EVALUATION OF SCROTAL PATHOLOGY BY HIGH RESOLUTION ULTRASOUND AND COLOUR DOPPLER

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ABSTRACT

BACKGROUND
Clinical diagnosis of a scrotal swelling is not straightforward. It is often difficult to decide whether a palpable scrotal mass is intratesticular or extratesticular. Moreover, the clinical examination may overlook significant pathology and physical signs elicited may be improperly interpreted. The sonogram with high frequency linear transducer and colour Doppler is invaluable in evaluating scrotum and its contents. Sonography is simple to perform, rapid, non-invasive, relatively inexpensive, easily reproducible, widely available and does not expose the gonads to radiation.

Aim and Objective- To evaluate various scrotal pathologies using ultrasonography and to describe the role of high resolution ultrasound and colour Doppler in their diagnosis.

MATERIALS AND METHODS
Fifty patients were descriptive studied over a period of 8 months from July ’16 – Feb ’17 using high-frequency real time gray scale ultrasonography and colour Doppler in our institution.

RESULTS
Out of total 50 cases non-inflammatory pathologies were seen in 26 cases (52%), whereas inflammatory pathologies in 20 cases (40%). Among the inflammatory scrotal diseases, incidences of various pathologies were acute epididymo-orchitis- 8 cases (40% of inflammatory category), chronic epididymo-orchitis- 4 cases (20%), acute and chronic epididymitis- 2 (10%) cases each. Among non-inflammatory pathologies, incidences of various pathologies were: hydrocele- in 23 cases (46% of total); epididymal cyst in 3 cases; varicocele, torsion, tumour, inguinal hernia and traumatic epididymitis- 1 case each (3.84%).

CONCLUSION
High frequency ultrasonography is highly sensitive in differentiating solid from cystic scrotal masses. Colour Doppler sonography is highly sensitive in diagnosing acute scrotal pathology, differentiating testicular torsion from acute inflammatory diseases and in demonstrating sub-clinical cases of varicocele.

KEYWORDS


BACKGROUND
Scrotum is a cutaneous pouch which contains the testes, both epididymis and the lower part of both spermatic cords. It is formed by the fusion of two scrotal sacs separated by an inner septum that corresponds a midline ridge or raphe, which is continued forward to the under-surface of the penis and backwards along midline of the perineum to the anus.

Since the ancient times, scrotal pathologies have been cause of apprehension and anxiety on part of both the patient and clinician.[1] During clinical examination of the scrotal pathology, physical evaluation by itself may be inadequate due to tenderness, swelling or gross distortion of scrotal contents. In addition, the normal examination may overlook significant pathology and physical signs elicited may be improperly interpreted.[2] Many of the scrotal disease processes like testicular torsion and epididymoorchitis produce common symptom of pain at presentation, and differentiation of these conditions and disorders is important for determining the appropriate treatment.

Ultrasound with colour Doppler, magnetic resonance imaging, testicular angiography and radioisotope studies are now first line of investigations used for various scrotal pathologies.[3] Computed tomography exposes testicles to the radiation. MRI gives the detailed anatomic imaging and provides a certain degree of tissue specificity. However, MRI is not easily available and its high cost resulting in its limitation for routine examination.

High-resolution ultrasonography enables in clear demonstration of morphological alterations associated with scrotal inflammatory diseases, but has the limitations because it does not enable assessment of perfusion of scrotum and its contents. When colour Doppler sonography is supplemented with high frequency grey scale US, the sensitivity of diagnosing acute scrotal pathology is increased. In addition, colour Doppler sonography accurately differentiates between testicular ischaemia and torsion from acute inflammatory diseases in acute painful scrotal conditions.
MATERIALS AND METHODS
This descriptive study was conducted at the Department of Radiodiagnosis at Agartala Government Medical College and G. B. Pant Hospital, Agartala, Tripura. We studied fifty (50) patients over a period of 8 months from July '16 - Feb ‘17, to evaluate various scrotal pathologies using ultrasonography and describe the role of high resolution ultrasound and colour Doppler in their diagnosis. All patients who had clinical manifestation of any scrotal pathology were included in the study. Haemodynamically unstable patients and those patients who did not give the consent for study were excluded.

Prior to subjecting the patients for ultrasound examination, patient details, detail clinical history was obtained along with thorough physical examination.

The study was performed using 7.5 to 10 MHz linear transducer. Siemens Acuson X300 ultrasound and Doppler machine was used. The colour Doppler sonography was routinely performed in all patients.

