



A Study of Disease patterns of scrotal pathologies diagnosed by ultrasonography in a tertiary care center

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ABSTRACT

Introduction

Among all the existing imaging modalities of imaging, ultrasound is non-invasive, repeatable, with no ionizing radiation involved, easily accessible, and cost-effective. Ultrasound is the most suitable imaging modality for investigating any scrotal disease as it easily highlights the scrotal and testicular problems because of their superficial anatomical position.

Aims and objectives

The present study is aimed to diagnose and analyze the various scrotal and testicular disorders presented to a tertiary care hospital by using ultrasonography (USG).

Materials and methods

This study was an analysis done on patterns of presentation of various scrotal pathologies referred from different specialties of the hospital by verifying hospital records of patients attended to the department of radiology by using ultrasonography. The sample size was 250 and the duration of the study was between July 2023 to September 2023 the study was conducted at, Narayana Medical College and Hospital, Nellore.

Results

A total of 250 patient records were observed in the study. Out of 250 patients, non-inflammatory pathologies were observed in 200 cases including hydrocele was seen in 70 cases, scrotal hernia in 34 cases, undescended testis in 23 cases, varicocele in 19 cases, and epididymal cysts in 20 cases, etc were observed. In the inflammatory pathologies category 50 cases were identified which include Acute epididymo-orchitis in 14 cases, Acute epididymitis in 11, cellulitis in 10 cases, etc. were observed.

Conclusion

By using ultrasonography majority of scrotal and testicular diseases are identified with utmost precision and hence it can be used as a diagnostic tool for patient evaluation.

Keywords ultrasound, testicular pathology, scrotal pathology, scrotal swelling, hydrocele. Varicocele

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INTRODUCTION

The scrotum is a peculiar structure made of fibrous tissue, and muscles and covered by skin. Male reproductive organs embraced in the scrotum include testicles, epididymis, and terminal portions of the spermatic cord. Conditions affecting these structures may be congenital, inflammatory, neoplastic, or of a mixed nature.^[1] Currently, available imaging modalities for the investigation of scrotal ailments include ultrasound, MR imaging(MRI), angiography, and usage of radioisotope technique studies.^[2] Patients who have severe pain with or without edema may require an accurate interpretation of the condition to differentiate the pathologies that require surgical intervention or can be dealt with by medical management.^[3]

CT scan exposes the testicles to ionizing radiation, and MRI is not widely accessible, the introduction of an ultrasound with a high-frequency transducer is the most advanced step in assessment of the scrotal pathologies.^[4] Ultrasonography is one of the safest modalities of imaging available to date and is the mainstay of imaging useful for the evaluation of the scrotum and its contents.^[5] Scrotal ultrasonography is an efficient technique used for the determination of the exact localization as well as the nature of palpable lesions and it also plays an important role in the demonstration of clinically non-palpable scrotal illnesses.^[6] ultrasonography also makes a significant contribution in differentiating testicular from Para testicular pathologies.^[7]

Evaluating any scrotal abnormalities by clinical examination is the most vital part in the determination of its pathology, but sometimes it is very difficult to perform a complete clinical examination Because of intense pain, swelling, edema, or non-specific character of symptoms with which the patient presented to the hospital.^[8] Testicular ailments like testicular torsion or acute epididymitis require prompt management to preserve the vital function of organs requiring correct clinical examination, which is difficult to perform, in such situations, ultrasound comes for establishing the correct diagnosis and helps in the completion of prompt treatment of the underlying condition.^[9]

Ultrasonography is now established as a gold-standard diagnostic technique in the evolution of various scrotal pathologies.^[10] It offers the utmost sensitivity and specificity in diagnosis when administered together with clinical examination. Sonography is simple to conduct, quick, noninvasive, affordable, easily repeatable, and generally available, and it does not need gonad irradiation.^[11]

Materials & Methods

The present study was a hospital-based, cross-sectional, observational one based on the review of hospital records conducted at the Department of Radiology, Narayana Medical College & Hospital, Nellore. The study sample is cases referred from different departments of the hospital for evaluation of Scrotal pathologies presented with symptoms like scrotal edema, scrotal masses, etc. A total of 250 samples were recruited into the current study. Sample for This study was collected between July 2023 and September 2023. The study was formulated after obtaining approval from the institutional ethical committee. With reference details of a letter dated 10-6-2023 with letter number (NMC/ADM/ETHICS/approval/007/06/2023). Written informed consent was obtained from all participants satisfying inclusion criteria before they were recruited into the study. Patients and their relatives were informed that unwillingness to participate in the study would not result in any deviation in treatment protocols. No invasive procedures were carried out. No additional benefits were provided to patients or their relatives as part of the study.

Gray scale real-time imaging technology was utilized for the evaluation of scrotal pathologies. The data was transferred to a Microsoft Excel 2010 sheet (Microsoft Corporation, Redmond, Washington), and statistical analysis was done using SPSS (Statistical Package for the Social Sciences) version 22.0 (IBM Corp., Armonk, NY). Ultrasound examination was performed using a SAMSUNG H60 ultrasound machine using an 8-MHz frequency linear probe.

