

ORIGINAL RESEARCH

Usefulness of high resolution ultrasonography and color doppler in diagnosis and differentiating of scrotal diseases

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ABSTRACT

Background: Acute scrotum is defined as acute pain with or without scrotal swelling, may be accompanied by local signs or general symptoms. The present study was conducted to assess usefulness of high resolution ultrasonography and color doppler in diagnosis and differentiating of scrotal diseases.

Materials & Methods: 87 patients of scrotal diseases was included. A thorough examination was performed and symptoms and clinical diagnosis was made. All the patients underwent scrotal ultrasonography using 7.0- 12.0 MHZ high frequency linear array transducer coupled with colour doppler in Esaote My Lab 40 and Phillips affinti 70G equipment. The ultrasound findings were recorded.

Results: Age group 20-30 years had 47, 31-40 years had 25 and 41-50 years had 15 patients. The difference was significant ($P < 0.05$). Common diagnosis was hydrocele in 25, epididymal cyst in 20, pyocele in 11, funiculitis in 4, epididymitis in 5, testicular abscess in 8, varicocele in 8 and testicular tumour in 6 cases. The difference was significant ($P < 0.05$). Left side was involved in 32, right side in 28 and both sides in 27 cases. The difference was significant ($P < 0.05$).

Conclusion: High frequency ultrasonography with color doppler is an efficient diagnostic imaging modality in the evaluation of scrotal diseases.

Key words: color doppler, scrotal diseases, ultrasonography

INTRODUCTION

A wide variety of disease processes involving the scrotum may have similar clinical manifestation (eg, pain, swelling or presence of mass). Differentiation of these processes is important for proper management. The ability to confidently establish a surgical versus a nonsurgical diagnosis for acute scrotal pain is important.¹ The benefits of early surgery for testicular salvage in ischemic disease, primarily torsion of the testis, are well-known; but must be balanced against the costs of operating unnecessarily on a large number of patients with nonsurgical disease, primarily acute epididymo-orchitis. Acute scrotum is defined as acute pain with or without scrotal swelling, may be accompanied by local signs or general symptoms. The most common differential diagnoses of the acute scrotum include: i) Torsion of the spermatic cord and ii) acute epididymitis or epididymo-orchitis.² Less common diagnoses include: Strangulated hernia, segmental testicular infarction, testicular tumor, and

idiopathic scrotal edema. This appropriate discussion, however, will be limited to patients with acute pain who have no history of trauma and no history of a mass before the onset of pain. There is, however, overlap in the clinical presentation of the different causes of acute scrotal pain. Imaging in clinically equivocal cases may lead to an early diagnosis of testicular torsion, and thus, decrease the number of unnecessary surgeries.³

High resolution ultrasonography (US) combined with colour Doppler ultrasonography (CDUS) has become the imaging modality of choice for evaluating scrotal diseases. Ultra sound with Color Doppler, Magnetic resonance imaging, testicular angiography and radioisotope studies are now first line of investigations used mainly to investigate various scrotal pathologies. The development of sonogram with high frequency linear transducer and color Doppler is an important mile stone in evaluating scrotal pathologies.⁴ Computed tomography exposes testicles to the radiation and MRI is not so easily available. So ultrasound with color Doppler is best suited for evaluation of scrotal pathologies. It is simple, non-invasive, reproducible, widely available, relatively inexpensive investigation that does not expose the testis to radiation.⁵ The present study was conducted to assess usefulness of high resolution ultrasonography and color doppler in diagnosis and differentiating of scrotal diseases.

MATERIALS & METHODS

The present study comprised of 87 patients of scrotal diseases. The consent was obtained from all enrolled patients.

Data such as name, age etc. was recorded. A thorough examination was performed and symptoms and clinical diagnosis was made. All the patients underwent scrotal ultrasonography using 7.0- 12.0 MHZ high frequency linear array transducer coupled with colour doppler in Esaote My Lab 40 and Phillips affinti 70G equipment. The ultrasound findings were analyzed.