Abdominal ultrasonography was performed in conjunction with the scrotal scans using 3.5 to 5.0 MHz convex array transducer whenever required, like in patients of tubercular epididymoorchitis, in patients of testicular malignancy, in patients of varicocele and in undescended testes.

Scanning Technique
Scanning was routinely performed in supine position, after elevating scrotum using a towel draped over thighs and the penis was placed on the patient’s abdomen and covered with a towel. The hemi scrotum were examined in transverse, sagittal and oblique planes.

Transverse side by side images were taken to compare the echogenicity and vascularity of both testes. Additional positions and manoeuvres like standing, Valsalva manoeuvres were used whenever required (as in case of a varicocele). Spermatic cord and inguinal regions were scanned in special circumstances like encysted hydrocele of cord, in varicocele to know the complete extension and in epididymitis to look for funicularis and in undescended testis cases.

Size, shape, echogenicity, echotexture, vascularity (on colour and power Doppler mode) of testes and epididymis was examined routinely in all cases. In a case of focal scrotal lesion in addition to above-mentioned parameters, location (intratesticular/extratesticular), laterality (unilateral/bilateral), margin and presence of any calcification were noted. Thickness and vascularity of the cord and also the thickness, echotexture and vascularity of scrotal skin were routinely examined. Any collection in scrotal sac and its nature were evaluated.

Statistical Analysis
Data has been expressed in number and in frequency in terms of percentage wherever felt necessary. Statistical Package for the Social Sciences (SPSS) software programme (Version 15) was used for data analysis.

RESULTS
Fifty cases of scrotal swellings were studied with real time high frequency ultrasonography and colour Doppler sonography.

Most of the subjects were in the age group of 21 to 30 years, which constituted 28% (14 nos.) of total cases [Refer to Table No. 1].

Commonest clinical presentation was painless scrotal swelling, which alone constituted 50% (25 nos.) of all pathologies. This was followed by painful scrotal swelling constituting approximately 34% (17 nos.) [Refer to Table No. 2].

Non-inflammatory pathologies were most common seen in 26 cases (52%), whereas inflammatory pathologies were seen in 20 cases (40%) and no pathology was seen in 4 cases (8%) [Refer to Table No. 3].

Among the inflammatory scrotal diseases, acute epididymo-orchitis was the leading cause, were seen in 8 cases (40% of inflammatory category) [Figure 1] followed by chronic epididymo-orchitis which were seen in 4 cases (20%). Acute epididymitis [Figure 2] and chronic epididymitis were seen in 2 (10%) cases each.

Funiculitis and scrotal wall cellulitis were seen in 3 (15%) cases in each category. One case of testicular abscess (5%) and one case (5%) of Fournier’s gangrene [Figure 3] was seen [Refer to Table No. 4].

Focal testicular infarctions [Figure 4] were noted in two of acute epididymoorchitis cases. Testicular atrophy was seen in one chronic epididymoorchitis case.

Hydrocele, the commonest type of non-inflammatory scrotal pathology was seen in 23 cases (46% of total case), though total 39 cases of hydrocele were seen; 16 no. of hydrocele cases were inflammatory. Varicocele was seen in 1 case (3.84%, out of 26 non-inflammatory cases) [Figure 5]. Torsion [Figure 6], tumour [Figure 7], inguinal hernia [Figure 8] and traumatic epididymitis were also seen in one case each (3.84%). Epididymal cysts (non-inflammatory) were seen in three cases (11.53%). Intratesticular cyst and cyst of tunica albuginea were also noted in one case (3.84%) in each category [Refer to Table No. 5].

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No. of Cases</th>
<th>Percent</th>
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<tr>
<td>11-20</td>
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<td>31-40</td>
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<td>41-50</td>
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**Table 1. Age Distribution of Patients of this Study**

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<tr>
<th>Presenting Complaints</th>
<th>No. of Cases</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Painful Swelling</td>
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<tr>
<td>Painful Swelling with History of Trauma</td>
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<tr>
<td>Painless Swelling</td>
<td>25</td>
<td>50.0</td>
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<tr>
<td>Pain without Swelling</td>
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<td>10.0</td>
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<tr>
<td>Total</td>
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**Table 2. Presenting Complaints**
### Table 3. Types of Pathology detected in this Study

<table>
<thead>
<tr>
<th>Type of Pathology</th>
<th>No. of Cases</th>
<th>Percent</th>
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<tr>
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<tr>
<td>Non-Inflammatory</td>
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<td>52.0</td>
</tr>
<tr>
<td>No. Pathology Detected</td>
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<td><strong>Total</strong></td>
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### Table 4. Inflammatory Scrotal Pathology

