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Sonographic Findings in Patients with Scrotal Swelling

Zaid Hadi Kadhim[1], Jabir Hasan Obaid[2*], Qais Qassim Malik[3]
[1]MBChB, DMRD, FIBMS(Rad), Sheheed Al-Mehrab for cardiac catheterization & surgery center.
[2]MBChB, DMRD, FIBMS (Rad.) (Maternity & peadiatric teaching hospital in AL-Diwaniya)- department of diagnostic imaging.
[3] MBChB, DMRD, FIBMS (Rad), Department of diagnostic radiology.

Abstract: *Based on physical examination alone, it is often difficult to decide whether a scrotal swelling arises from testicle itself or from extra testicular elements in scrotum. The aims of the study were, to establish the causes of scrotal swelling in the population and to evaluate the relationship between clinical, demographical and sonographic findings. One hundred patients with age ranging between (1-77 years) presented with scrotal swellings were examined by high resolution real-time ultrasound using 5-12MHz linear probe during the period from October 2011 to April 2012 in Al-Diwaniya teaching hospital at Al-Diwaniya city-Iraq.Seven patients were referred as scrotal swelling clinically, while ultrasound examination was unremarkable. Among the scrotal swellings, hydrocele was the commonest finding (33.1%) and varicoceles was the next (20.3%). Epididymal cystic masses were discovered in 17 patients (14.4%). Inflammation was seen in 14 patients (11.8%) , and 8 patients (6.7%) were subjected to trauma, 5 cases of hematocele and 3 cases extra-testicular hematoma. The findings in remaining patients were: three patients (2.6%) were diagnosed as testicular torsion by using Color Doppler imaging, 3 patients (2.6%) scrotal hernia and 3 patients (2.6%) showed solid intratesticular mass.*

Keywords: *sonography, patients scrotal swelling*

I. Introduction

Ultrasound was the preferred imaging modality for evaluating the patient with scrotal pain. Over the past decades, ultrasound has continuously evolved to allow high resolution imaging of the testicular parenchyma, scrotal soft tissues and the surrounding structures. Doppler analysis allowed detection and diagnosis of abnormalities affecting the vasculature. Ultrasound played a key role in triage, as the patient presenting with scrotal swelling can often produce a diagnostic dilemma for the evaluating clinician. The portability, speed, accessibility and lack of ionizing radiation make ultrasound the most attractive imaging modality in the evaluation of acute scrotal pain(1). Scrotal swelling can represent a wide range of medical issues, from benign congenital conditions to life-threatening malignancies and acute surgical emergencies. Surgical consultation should be obtained concurrently with ultrasonography(2).

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 was an important for proper management. High resolution ultrasonography combined with colour Doppler ultrasonography became the imaging modality of choice for evaluating scrotal diseases (3) .

Clinical symptoms and physical examination were often not enough for definite diagnosis due to pain and swelling that limit an accurate palpation of the scrotal contents (4-5)

This study was designed to determine the causes and findings of scrotal swelling by ultrasonography with clinical and demographical correlations.

II. Patients And Methods

Between October 2011 and April 2012, 100 patients presented with scrotal swellings were evaluated prospectively by ultrasound examination. The ages of the patients and the clinical features were recorded. The age ranged from 1 year to 77 years. All patients were referred from the uro-surgical department and the outpatient clinic of Al-Diwaniya Teaching Hospital for ultrasound or colour Doppler examination of scrotal swellings from October 2011 to April 2012. The patients were questioned about the duration of swelling as well as presence of other symptoms like pain, fever, history of trauma, infertility, history of un-descended testis. The scrotum was scanned using a high-frequency (5-12 MHz), linear-array transducer (Philips Medical Systems, HD11 XE) with the patient in the supine position, the scrotum supported on a rolled towel to hold the scrotum anteriorly, with another towel to hold the penis on the anterior abdominal wall. Lower frequencies may be required to provide adequate penetration in some situations. Images of each testis and epididymis were obtained in the transverse and longitudinal planes and compared. In cases of a unilateral abnormality, the gray scale gain and Doppler parameters optimized on the contralateral, normal side before scanning the abnormal side. Application of colour Doppler was routinely used, initially using low wall filter, low pulse repetition frequency

and high Doppler gain setting, with power Doppler study sometimes used to increase detection of slow flow compared to colour Doppler evaluation. Survey of the inguinal canals, perineal soft tissues and para-aortic region was carried out to investigate any associated or related abnormality [5-6]. In cases of suspected varicocele or hernia the patients were examined in the erect position and during the Valsalva maneuver.