Data thus obtained were subjected to statistical analysis. P value <0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group (years)	Number	P value
20-30	47	0.05
31-40	25	
41-50	15	

Table I shows that age group 20-30 years had 47, 31-40 years had 25 and 41-50 years had 15 patients. The difference was significant (P< 0.05).

Table II USG diagnosis of scrotal lesions

Diagnosis	Number	P value
Hydrocele	25	0.01
Epididymal cyst	20	
Pyocele	11	
Funiculitis	4	
Epididymitis	5	
Testicular abscess	8	
Varicocele	8	
Testicular tumour	6	

Table II, graph I shows that common diagnosis was hydrocele in 25, epididymal cyst in 20, pyocele in 11, funiculitis in 4, epididymitis in 5, testicular abscess in 8, varicocele in 8 and testicular tumour in 6 cases. The difference was significant ($P < 0.05$).

Graph I USG diagnosis of scrotal lesions

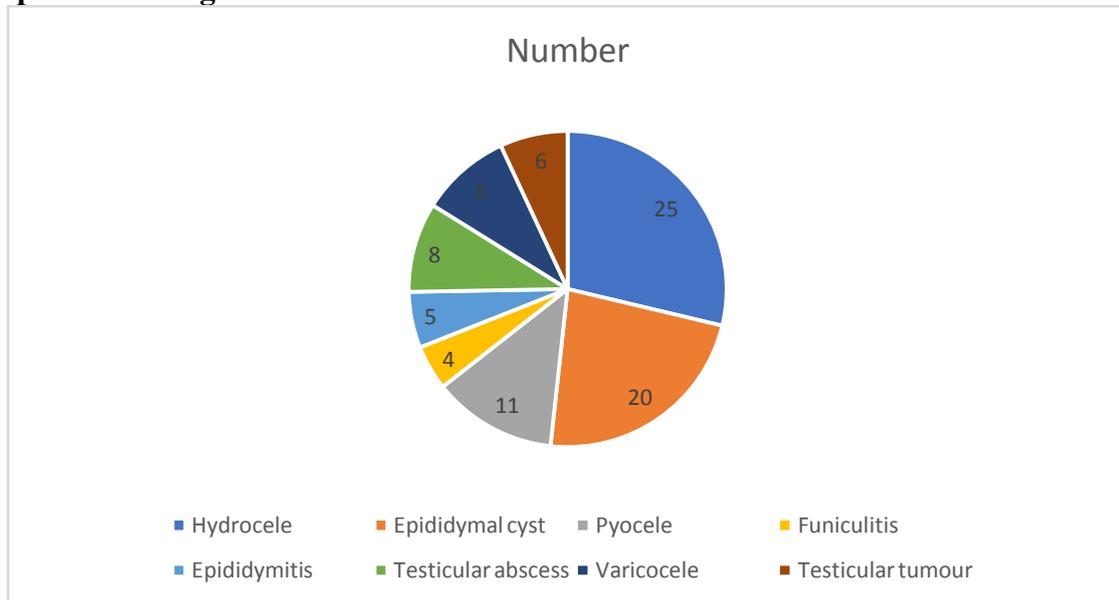
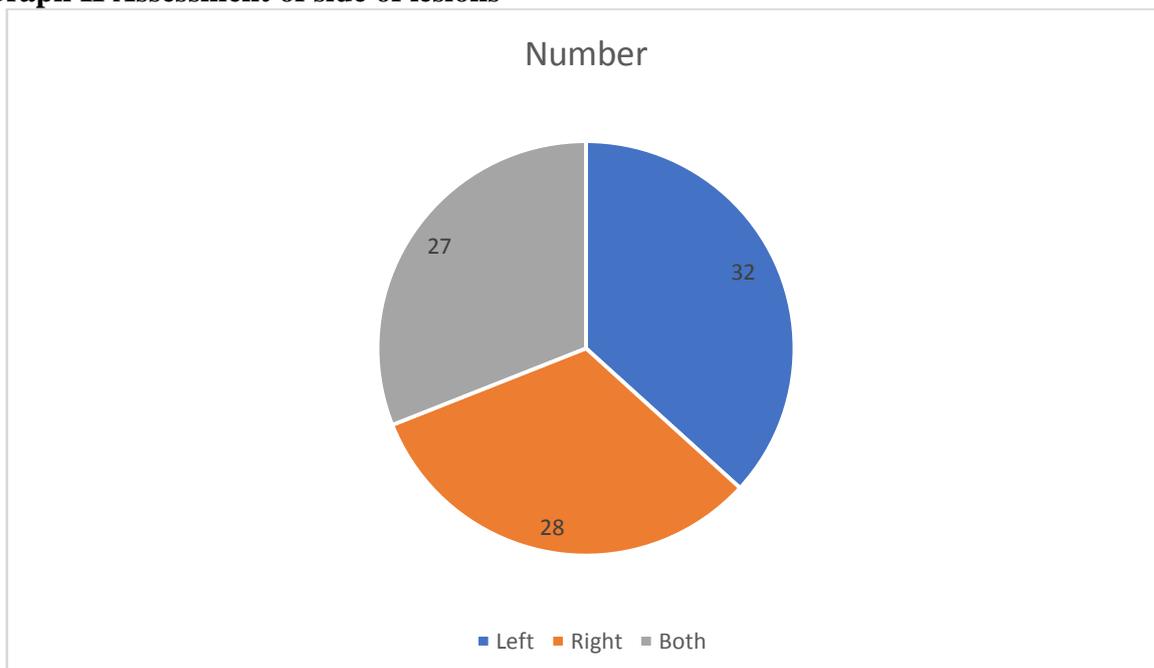


