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A CLINICAL STUDY OF SONOGRAPHY AND COLOUR DOPPLER IN CORRELATION WITH ITS HISTOPATHOLOGY OF PEDIATRIC NON NEOPLASTIC SCROTAL MASSES

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Abstract

Background: Testicular trauma and obstructed hernia can be differentiated by taking history from patient. Physical examination adds only a little information. Color Doppler ultrasound (US) is the modality of choice to differentiate testicular torsion from inflammatory conditions and can thus help in avoiding unnecessary surgical explorations. Color Doppler US alone has a limited role in the evaluation of testicular tumours. Gray-scaleultrasonography in combination with color Doppler imaging is a well-accepted technique for assessing scrotal lesions andtesticular perfusion.
Aims and Objectives: To Evaluate the study of Sonography and Colour Doppler in correlation with its histopathology and pediatric non neoplastic scrotal masses and also to compare non-neoplastic and neoplastic scrotal masses by characterization on B-modescan and Colour Doppler ultrasonography.
Material and Methods: The present study was carried out in 100 patients with clinically suggestive scrotal lesions. All cases were subjected to real time sonography examination. Main stress was laid to determine of organ of scrotal lesion to evaluate its nature size and echo texture and to see the results on management of serial Ultrasonography.
Results: Of 56 cases of non-inflammatory scrotal swellings, 5 cases wereneoplastic lesions, remaining 51 cases were non-neoplastic swellings. The 5 cases of neoplastic swellings were three cases of testicular neoplasm, two case of spermatic cord neoplasm which was histopathologically confirmed.
Conclusion: When color Doppler sonography is supplemented with High frequency gray scale US, the sensitivity of diagnosing acute scrotal pathology will be increased.

Keywords: Color Doppler in acute scrotum,ultrasonography in acute scrotum, Color Doppler sonography, neoplasm, non-neoplastic lesions

Introduction

Causes of acute scrotal pain and swelling in children include torsion of the testis,torsion of the appendix testis, epididymitis, orchitis, epididymoorchitis, tumor andtrauma. It is not always possible clinically to distinguish testicular torsion from thenonsurgical causes of scrotal pain and testicular perfusion must be assessed. Inadults with acute scrotal pain and equivocal clinical findings, recent studies havesuggested that color Doppler sonography can serve as the initial imaging techniquefor evaluating testicular perfusion. Testicular trauma and obstructed hernia can be differentiated by taking history from patient. Physical examination adds only a little information. Color Doppler ultrasound (US) is the modality of choice to differentiate testicular torsion from inflammatory conditions and can thus help in avoiding unnecessary surgical explorations.The scrotum being superficial structure, ultrasound isroutinely used for the investigation of patients presentingwith scrotal symptoms. Color Doppler US alone has a limited role in the evaluation of testicular tumours[1]. Grayscale ultrasonography (US) in combination with colorDoppler imaging is a well-accepted technique for assessing scrotal lesions and testicular perfusion [2-5]. Findings at color Doppler US scanning depend on the size of the lesion. Tumours, which are of size more than 1.6cms diameter, show hypervascularity. The cell type of the tumour has no correlation with the visible vascularity at color Doppler US scanning. However, hypervascularity

of these neoplastic lesions cannot be differentiated fromthat of inflammatory lesions. The clinical manifestations in many scrotal processes include pain, swelling, redness, and a palpable mass. Non-inflammatory, Non-Neoplastic swellings of scrotum includes hydrocele, lymphocele, spermatocele, epididymal cyst, testicular cyst, varicocele and complete hernia. US permits differentiation between lesions that require urgent surgery in cases such as testicular torsion, malignant tumors and traumatic ruptureand those that can be managed conservatively such as, epididymo-orchitis, torsion of the testicular appendages [6,7]. The present study aimed to comparenon-neoplastic and neoplasticscrotal masses by characterization on B-mode scan and Colour Dopplerultrasonography.

Material and methods

The present study was carried out in 100 patients with clinically suggestive scrotal lesions. Cases were selected in a random manner from the vast pool of the patients either attending department or being admitted in department of surgery. The study was conducted in theDepartment of Radio diagnosis at DrS.N. Medical College Jodhpur,Rajasthan. Afterdetailed clinical examination all patients with scrotal lesion were subjected to real time sonography examination. Main stress was laid to determine of organ of scrotal lesion to evaluate its nature size and echotexture and to see the results on management of serial Ultrasonography.