<table>
<thead>
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<th>Pathology</th>
<th>No. of Cases</th>
<th>Comment</th>
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<td></td>
</tr>
<tr>
<td>Acute</td>
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<td></td>
<td>5</td>
</tr>
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<td>Chronic</td>
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<td></td>
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<tr>
<td>LT</td>
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<tr>
<td>BIL</td>
<td>1</td>
<td></td>
<td>1.5</td>
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<tr>
<td><strong>Total</strong></td>
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<td></td>
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Footnotes: * RT - Right, † LT - Left, ‡ BIL - Bilateral

### Table 5. Non-Inflammatory Cases

<table>
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<th>Pathology</th>
<th>No. of Cases</th>
<th>Comment</th>
<th>%</th>
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<tr>
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<tr>
<td>LT</td>
<td>1</td>
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<td>5</td>
</tr>
<tr>
<td>Chronic</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>2</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td></td>
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### Table 6. Gray Scale and Colour Doppler Pattern of Epididymoorchitis and Epididymitis

<table>
<thead>
<tr>
<th>Study</th>
<th>Epididymoorchitis (%)</th>
<th>Epididymitis (%)</th>
<th>Funiculitis (%)</th>
<th>Scrotal wall cellulitis (%)</th>
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<tr>
<td></td>
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<td>Chronic</td>
<td>Acute</td>
<td>Chronic</td>
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<td>10</td>
<td>10</td>
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<td>Melkaandi et al</td>
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<td>8.3</td>
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<td>Mathukumili et al</td>
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<td>37.5</td>
<td>18.5</td>
<td>6.2</td>
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<td>Narra et al</td>
<td>36</td>
<td>7.14</td>
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<td>7.14</td>
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<tr>
<td>Horstman et al</td>
<td>42</td>
<td>-</td>
<td>56</td>
<td>-</td>
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<td>Lerner et al</td>
<td>40</td>
<td>-</td>
<td>60</td>
<td>-</td>
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<td>Farriol et al</td>
<td>40</td>
<td>44</td>
<td>8</td>
<td>-</td>
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<tr>
<td>Patil &amp; Shetty</td>
<td>30</td>
<td>20</td>
<td>10</td>
<td>5</td>
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### Table 7. Comparisons of Incidence of Epididymitis, Epididymoorchitis, Funiculitis and Scrotal Wall Cellulitis of this Study to other Study
Some Relevant Images of the Study

Figure 1. Acute Epididymoorchitis: Colour Doppler Dual Image shows Increased Vascularity in Left Testis. Minimal collection seen bilaterally. The Left Head of Epididymis was Bulky, Heterogeneous and Hypervascular (Not Shown)

Figure 2. Acute Epididymitis (Right): The Right Epididymis is Bulky and Hyperaemic (Left Lower Image). The Left Epididymis and both Testes appear Normal. Minimal Free Fluid present Bilaterally (Left > Right)

Figure 3. Fournier’s Gangrene: Longitudinal Image (Gray Scale and Colour Doppler) shows Thickening and Loss of Normal Hyperechogenicity associated with Subcutaneous Gas in the Left Scrotal Wall

Figure 4. Acute Epididymoorchitis with Focal Testicular Infarction: Dual Image USG shows a Small Hypoechoic Area in Left Testis with Coarse Echotexture in Gray Scale (Right). In the Left Image Colour Doppler USG shows Increased Vascularity in Left Epididymis and Adjacent Part of Testis except in the Focal Hypoechoic Area which is Avascular

Figure 5. Varicocele. Colour Doppler Image shows Multiple Anechoic Structures creating a Tortuous, Multicystic Collection located Adjacent to the Upper Pole of the Testis and Head of the Epididymis. These are distended following Valsalva Manoeuvre and Decompressed after release of Valsalva

Figure 6. Torsion of Testis - Dual (Longitudinal and Transverse) Image of Left Testis shows Avascular Heterogeneous Testis. Minimal Hydrocele is Noted
cases (28%), non-inflammatory diseases in 28 cases (65%).
In the study by Melkundi et al, the bulk of the pathology detected by high-resolution US were from two groups: Inflammatory pathologies (28 cases- 56%) and non-inflammatory swellings (22 cases- 44%).
Thus, it is obvious that the types of pathology (Inflammatory and Non-Inflammatory) detected in this study correlates with findings documented in previous studies.

