

# Sonological Evaluation of Scrotal Pathology

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## A B S T R A C T

**Introduction:** In the clinical examination of the scrotal swelling physical evaluation by itself may be inadequate due to tenderness, swelling or gross distortion of scrotal contents. Clinical signs and symptoms are usually non-specific, variable and misleading. The study was done to assess the usefulness of high frequency greyscale ultrasound and colour Doppler study in evaluation of various scrotal pathologies.

**Material and methods:** In this series, 100 cases of scrotal pathology was studied using High-frequency real time gray scale ultrasonography and Doppler study, during the period September 2003 to June 2005, were included in this study. **Results:** Out of 100 cases, 8 cases didn't had any abnormality, 32 cases had pathology bilaterally, unilaterally in 60 cases. Out of 60 cases of unilateral side involvement, 26 cases of involvement were on right side, 34 cases involvement was on left side. Totally, pathology was noted in 124 hemiscrotum out of 100 patients studied. Most of the cases Clinically presented with multiple symptoms. Commonest clinical presentation was combination of Symptoms like, pain and scrotal swelling, as in 34 cases (34%), Combination of pain, swelling and fever in four cases (4%).

**Conclusion:** When color Doppler sonography is supplemented with High frequency grey scale US, the sensitivity of diagnosing acute scrotal pathology will be increased. In addition, Color Doppler sonography accurately differentiates between testicular ischemia and torsion from acute inflammatory diseases in acute painful scrotal conditions.

**Keywords:** Scrotal Pathology, Ultrasonography, Doppler, Epididymo Orchitis, Scrotal Swelling

## INTRODUCTION

Scrotum is a cutaneous bag containing right and left testis, the epididymis and the lower part of the spermatic cord. Externally scrotum is divided into right and left parts by a ridge or median raphe, which is continued forwards on to the under surface of the penis and backwards along midline of the perineum to the anus. The testis is separated from the examining fingers by little more than few millimetre Covering of loose skin and fibro muscular tissue, so is most accessible for clinical examination. consequently one would presuppose that clinical diagnosis of a scrotal swelling would be straight forward. On the contrary certain testicular swellings are more difficult to diagnose with confidence based on physical examination alone.<sup>1</sup>

In the clinical examination of the scrotal swelling physical evaluation by itself may be inadequate due to tenderness, swelling or gross distortion of scrotal contents. Clinical signs and symptoms are usually non-specific, variable and misleading. Until mid-1970 clinical evaluation of scrotal contents was confined to palpation, transillumination supplemented by investigative modalities like thermography and venography. The present day diagnostic armamentarium includes greyscale-ultrasonography, Doppler studies, magnetic resonance imaging in addition to radio isotope studies and testicular angiography. Ultrasonography is

exceptionally well suited to study of scrotum and its contents. Sonography is simple to perform, rapid non-invasive and relatively inexpensive, easily reproducible, widely available and does not involve radiation of gonads.<sup>2,3</sup> The study was done to assess the usefulness of high frequency greyscale ultrasound and colour Doppler study in evaluation of various scrotal pathologies.

## MATERIAL AND METHODS

In this series, 100 cases of scrotal pathology was studied using High-frequency real time gray scale ultrasonography and Doppler study, during the period September 2003 to June 2005, were included in this study. These patients were referred to our department for scrotal ultrasonography and Doppler study by department of Urology and department of Surgery of Victoria hospital and Bowring and Lady Curzon hospitals.

Prior to subjecting the patients for ultrasound examination, patient details, detailed clinical history was obtained along with thorough physical examination. The color Doppler sonography was routinely performed in all these patients. Subsequently these cases were followed up and correlated with histopathology report, fine needle aspiration cytology results, surgical findings, response to treatment. Follow up scans were done in selected cases when clinically indicated.

Abdominal ultrasound scan was done in conjunction with scrotal scans in cases of undescended testis to look for ectopic testis, in tubercular Epididymo orchitis cases to look for abdominal tuberculosis, in cases of testicular malignancy to look for associated pathology, in cases of varicoceles to look for any cause of testicular vein obstruction. Conventional radiography was done wherever indicated.

## RESULTS

Commonest clinical presentation was combination of Symptoms like, pain and scrotal swelling, as in 34 cases (34%), Combination of pain, swelling and fever in four cases (4%).

Out of 92 cases, 32 cases had pathology bilaterally, unilaterally in 60 cases. Out of 60 cases of unilateral side involvement, 26 cases of involvement were on right side, 34 cases involvement was on left side. Totally, pathology was noted in 124 hemiscrotum out of 100 patients studied (table-1). Various clinical presentations are depicted in table-2. Most of the cases clinically presented with combination of multiple symptoms.

In our study, out of 100 cases, 40 cases were detected have inflammatory scrotal pathology on high frequency US and Doppler study. Chronic Epididymo orchitis was the commonest inflammatory pathology detected, noted in 18 cases (45 %). Next most frequent inflammatory pathology detected was acute Epididymo orchitis, noted in nine cases (22.5%) (table-3).

