. The only neoplasm that did not show hyper vascularity was a small teratoma

(10 mm in size). Horstman at el., (1991) showed in one study that tumors less than 1.6 cm in diameter are hypovascular and larger tumors more than 1.6 cm in size are hypovascular. This finding coincides with the present study. Standard teaching is that solid focal lesions within the testis are considered malignant until proven otherwise (Dewbury, 2000).

The most common epididymal mass found in this study was epididymal cyst. Three (75%) out of 4 epididymal space occupying lesions were diagnosed as epididymal cysts. They appeared as anechoic with septations, in some cases. This finding is consistent with the finding of Dewbure, 2000 who have also found

similar finding. One patient with cystic mass of head of epididymis was diagnosed as spermatocele and this was proved surgically. The only solid lesion of epididymis was a case of adenomatoid tumor which showed homogenous lesion with well-defined margin and low vascularity on Doppler imaging. Dewbury (2000) reported that the most common solid mass of epididymis was adenomatoid tumor and hypovascular on Color Doppler. This finding is consistent with the present study. Another common pathology observed in this study is varicoceles. Out of 11 patients of Varicoceles 10 (91%) patents had left sided involvement while one (9%) patient had bilateral Varicoceles. This finding is supported by the fact that venous drainage of left testis is frequently impeded due to anatomical reason (Gabella, 1995). The left side is affected in >90 % of cases (Dewbury, 2000). This finding is consistent with the present study. In one study Horstman (1997) showed that bilateral Varicoceles occur in approximately 15% of cases. Slightly small percentage (9%) of bilateral Varicoceles in the present study is probably due to small size.

Varicoceles can cause infertility. Fertility rate and semen analysis can improve with repair of small or large Varicoceles. Thus the detection of even non palpable Varicoceles is important in infertile man (Horstman, 1997). Varicocele can be reliably diagnosed by color flow imaging showing intrascrotal veins larger than 2mm in diameter. The flow augmentation is dramatic when the patient stands upright. The varicocele is the most common surgically correctable causes of male infertility and it is found in approximately 30% of infertile males. In this study the accuracy of varicocele on gray scale imaging was 90% where as, the accuracy of Color Doppler imaging was 100%. Color flow imaging is highly accurate and non invasive modality in diagnosing Varicoceles (Sigman & Howards 1998). This finding is consistent with the present study. Color flow imaging is particularly helpful for the evaluation of acute scrotum. Testicular torsion and inflammatory lesion of the epididymis and/or testis

usually present with severe pain where clinical examination is inconclusive very often. Both the conditions are associated with high leucocytes count in the blood.

The main purpose of imaging in patients with acute scrotum is to distinguish inflammation from testicular torsion or other surgically correctable causes of scrotal pain, such as abscess or testicular tumor (Horstman et al., 1991). The clinical diagnosis of inflammation of the testis can be difficult as 10 % of neoplasm present acutely with features of inflammation or torsion (cook & Dewbury, 1999). Testicular torsion is a surgical emergency. After 6 hours of torsion the testis undergoes irreparable damage (Ragheb & Higgins, 2000). Clinical sign is not always reliable to distinguish between torsion and acute epididymo-orchitis. Color flow Doppler ultrasound can help in the differentiation of torsion from epididymo-orchitis (Howellet at el., 2000). Before the invention of the color flow imaging scintigraphy was the only modality to detect testicular blood flow. Both scintigraphy and color flow imaging have almost similar sensitivity and accuracy. But color flow imaging has extra advantages over scintigraphy in that it provides morphologic status of the testis along with its vascularity and it is less time consuming with no radiation hazards (Shidhu, 1999).

In this study there is 100 % sensitivity & % 100% specificity of Color Doppler sonography in the diagnosis of testicular torsion. In one study Patriquin at el., 1993 found 89 % sensitivity

& 100 % specificity of Color Doppler sonography in the diagnosis of testicular torsion. This finding is nearly consistent with the present study. The small discrepancy is due to small number of the sample size.

The present study showed that in the diagnosis of different intrascrotal diseases with color flow imaging have played a significant role with the accuracy 96.1%, sensitivity 97.8 %, specificity 80 %, positive predictive value 97.8 % and negative predictive value 80%, whereas the gray scale image had accuracy 80.7 %, sensitivity 84.4 %, specificity 57.1 %, positive predictive value 92.6 % and negative predictive value 36.3 %. Predictive accuracy, sensitivity & negative predictive value of Color Doppler in diagnosing scrotal disease was found to be significantly greater than that of gray scale diagnosis.

Conclusion & Recommendation

This study showed that Duplex Color Doppler sonography is quite sensitive, accurate and non-invasive modality in the diagnosis of various intrascrotal pathology. It can be concluded that color flow imaging to be used in the diagnosis of intrascrotal diseases. As the modality is radiation free it can also be used for repeated examination during follow up of patients. So, there is greater value of Color Doppler ultrasound in diagnosis of various intrascrotal diseases, it should be recommended that Color Doppler Ultrasound machine should provide all tertiary level hospital of Bangladesh for delivering greater health services.

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