Inflammatory Pathology
In our study, out of 50 cases 20 cases were detected to have inflammatory scrotal pathology on high frequency US and colour Doppler.

Epididymoorchitis and Epididymitis
Among the inflammatory pathologies acute epididymoorchitis was the commonest, noted in 8 cases (40%). Horstman et al in their study of 45 patients found acute epididymo-orchitis in 19 cases (42%). Lerner et al in their limited series of 5 cases of acute inflammatory diseases of scrotum, acute epididymo-orchitis in 2 patients (40%). Narra et al in their study of 60 cases detected 14 cases of inflammatory pathology, out of which acute epididymoorchitis was the commonest seen in 5 cases (36%).

Next most frequent inflammatory pathology detected in our study was chronic epididymo-orchitis noted in 4 cases (20%). In the study of 100 cases by Patil V and Shetty SMC, chronic epididymo-orchitis was detected in 8 patients (20%).

Acute epididymitis was seen in this study in 2 cases (10%). In their study by Patil V and Shetty SMC, acute epididymitis was seen in 4 patients (10%).

We detected chronic epididymitis in 2 cases (10%). Melkundi et al detected chronic epididymitis in 3 cases (8%).

From the above discussion, it is clear that, frequency of acute epididymoochitis, chronic epididymoorchitis and acute epididymitis are consistent and that of chronic epididymitis is comparable with the previous studies.

Funiculitis
Total three cases (15%) of funiculitis were seen. Two cases were associated with epididymoorchitis and one case with epididymitis. There were thickened spermatic cords with increased vascularity.

Scrotal Wall Cellulitis
In the cases of scrotal wall cellulitis, ultrasonographic finding was thickening and loss of uniform hypechochogenicity of the scrotal wall with normal testis and epididymis. Among three such cases (15%), two were isolated and one was with left acute epididymitis.

The incidence of funiculitis and scrotal wall cellulitis in this study were 15% (3 cases) in both. Various literatures reveal that the incidence of funiculitis and scrotal wall cellulitis ranges from 7.14% to 8% and 3.1% to 7.5% respectively. These slight higher levels in our study is probably because of very careful clinicoradiological evaluation of the scrotum.

Out of 8 cases of acute epididymoorchitis, we observed diffuse hypechochogenicity in 7 cases, coarse echotexure in 6
cases and diffuse increase in vascularity in all 8 cases. Size of
the involved testis was bulky in 5 and that of epididymis in
all. Out of 4 cases of chronic epididymoorchitis, we observed
slightly increased echogenicity in 3 cases, heterogeneous
echotexture in 1 case and coarse echotexture in 3 cases and
increase in vascularity in 2 cases. Size of the involved testis
and epididymis was normal in 3 cases each. Out of 3 cases of
acute epididymitis, we observed diffuse hypoechoogenicity in
2 cases and increase in vascularity in all. Size of epididymis
was bulky in 2 cases. Both the cases of chronic epididymitis
showed thickened, irregular epididymis with heterogeneous
echotexture and hypervascularity. In both cases, testes were
normal in size [Refer to Table No. 6].

These sonographic findings are nearly similar to the
finding of Mathulaumili C and Bahaddur A.[10]

**Tubercular Epididymoorchitis**
In this study, we have found a case where High Resolution
Ultrasonography (HRUS) revealed diffusely enlarged
heterogeneously hypoechoic epididymis and coarse
echotexture of testis associated with multiple septated hydrocele
and thickened scrotal skin in right hemiscrotum, which
was diagnosed as a case of tubercular epididymoorchitis. FNAC
was suggested. Table no. 7 shows comparison of incidence of
epididymoorchitis, epididymitis, funiculitis and scrotal wall
cellulitis of various literatures.

**Pyocele**
In this study two cases (10%) of pyocele were seen where
there were complex, heterogeneous fluid collection with
septa in the ipsilateral scrotal sac. Both the cases were
associated with acute epididymitis. This is comparable to
finding by Melkundi et al, who observed pyocele in 4 cases
(14.28%) cases.[5]

**Fournier’s Gangrene**
On HRUS, thickening and fluid collection and loss of normal
hyperechogenicity of scrotal wall associated with
subcutaneous gas in the scrotal wall was seen in a case, which
was diagnosed as Fournier’s gangrene. In the study by Patil V
and Shetty SMC, Fournier’s gangrene was seen in 1 case
(2.5%).[11] Mathukumili C and Bahaddur A- detected it in 6.2% of cases[13] and Narra et al[10] found it in 1 case (7%). We
observed Fournier’s gangrene in 1 case (5%), which is quite
consistent to finding of previous studies.