Of two cases of acute epididymitis, we observed diffuse hypoechogenicity with diffuse increase in Vascularity. Of nine cases of acute Epididymo-orchitis, we observed diffuse hypoechogenicity with diffuse increase in vascularity in 4 cases, 2 case showed heterogenous echotexture, 3 case was normal echotexture, 6 cases showed diffuse increase in Vascularity. Of three cases of acute orchitis, focal involvement appeared as focal area of hypoechogenicity, two cases of diffuse involvement showed diffuse enlargement with diffuse hypoechogenicity (table-4).

Author	No of Cases	Inflammatory	Non Inflammatory
Arger et al <sup>4</sup>	62	16 (26%)	45 (67%)
Willscher et al <sup>5</sup>	43	12 (28%)	28 (65%)
Richie et al <sup>6</sup>	124	31 (27 %)	75 (66%)
Present study	132	40 (30.5%)	29 (22%)
Comparison with other series			

Inflammatory disease	Horstman et al <sup>11</sup>	Lerner et al <sup>9</sup>	Farriol et al <sup>10</sup>	Present study
Acute epididymitis	25 (56%)	3 (60%)	11 (44%)	2 (5%)
Acute Epididymo-orchitis	19 (42%)	2 (40%)	10 (40%)	9 (22.5%)
Acute orchitis	1 (2%)		2 (8%)	3 (7.5%)
Complication of acute inflammation	5 (11%)			5 (40%)
Cellulitis of scrotal wall				3 (5%)
Fournier's gangrene				1 (2.5%)
Funiculitis			2 (8%)	1 (2.5%)
Chronic Epididymo-orchitis				18 (45%)
Inflammatory diseases of scrotum and its contents: Comparison with other studies				

On color Doppler sonography, there was evidence of diffuse increase in vascularity in 9 cases, normal vascularity in 5 cases, decreased vascularity in 4 cases. Of 18 cases, 14 cases were proven to be of tubercular etiology (table-5).

## DISCUSSION

Arger et al<sup>4</sup>, in a series of 62 patients, detected the following pathologies: Inflammatory diseases in 16 cases (26%), and non-inflammatory swellings in 45 cases (67%).

Willscher et al<sup>5</sup>, in a study of 43 pts (86 testes), noted the following distribution of pathologies: Inflammatory diseases 12 cases, Non-inflammatory diseases in 28 cases. Richie et al<sup>6</sup>, in their study of 124 patients (243 testicles) by ultrasonography, found inflammatory lesions in 31 cases, and non-inflammatory swellings in 75 cases.

In our study, inflammatory conditions constitute the largest number of detected pathology, followed by Non-inflammatory swellings.

In our study, the bulk of the pathology detected by high-resolution US are from two groups: Inflammatory pathologies and Non-inflammatory swellings (69 cases – 52%), which correlates with findings documented in previous studies.<sup>4,7,5</sup> However, in our study, we noticed that proportion of Inflammatory pathology is higher, compared to previous studies. Factors contributing for this variation are higher incidence of chronic inflammatory pathology, especially Tubercular etiology and higher complication rate in our study.

Horstman, Middleton, and Nelson, in their study of 45 patients, found acute epididymitis present in 25 cases (56%), acute Epididymo-orchitis in 19 cases (42 %), acute orchitis in 1 case (2 %).<sup>8</sup> No case of chronic Epididymo orchitis was reported.

Lerner et al<sup>9</sup>, in their limited series of 5 cases of acute inflammatory diseases of scrotum, found acute epididymitis in 3 patients (60%), acute Epididymo orchitis in 2 patients (40%) .

Farriol et al<sup>10</sup>, in their study of 25 cases of acute inflammatory diseases of scrotum using high-resolution grey scale and power Doppler sonographic study, found epididymitis in 11 cases (44%), Epididymo-orchitis in 10 cases (40%), orchitis in 2 cases (8%), funiculitis in 2 cases (8%)

Compared to other studies, in the present study there is low incidence of acute inflammatory conditions and higher incidence of complications of acute scrotal inflammatory disease. This is due to the fact that there is a larger gap of time between onset of symptoms and time of examination

(average 4.5 days), which may be less in western population, (details not available), but it is hypothesized that those patients are evaluated at early stage of disease and less likely to present with complications.

High frequency US and color Doppler appearance of inflammatory scrotal pathology:

High frequency US are similar to the findings of Horstman et al<sup>11</sup>, in their study of 45 cases (51 hemiscrotum), Farriol et al<sup>10</sup>, in their study of 11 cases. High-frequency US sonography and color Doppler sonography findings are in similarity with study KIM S H et al.<sup>12</sup>

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## CONCLUSION

One hundred cases of scrotal swellings were studied with real time High frequency ultrasonography and Color Doppler sonography. The commonest indications for scrotal ultrasonography in clinical practice were inflammatory scrotal disorders and non-inflammatory scrotal swellings, which together constituted more than 50% of all pathologies. Commonest clinical presentation was scrotal swelling with / or without pain. Among acute scrotal inflammatory diseases, acute Epididymo-orchitis was the leading cause.

When color Doppler sonography is supplemented with High frequency grey scale US, the sensitivity of diagnosing acute scrotal pathology will be increased. In addition, Color Doppler sonography accurately differentiates between testicular ischemia and torsion from acute inflammatory diseases in acute painful scrotal conditions.

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