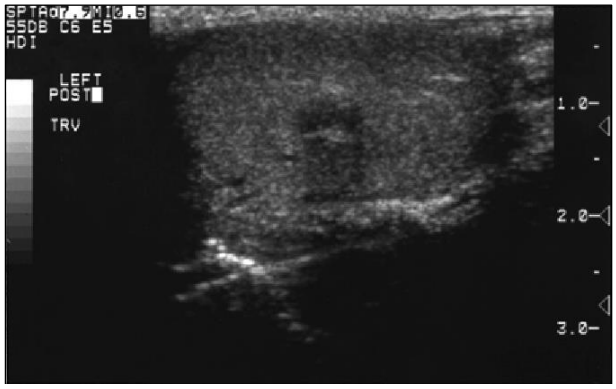

Fig 1: USG Image showingheterogenous area noted in epididymis and Testis

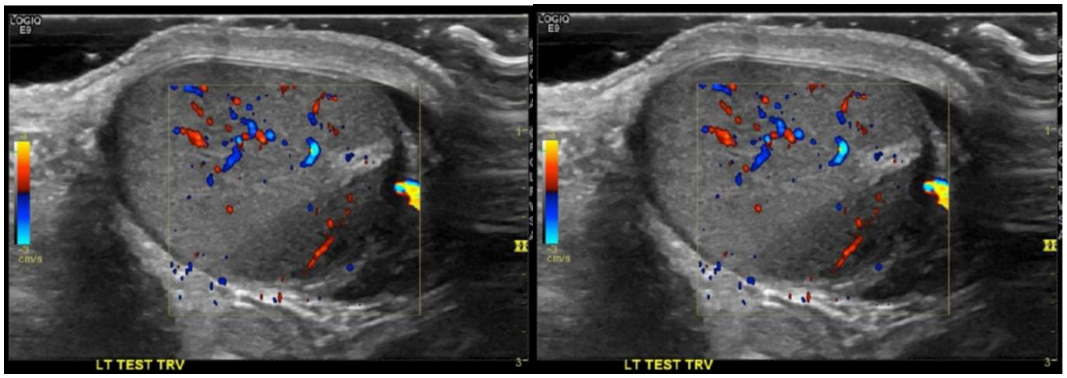

Fig 2: USG image showing diffuse hypoechoic area noted in left testis

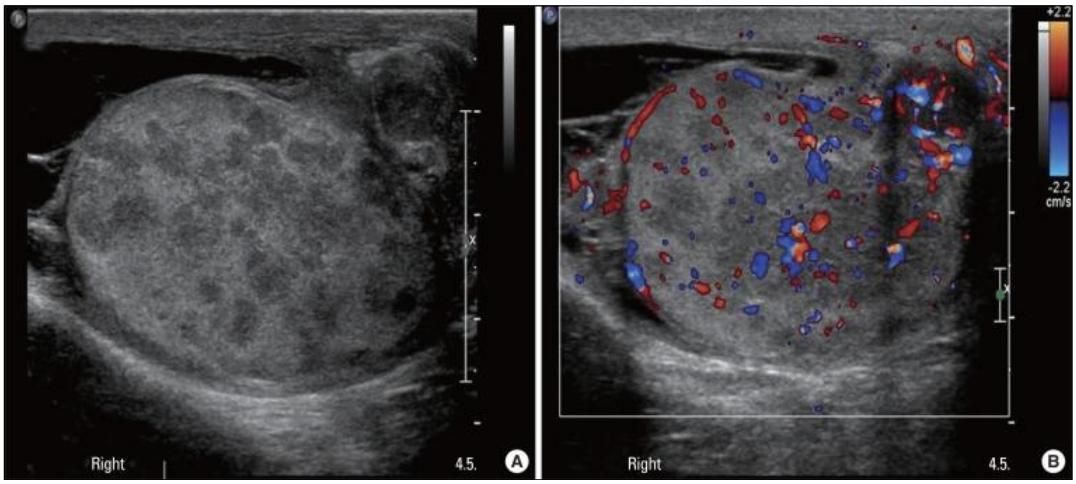

Fig 3: USG Image showing multiple focal hypoechoic area noted in right testis

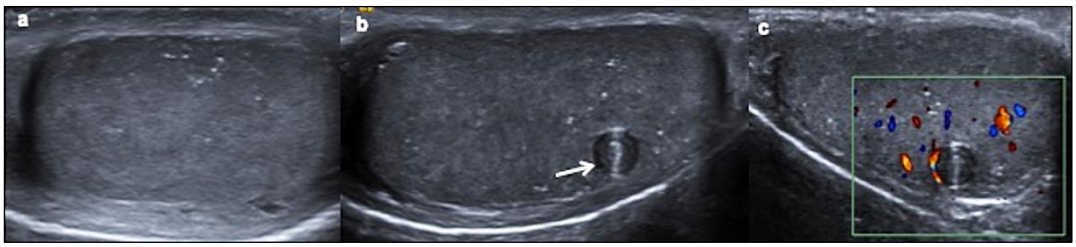

Fig 4: CDUS image showing carcinoma of testis

Results

Out of the 100 cases 56 were found to have non inflammatory scrotal swellings. Of 56 cases of non-inflammatory scrotal swellings, 5 cases were neoplastic lesions, remaining 51 cases were non-neoplastic swellings. The 5 cases of neoplastic swellings were three cases of testicular neoplasm, two case of spermatic cord neoplasma which was histopathologically confirmed.Three cases of testicular neoplasm showed well defined, homogenous hypoechoic echo-texture with increase vascularties, other two cases of spermatic cord neoplasmshowed ill-defined hypoechoic areas. Both cases showed increased vascularity on Color Doppler study. One of the case of seminoma had distant metastases in lungs. Five cases were diagnosed as testicular malignancy on Colour Doppler Ultrasonography out of which, only 4cases were subsequently found to have malignancy. 4 case were turned out to be orchitis, one of which was wrongly diagnosed as malignancy. Out of 5 cases of malignancy, three cases were diagnosed as testicular mass and 2 cases were diagnosed as spermatic