All data were analyzed using SPSS software, version 16 for Windows (SPSS Inc.). Statistical comparisons were performed using the χ^2 test for independence for categorical dependent variables and the independent samples *t* test for continuous dependent variables (patient age and cause).

III. Results

The distribution of cases according to age groups in this study were described in table-1, ages were varied from 1year to 77 Years. Highest number of cases were presented in the age group of 31 to 40 years (22 cases – 22%), and also age group 21 to 30 years (22 cases – 22%). Third and forth decades constitutes 44% of our cases. Least number of cases was seen in the age group 71 to 77 years (3 cases – 3%) and in the age group (61-70), 3 cases-3%.

Patients complaining from painless scrotal swelling were (34%) while those with multiple symptoms of pain, fever and infertility represents (66%) (Table 2).

As seen in table (3), 7 of the referred patients , were normal due to variable normal testicular size between indivisuals. Of those 93 positive cases, some patients presented with different pathologies in the same side (for example hydrocele and epididymal cyst) , so that 111 sonographic investigations were carried out on 93 patients.

Hydrocele was the commonest ultrasound finding (33.1%), varicocele was the 2nd common ultrasound finding (20.3%) followed by epididymal cysts (14.4%). Inflammatory causes(11.8), while testicular focal lesions found in (2.6%) of cases. Testicular torsion and scrotal hernia were recorded in (2.6%) for each (Table 3).

The frequency of ultrasound and Doppler findings regarding the side of affection showed that 44% of cases was right sided, 41% was left sided and 15% of cases were bilateral.

Table (4) revealed the ultrasonic features of hydrocele, iun which (56.41%) showed anechoic hydrocele, followed by (23.07%) with internal echoes.

Hematocele was found in (62.5%) of patients with scrotal trauma followed by extra-testicular hematoma in (37.5%) (Table 5). Among patients with inflammatory diseases , acute epididymitis and epididymo-orchitis were equally occurred (5.9%).

Regarding relation of findings to age of patients, The most cases of hydrocele, the commonest finding in this study, was recorded in 31-40 age group. While, 50% of the cases of varicocele was recorded in age group 21-30 year. Epididymal cysts were mostly seen at 41-50 years age group(29.4%). Inflammatory cause of scrotal swellings was seen in 2 age groups (11-20) and (41-50), the incidence was 28.5% for each. Most cases of varicocele are of grade II (62.5 %) as shown in table(7).

IV. Discussion

The common scrotal problems in adolescent and adult male patients that require medical care were swelling and pain. Bacterial epididymitis or epididymo-orchitis are the most common causes of scrotal pain in adults while torsion is more common in a younger age group [7-10]. Minayoshi *et al* [11], showed that the left side was affected in 78-93% of cases of varicocele, while bilateral varicoceles occurred in 7-22%, these results were consistent with our study which revealed that left sided varicocele constituted 83.33% and bilateral varicocele 16.67% of patients.

Brigitte and Jacqueline [12], stated that inflammatory disease is usually a unilateral process, occurring slightly more often on the right, a finding that in agreement with our study as we also found unilateral inflammatory scrotal swelling in 92.28% of cases, in which the right side affected in 69.23%. Also the same study stated that torsion of the testis have a left sided predominance, which also in agreement with the 66.66% testicular torsion recorded in this study. The same authors found that there was no side predilection for tumors, on the contrary, but our study showed a right sided predilection for focal testicular masses (66.66%), however, this cannot be considered of statistical significance because the number of cases were three only.

Hydrocele were the most common fluid collection of the scrotum. The fluid contents of hydrocele was either clear anechoic (56.41% of patients) or with internal echoes (23.07%), these findings were similar to that obtained by Krone and Carroll [13] and Black *et al*., [14]. In hydrocele, imaging was important in large hydrocele with query about an underlying malignancy in the testis (which was not palpable) [15]. Multi-loculated hydrocele were recognized and may be differentiated from an organized haematoma.