Table III Assessment of side of lesions

Side	Number	P value
Left	32	0.91
Right	28	
Both	27	

Table III, graph II shows that left side was involved in 32, right side in 28 and both sides in 27 cases. The difference was significant ($P < 0.05$).

Graph II Assessment of side of lesions



DISCUSSION

Scrotal abnormalities can be divided into two main complaints, which are scrotal pain and mass. Causes of scrotal pain include inflammation (epididymitis, epididymo-orchitis, abscess), testicular torsion, testicular trauma, and testicular cancer.⁶ Prompt diagnosis is required to differentiate surgically correctable lesions from abnormalities that can be adequately treated by medical therapy alone.⁷ Clinical symptoms and physical examination are often not enough for definite diagnosis due to pain and swelling that limit an accurate palpation of the scrotal contents. Imaging in clinically equivocal cases may lead to an early diagnosis of testicular torsion, and thus, decrease the number of unnecessary surgeries.⁸ There is no definite protocol of acute scrotum screening for the primary care physicians to follow. Early detection of testicular torsion through color doppler is the only means to reduce the burden of morbidity.⁹ The present study was conducted to assess usefulness of high resolution ultrasonography and color doppler in diagnosis and differentiating of scrotal diseases.

We found that age group 20-30 years had 47, 31-40 years had 25 and 41-50 years had 15 patients. Thinyu et al¹⁰ determined the role of ultrasonography in diagnosis of scrotal disorders. The presentation symptoms were divided into three groups including scrotal pain, painless scrotal mass or swelling, and others. Surgery was performed in 32 patients. Of 144 patients, 110 had clinical follow-up and constituted the material of this study. The patients ranged in age from 13 to 82 years (mean 38.6 years). Of 110 patients, 84 (76.4%) presented with scrotal pain, 21 (19%) had painless scrotal mass or swelling and 5 (4.5%) had other symptoms. Of the 84 patients with scrotal pain, 52 had infection, 4 had testicular torsion, 7 had testicular trauma, 10 had varicocele, 4 had hydrocele, 1 had epididymal cyst, 1 had scrotal sac and groin metastases, and 5 had unremarkable results. Of the 21 patients who presented with painless scrotal mass or swelling, 18 had extra-testicular lesions and 3 had intratesticular lesions. All the extra-testicular lesions were benign. Of the 3 intratesticular lesions, one was due to tuberculous epididymo-orchitis, one was non-Hodgkin's lymphoma, and one was metastasis from liposarcoma. Of the 5 patients who presented with other symptoms, 4 had undescended testes, and 1 had gynaecomastia. US gave incorrect diagnosis in only one patient with scrotal pain.