cord neoplasmwith sensitivity 80% and specificity 75%. Overall sensitivity and specificity of Colour Doppler Ultrasonography in diagnosis of scrotal diseases was 98.9% and 80% respectively. Among non-neoplastic scrotal swellings, hydrocele is the commonest pathology noted 39

cases (39%). The incidence of non-neoplastic scrotal swellings is very much high comparedto neoplastic swellings. Incidence of extra testicular swellings is more, compared to intra testicular swellings. High frequency was 100% sensitive in differentiating, As in Table 1 and Figure 5.

Table 1: Sensitivity and specificity of CDUS in diagnosis ofDetected

S. No.	Pathology	No. of cases	%
1.	Hydrocele	39	76.47%
2.	Epididymal Cyst	9	17.64%
3.	AVM of Scrotum	1	1.96%
4.	Varicocele	2	3.92%
	Total	51	100%

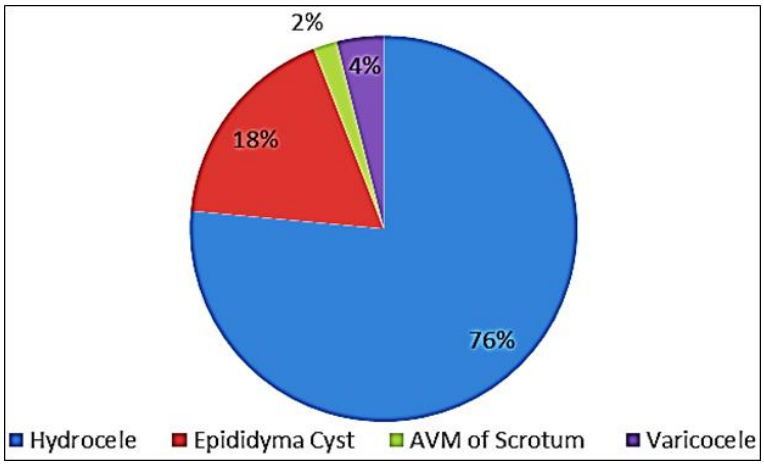

Fig 5: Sensitivity and specificity of CDUS in diagnosis of detected

Four cases were true positive, one case was false positive,whereas, 3 cases were true negative and one case wasfalse negative. Thus, sensitivity of CDUS in detectingneoplastic lesions was 80% and specificity was 75%, As in Table 2 and Figure 6.

Table 2: Sensitivity and specificity of CDUS in diagnosis oftesticular masses

CDUS Diagnosis	Histopathological diagnosis		Total
	Positive	Negative	
Tumor	4	1	5
Non tumor	1	3	4
Total	5	4	9