Epididymal cysts and spermatoceles were probably the most common abnormalities identified on the epididymal sonography and can be seen in adults of all ages[14]. However, we recorded less scrotal hernia (2.6%) than that recorded by Joseff [16] who showed that 10% of scrotal swellings were caused by scrotal hernias.

Five patients of traumatic scrotal swelling (62.5%) showed a hypo-echoic non-homogeneous area with internal echoes between the two layers of tunica vaginalis, hematocele was the diagnosis. These findings were in consistent with that of Gutman *et al*., [(17)].

As in our study, Wayne and Scrotum mentioned that the sonographic appearance of intra-testicular masses was more often focal and hypo-echoic[(18)].

Three patients (2.6 %) diagnosed by ultrasound and color Doppler as solid masses, where the lesions appeared hypo-echoic, homogenous with pseudocapsule (which was demonstrated as an echogenic band surrounding the mass). On color Doppler they were hyper-vascular in comparison with the normal testicular parenchyma and this coincides with the ultrasonic appearance of seminoma in other study [(19)]

The enhanced diagnostic accuracy of color Doppler imaging compared with clinical assessment alone has highlighted that epididymo-orchitis was the principal etiology of acute scrotal pathology and that acute torsion was less common cause than what was previously thought [(20)]

In our study 14 patients (11.8%) showed inflammatory changes. The 3rd and 5th decades of life had high incidence of inflammatory lesions (28.5%). This agreed with a comparative studies which showed that epididymitis and epididymo-orchitis were most common after puberty [(21, 22)]. A comparative study was carried out in Iraq in 2001 revealed that 14% of scrotal swellings were caused by inflammatory process which is very close to our study (11.8%)[(23)] .

Stewart *et al*., [(22)] stated that primary varicoceles occur between the ages of 15 and 25 years. Our study showed that 50% and 20.8% of patients with varicoceles presented in the 3rd and 4th decades respectively. Mohammed [(23)] showed a very close results, 71.2% of cases presented in the 3rd and 4th decade.

V. Conclusion

Hydrocele was the commonest cause of scrotal swelling among all age groups. The least common causes of scrotal swellings were scrotal mass, hernia and testicular torsion. Most common cause of scrotal swelling in children was also hydrocele. Age of the patients have some relationship to findings. In most of the cases, the abnormality was unilateral & more on the left side .