**Testicular Abscess**
In this study, 1 case (5%) of testicular abscess was detected.
On HRUS, it showed an enlarged right testicle with disrupted
testicular architecture, containing a predominantly fluid-
filled mobile low level echogenic avascular collection.
Testicular abscess were observed in 3 cases (7.5 %) by Patil V
and Shetty SMC.[11] This discrepancy was likely due to early
diagnosis and efficient management of predisposing
condition like epididymoorchitis in this state.

**Non-Inflammatory Pathologies**

**Hydrocele**
Total thirty nine (78%) cases of hydrocele were seen in this
study. Sonographically, there were anechoic collections
surrounding the anterolateral aspects of the testis. Low-level
to medium-level echoes were visualised in many cases
moving freely within hydrocele.

Sixteen (41.02% out of 39 cases) were inflammatory and
twenty-three cases (58.97%, out of 39 cases) were non-
inflammatory.

Out of thirty-nine cases, 12 cases (30.76%) were primary
containing large amount of fluid. These were painless and
were otherwise asymptomatic, other than size and weight,
causing some inconvenience. 26 cases (66.66%) were
secondary type. These were lax and of moderate size and
mostly associated with epididymo-orchitis. 15 cases
(38.46%) were unilateral and 24 cases (61.53%) were
bilateral.

Melkundi et al also noted that hydrocele was the
commonest non-inflammatory pathology. They found 22 non-
inflammatory cases, among which hydrocele were noted in
14 cases (28%).[5] In a prospective study of 100 cases by
Rathi et al, out of total 22 cases of hydrocele, primary
hydrocele was seen in 7 seven cases (31.81%) and secondary
hydrocele in 15 cases (68.18%).[11] In the present study,
primary and secondary hydrocele was seen in 30.76% and
66.66% cases respectively, which are very close to study by

In this study in one case (2.56% out of total hydrocele cases), USG of inguinal region showed elongated fluid
collection above the level of the testis and epididymis
suggestive of hydrocele of cord, which is comparable to the
study by Patil V and Shetty SMC, where encysted hydrocele
was detected in 1 case (5%).[11]

High incidence of hydrocele was noted in this study
(78%). Various similar studies show that the incidence of
hydrocele is 19% to 28%.[1,15,11]

**Epididymal Cysts**
Epididymal cysts were small unilocular simple cystic lesions
and involving the head of epididymis. Total 7 cases (14%)
had epididymal cyst which is comparable to the finding of
Melkundi et al, where they detected 5 cases (10%) of
epididymal cysts.[5]

In our study, out of 7 cases of epididymal cyst, 4 cases
were associated with inflammatory scrotal disease and 3
cases were non-inflammatory. Single cyst was seen in 4 cases
and multiple cysts were noted in 3 cases. Among these 3
cases of multiple epididymal cysts, unilateral multiloculated
cysts were in 2 cases (28.57%). These findings are close to
the finding of Melkundi et al, where they detected 1 case of
unilateral multiloculated (20%) epididymal cyst out of total 5
cases.[5]

**Traumatic Epididymitis**
One case (3.8% of non-inflammatory category) of traumatic
epididymitis was seen in this study (among the three cases
with history of trauma), where the involved left epididymis
was enlarged, heterogeneous and hyperaemic. Similar
sonographic finding was noted by Gorden et al in their study
of 5 cases.[13] This was associated with low level echogenic
collection with septations in the ipsilateral scrotal sac
suggestive of haematocele. Gorden et al observed
haematocele in 2 cases (40%) out of 5 cases of traumatic
epididymitis.[13] Melkundi et al noted haematoma in all the 5
cases of testicular trauma (100%).[5] We observed
haematocele in 1 case out of 3 cases with history of trauma.
(33.33%). This discrepancy could be due to less number of traumatic cases included in our study.

**Varicocele**

In this series, one case (3.84%) of varicocele was detected. Clinically, the case presented with unilateral scrotal swelling with mild discomfort but was not diagnosed as a case of varicocele. On gray-scale USG there were multiple, serpentine, anechoic structures measuring up to 3.4 mm in diameter, creating a tortuous, multicystic collection located adjacent to the upper pole of the testes and head of the epididymis (left side). Colour Doppler USG reveals the typical venous flow pattern. These were distended following Valsalva manoeuvre and decompressed after release of Valsalva. These results indicate that HRUS with colour Doppler sonography is having high sensitivity in diagnosis of varicocele compared to physical examination. Literature shows that the incidence of varicocele ranges from 9 to 26%.[15,10,11] Compared to existing literature, the incidence of varicocele was found to be significantly less.