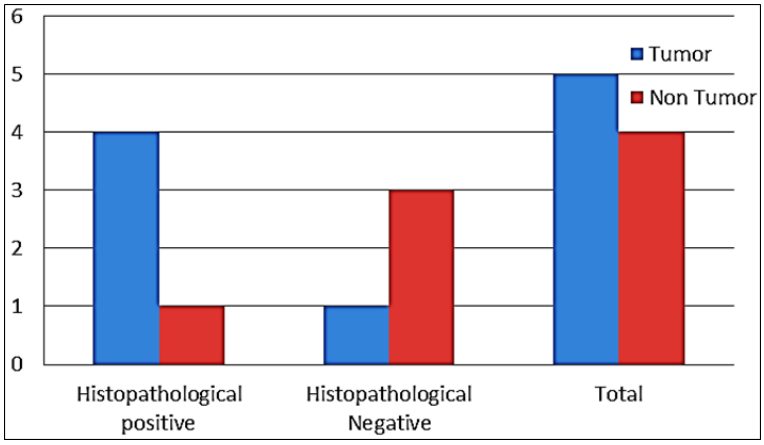

Fig 6: Sensitivity and specificity of CDUS in diagnosis of testicular masses

Discussion

Epididymo-orchitis is the most common cause of acute scrotal pain in postpubertal men. The age of peak incidence is 40-50 years. In our study out Of 56 cases of non-inflammatory scrotal swellings, 5 cases were neoplastic lesions, remaining 51 cases were non-neoplastic swellings. The 5 cases of neoplastic swellings were three cases of testicular neoplasm, two case of spermatic cord neoplasm which was histopathologically confirmed. Three cases of testicular neoplasm showed well defined, homogenous hypoechoicecho-texture with increase vascularity, other two case of spermatic cord neoplasm showed ill-defined hypoechoic areas. Both cases showed increased vascularity on color Doppler study. One of the case of seminoma had distant metastases in lungs. These findings are in similarity to previous studies by Grantham *et al*.,[8] and Schwerk*et al*.[9]of the remaining 51 cases, pathology was seen in both hemi scrotum in 25 cases, unilateral in 26 cases. Of total 76 hemiscrotum, more than one pathology noted in 6 cases. So totally 82 pathologies were detected. In the studies by Willsche*et al.*, [10]Arger*et al.*, [11] and Richie *et al*.[12] including the present study, the incidence of non-neoplastic scrotal swellings is very much high compared to neoplastic swellings. In addition, incidence of extra testicular swellings is more compared to intra testicular swellings. High frequency was 100% sensitive in differentiating intra testicular swellings from extra testicular swellings. Among non-neoplastic scrotal swellings, hydrocele was the commonest pathology noted39 cases (39%). Out of 39 cases, 36 cases were primary vaginal hydrocele (36%), 3 cases were encysted hydrocele of cord (3%). Out of 39 cases, hydrocele was noted unilaterally in 14 cases, bilateral in 25 cases. These findings are in similarity to previous studies of Willsche*et al*.,[10] and Arger*et al*.[11]all cases of hydroceles appeared as collection of clear fluid between two layers of tunica. In encysted hydrocele of cord, the collection of clear fluid along spermatic cord appeared as anechoic lesions adjacent to spermatic cord that moves with gentle traction to cord. In present study, we noted two cases ofInguinoscrotal hernia in association with hydrocele. On High-frequency US scan, there was a hernial sac in the inguinal region, extending up to upper pole of testis with bowel loops within the sac. Ipsilateral testis and epididymis were normal. Next most common lesion wasvaricocele, noted in 2 cases, Out of 51cases (3%). Out of 2 cases, unilateral varicocele noted in 1 cases (50%), bilateral varicocele noted in 1 cases (50%). A varicocele was considered to be present by high-frequency grey scale US, if 2 or more veins could be identified, with atleast 1 vein having diameter of 3 mm or greater. A varicocele was considered to be present by color Doppler US, if retrograde flow was identified within the pampiniform plexus spontaneously and/or during Valsalva maneuver. Out of 2 cases of Ultrasonographycally confirmed cases of varicocele, one case showed pathological abnormalities in semen analysisin the form of azoospermia. These results indicate that colourdopper is having high sensitivity 100%.These finding were compared to previous similar study by Meacham RB *et al*.[13], Bowel strangulation is more common in indirect than in direct inguinal hernia. An akinetic dilated loop of bowel observed at US in the hernial sac is reported to have high sensitivity and specificity for the recognition of bowel strangulation [14,15]. Hyperemia of scrotal soft tissue and bowel wall are suggestive of strangulation.

Conclusion

Ultrasonography and colour Doppler is non-invasive first modality of choice for evaluation of various scrotal pathologies. It is useful for differentiating testicular swelling from and extra testicular swelling and solid from cystic testicular masses. High-resolution ultrasonography enables in clear demonstration of morphological alterations associated with acute scrotal inflammatory diseases, but has the limitations, because it does not enable assessment ofperfusion of scrotum and its contents. When color Doppler sonography is supplemented

with High frequency gray scale US, the sensitivity of diagnosing acute scrotal pathology will be increased.

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Conflict of interest: None Declared.

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