Scanning technique

Ultrasound examination of the scrotum is performed by using a SAMSUNG H60 ultrasound machine using an 8-MHz frequency linear probe as per standard protocols. The patient was placed in a reclining position with their thighs separated. The scrotum of the patient is supported by a pillow or rolled towel depending on the exposure required. Penis of the patient was positioned onto the abdominal wall by wrapping it in a small towel. Different parameters were assessed during the examination like echogenicity, flow symmetry, the thickness of the scrotal wall, etc. To assess these parameters sagittal, transverse, side-by-side planes were used.

Results

Table 1 shows the age distribution of cases. The highest number of cases presented was in the age group of 21-30 years (60 cases), followed by 31-40 (50 cases). In our study, out of 250 cases, 50 cases were detected to have inflammatory scrotal pathology in the high-frequency US (Table 2). Acute epididymal orchitis was the most common inflammatory pathology detected, which was noted in 14 cases. The next most frequent inflammatory pathology detected was acute epididymitis, which was noted in 11 cases.

Table 1: Age distribution:

Age	No of cases	Percentage
0-10	25	10.00
11-20	28	11.20
21-30	60	24.00
31-40	50	20.00
41-50	35	14.00
51-60	20	8.00
>60	32	12.80-

TABLE 2: Depicting the segregated results of the inflammatory pathologies.

Pathology	No of cases	Percentage
Acute epididymo-orchitis	14	28.00
Epididymal abscess	1	2
Funiculitis	3	6.00
Acute orchitis	3	6.00
Testicular abscess	5	10.00
Acute epididymitis	11	22.00
Cellulitis	10	20.00
Chronic epididymo-orchitis	3	6.00
Total	50	100

Among non-inflammatory scrotal swellings, hydrocele is the commonest pathology noted in seventy cases followed by a scrotal hernia in thirty-four cases, undescended testis in twenty-three cases, and epididymal cysts in twenty cases, and varicocele in nineteen cases (Table 3).

TABLE 3: Depicting the segregated results of the non-inflammatory pathologies

Disease condition	Number of cases	Percentage (%)
Hydrocele	70	35.00
Scrotal filariasis	6	3.00
Undescended testis	23	11.50
Varicocele	19	9.50
Spermatic cord hydrocele	3	1.5
Scrotal hernia	34	17.00
Testicular cyst	3	1.5
Neoplasia	9	4.50
Epididymal cyst	20	10.00
Small testis	8	4.00
Testicular microcalcification	5	2.50
Total	200	100

DISCUSSION

The scrotal contents are anatomically located in a superficial position which makes ultrasound a suitable evaluation tool. With the advent of High-frequency Ultrasonography, accurate diagnosis can be done in no time. Currently, Scrotal ultrasonography has reached the level of the first line as well as a reliable imaging tool to evaluate the contents of the scrotum. The age-wise distribution of the patients in this observational study ranged from less than a year to more than sixty years. The age group of 21-30 years was the most frequently presented (sixty cases), followed by 31-40 years (fifty cases). In our observational study, hydrocele was the most common disease seen in 70 out of 250 cases, scrotal neoplastic tumors in nine cases, undescended testis in twenty-three cases, varicocele in nineteen cases, epididymis cyst in twenty cases, acute epididymo-orchitis in seventeen cases, and inguinal hernia in thirty-four cases. On a comparative note, the prevalence of swellings of testicular origin is less when compared to extra testicular origin. A

prospective study done by Gajbhiye et al. with 200 patients, showed results similar to our study findings. In that study reported the most prevalent disease was hydrocele, which is consistent with our study findings.^[7] In our observational study, 50 out of a total of 250 subjects were found to have inflammatory scrotal disease on high-frequency Ultrasound imaging. Acute epididymal-orchitis was the most prevalent inflammatory pathology seen, with 14 cases. This finding is consistent with the findings of studies done by VGFarriole et al. and GD Luker et al. who also reported Acute epididymal-orchitis as the most common condition.^[11, 12] In our study, we followed the principle that asymmetric blood flow should be compared with normal blood flow on the unaffected side to diagnose epididymitis. This principle was emphasized in the study findings of TSKeener et al.^[13] Our study findings were comparable to those of JA Petros et al. and PH Arger et al. in overall percentages of various disease presentations.^[14,15] We also followed the same



principle as followed by Brown et al. in the identification of the inflammation of scrotal structures. They defined criteria for the diagnosis of inflammation of scrotal structures as follows, a Peak Systolic Velocity of >15 cm/s in the epididymis or testis, >1.7 for the epididymis, or 1.9 in the testis. ^[16]

CONCLUSIONS

With the advent of High-frequency ultrasonographic instruments which can be used as an adjunctive tool to the clinical diagnosis made by physician. These techniques help in differentiating the origin of scrotal masses as testicular or extra-testicular masses. The morphological changes associated with scrotal and testicular pathologies can also be visualized by using the high-frequency USG.

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