We found that common diagnosis was hydrocele in 25, epididymal cyst in 20, pyocele in 11, funiculitis in 4, epididymitis in 5, testicular abscess in 8, varicocele in 8 and testicular tumour in 6 cases. Agrawal et al¹¹ included 50 patients was conducted who were referred with history of acute scrotal pain. Color doppler sonography yielded a positive and negative predictive value (PPV and NPV) of 100% each for torsion, whereas, 93.9 and 70.6% for epididymo-orchitis, respectively; a sensitivity and specificity of 100% for torsion, whereas, for epididymo-orchitis it was found to be 86.1 and 85.7%, respectively. In cases of incomplete or early torsion, some residual perfusion may be detected leading to false-negative results. Authors concluded that color Doppler sonography can reliably rule out testicular torsion and can thus help in avoiding unnecessary surgical explorations. Hence, it can significantly improve outcome and decrease morbidity of patient. It is an accurate, rapid, non-expensive, nonionizing, important adjunct to clinical assessment of scrotum.

We found that left side was involved in 32, right side in 28 and both sides in 27 cases. Prasad et al¹² evaluated various scrotal pathologies using ultrasonography and describe the role of High resolution ultrasound and colour doppler in their diagnosis and differentiation. The 100 patients with clinical features of scrotal diseases were include in this study. All the patients included in the study underwent scrotal ultrasonography using 7.0- 12.0 MHZ high frequency linear array transducer coupled with Colour Doppler in Esaote My Lab 40 and Phillips affinti 70G equipments. The patients most commonly involved were those belonging to the age group of 30 to 40 years (38%). The least number of patients belonged to the age group of 0-

10 years (4%). On USG, the total number of lesions detected were 120. The most common cause of scrotal pathologies was hydrocele (n=31, 25.83%) followed by epididymal cyst (n=20, 16.67%), epididymo-orchitis (n =16, 13.33%), epididymitis (n = 9; 7.5%), funiculitis (n=8, 6.67%), varicocele (n = 7, 5.83%), pyocele (n= 6, 5%), testicular torsion (n=5, 4.17%), testicular abscess (n = 5, 4.17%), inguino-scrotal hernia (n = 4, 3.33%), testicular microlithiasis (n= 3, 2.5%), testicular tumour (n=3, 2.5%) and tubercular epididymo-orchitis (n=3, 2.5%) . The number of scrotal lesions seen on the left side were 45(37.5%), on the right side were 35 (29.17%) and in bilateral locations were 20(16.67%). Associated symptoms included swelling, pain, fever and infertility. Almost all the scrotal pathologies were associated with scrotal swelling (n=97, 97%) except in 3 cases. Epididymal cysts were seen in 20 patients, Acute epididymo-orchitis(n=16) was most commonly seen on the left side. Hydrocele (n=31) was the most common scrotal pathology detected in this study. Varicocele 7 patients was most commonly seen on the left side. Testicular torsion was detected in 5 (n = 5) patients. 3 (n=3, 60%) patients had right testicular torsion.

CONCLUSION

Authors found that high frequency ultrasonography with color doppler is an efficient diagnostic imaging modality in the evaluation of scrotal diseases.

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