**Scrotal Hernia**

There was 1 case (3.84%) of scrotal hernia in this study. The hernia contained small bowel loops. On real-time examination, peristalsis was detected. This is almost similar to the finding by Patil V and Shetty SMC, where scrotal hernia was detected in 1 case (2%).[11]

**Torsion**

One case (3.84%) of torsion was seen in the present study where the left testis and epididymis was bulky and avascular with decreased echogenicity and coarse echotexture following minor degree of trauma in left hemiscrotum. Bilateral hydrocele was seen in the case (Left > Right).

Rathi et al.[11] noted torsion in 10 cases (10%) and Patil V and Shetty SMC[11] noted it in 5 cases (11%). Melkundi et al noted torsion in 5 cases (10%), where left testis was involved in 3 cases.[11] This discrepancy was due to large sample size in the former two studies and more number of traumatic cases in the third study of (Melkundi et al).

Gray scale sonography could not confidently diagnose the torsion. Prompt diagnosis is necessary because torsion requires immediate surgery to preserve the testis. The testicular salvage rate is 90% to 100% if surgery is performed within 5 to 6 hours of the onset of pain, 70% if surgery is performed within 6 to 12 hours and only 20% if surgery is delayed for more than 12 hours.[14] Here lies the significant role of colour Doppler, which promptly revealed absent vascularity in left testis and epididymis.

**Seminoma**

We detected one neoplastic case (3.84%) in a 35 years old male, who presented with painless diffuse left testicular swelling, where the whole left testis was replaced by ill-defined multifocal homogeneously hypoechoic mass. The ipsilateral epididymis was indistinct. There were multiple enlarged heterogeneous retroperitoneal lymph nodes. The case was sonographically diagnosed as multifocal seminoma. This is comparable to study by Narra et al who detected neoplastic lesions in 2 cases (4.34%).[10] Literature[15] reveals that seminoma occurs most commonly in fourth to fifth decade and presents with painless diffuse unilateral testicular enlargement as in our case.

**Intratesticular Cyst**

In the present study one case (3.84%) of intratesticular cyst was seen sonographically that appeared as well-defined, anechoic lesions with thin, smooth wall and posterior acoustic enhancement near the mediastinum testis. Existing literature[16] states that these cysts are discovered incidentally on sonography in 8% to 10% of the male population. The incidence of intratesticular cyst in this study is comparable to Narra et al.[10] who found 2 cases (4.34%) of intratesticular cyst. As in our case, Rathi et al reported that the cysts were located near the mediastinum testis.[16]

**Cysts of the Tunica Albuginea**

This study detected one case (3.84%) of cysts of the tunica albuginea. This presented as a well-defined small (approx. 11 mm in size) solitary unicystic lesion seen located within the tunica, surrounded by the testis. Though the mean age at presentation is 40 years,[17] our case aged 35 years.

The present study detected slightly higher incidence of funiculitis and scrotal wall cellulitis compared to previous studies. Incidence of hydrocele was significantly higher compared to previous literature. We detected hydrocele in 41.02% inflammatory condition and 58.97% in non-inflammatory condition. To our knowledge, no such separate categorisation of hydrocele into inflammatory and non-inflammatory type was done in any other study till date. Incidence of varicocele was found to be significantly lower, compared to previous literature.

**CONCLUSION**

The advantages of high frequency ultrasound and colour Doppler include non-invasiveness, lack of ionising radiation, simplicity, wide availability, cost effectiveness and repeatability.

High frequency ultrasonography is highly sensitive in differentiating solid from cystic scrotal masses and is clearly superior to clinical diagnosis.

It is invaluable in demonstrating normalcy of testes and epididymis in the presence of large hydrocele and also enables clear demonstration of the morphological alterations associated with scrotal diseases.

Colour Doppler sonography is highly sensitive in diagnosing acute scrotal pathology and accurately differentiates testicular ischaemia or torsion from acute inflammatory diseases. In combination with high frequency ultrasonography, colour Doppler is highly sensitive in demonstrating sub-clinical cases of varicocele.

Hence, the present study highly recommends the use of high-frequency ultrasonography and colour Doppler for the evaluation of scrotal pathologies.

**REFERENCES**