References

[1]. Randall B. Meacharn, Ronald R. *et al*. The incidence of varicocele in the general population when evaluated by physical examination, Gray scale sonography & color Doppler sonography. Journal of Uro1ogy 1994; 151: 1535-1538.
[2]. Dogra VS, Gottlieb RH, Oka M, *et al*. Sonography of the scrotum. Radiology 2003; 227(1): 18-36.
[3]. Muttarak M. Anatomy and disease of the scrotum. In: Peh WCG and Hiramatsu Y (eds.). The Asian-Oceanian textbook of radiology. Singapore: TTG Asia Media 2003: 809-821
[4]. Muttarak M, Lojanapiwat B. The painful scrotum: An ultrasonographical approach to diagnosis. Singapore Med J 2005; 46(7): 352-357.
[5]. Ralph WD, Mark JR, Wittenberg J. The genitourinary imaging, in: Primer of diagnostic imaging 4th edition. St. Louis, Mosby year book 2007.
[6]. Randall BM, Ronald R. *et al*. The incidence of varicocele in the general population when evaluated by physical examination, Gray scale sonography & color Doppler sonography. Journal of Uro1ogy 1994; 151:1535-1538.
[7]. Meachman RB, Townsend RR, Rademacher D and Drose JA. The incidence of varicoceles in the general population when evaluated by physical examination, gray scale sonography and color Doppler sonography. J Urol 2008; 151:1535–1538.
[8]. Naughton CK and Nangia AK, Agrawal A. Pathophysiology of varicoceles in male infertility. Hum Reprod Update 2009; 23:473–481
[9]. Sudakoff GS and Quiroz F. Scrotal Ultrasonography with emphasis on the extratesticular space: Anatomy, Embryology, and Pathology. Ultrasound Quarterly, Lippincott Williams & Wilkins, Inc., Philadelphia 2002; 18 (4): 255–273
[10]. Wein. Campbell-Walsh Urology, 9th ed. In: Male infertility. Saunders 2007; 7 (19): 2213.
[11]. Minayoshi K.E., Okoda 14.1., Fujisawa M.A., *et al*. Hemodynamic evaluation of left testicular varicocele by scrotal scintigraphy. Eur Urol 2001; 39: 030-035.
[12]. Brigitte M, and Jacqueline C. Ultrasonography of the cute scrotum. J Clin Ultrasound 1997; 15: 37-44.
[13]. Krone KD and Carroll BA. Scrotal ultrasound . Radiol clin North Am 1995; 23: 121-139.
[14]. Black JAR and Patel A. Sonography of the abnormal extratesticular space. AJR 1996; 167: 507-511.
[15]. Hricak H and Frilly RA. Sonography of the scrotum. Invest Radiol 1993; 18: 112-121.
[16]. Joseff L. The role of ultrasound and color Doppler in the evaluation of scrotal swellings, Board thesis, Baghdad College of Medicine 2006.
[17]. Gutman H, Golimbu M and Subrarnanyam BR. Diagnostic ultrasound of scrotum. Urology 1998; 27(1): 72-79.
[18]. Wayne C L. Scrotum in: Kawammura DM. Diagnostic medical sonography, abdomen & superficial organ. 2ed. New York, Lippincott 1997: 719-764.
[19]. Gerscovich E. High- resolution ultrasonography in the diagnosis of scrotal pathology: II. Tumors. J Clin Ultrasound 1993; 21: 375-386.
[20]. Groski M and Holiman AS. The acute paediatric scrotum. EJR 1998; 6:183-193.
[21]. Feld R and Middleton WD. Recent advances in sonography of the testis and scrotum. Radiol North Am 1992; 30: 1033-1051.
[22]. Stewart R and Carrll BA. The scrotum. In: Rumack CM, Wilson SR and Charboneau JW (eds.): Diagnostic ultrasound, vol 1. St. Louis, Mosby yea rbook; 1991.
[23]. Mohammed A. K. The role of ultrasound and color Doppler in the evaluation of scrotal lesions, Diploma thesis, medical college, Baghdad University, 2001.

Table (1): The distribution of cases according to age group

Age group	No. of cases	Percent
0-10	-	14
11-20	8	8
21-30	22	22
31-40	22	22
41-50	17	17
51-60	11	11
61-70	3	3
71-80	3	3
Total	100	100%

Table (2): The frequency of symptoms among studied group

Presenting symptoms	Frequency	Percent
Painless swelling	34	34, 0
pain	37	37, 0
Pain + fever	4	4, 0
Infertility	17	17, 0
History of trauma	8	8,0
Total	100	100, 0

Table(3) shows the distribution of findings according to side affected

Findings	**Rt**	**Lt**	**Bilateral**	**Normal**	**Total**	**%**
Hydrocele	21	8	10	-	39	33.1%
Varicocele	-	20	4	-	24	20.3%
Scrotal hernia	3	-	-	-	3	2.6%
Torsion	1	2	-	-	3	2.6%
Epidydmitis	4	2	1	-	7	5.9%
Epidydmo- orchitis	5	2	-	-	7	5.9%
Testicular focal lesion	2	1	-	-	3	2.6%
Epidydmal cyst	9	7	1	-	17	14.4%
Hematoma	4	4	-	-	8	6.7%
Normal	-	-	-	7	7	5.9%
Total	49	46	16	7	118	100%

Table.4: Characterization of hydrocele by Ultrasound.

U/S Finding	**N**	**%**
Anechoic	22	56.41
Internal echoes	9	23.07
Septations	8	20.52
Total	39	100

Table 5: Sonographic findings in post traumatic scrotal swellings.

U/S Finding	**N**	**%**
Extra-testicular hematoma	3	37.5
Hematocele	5	62.5
Testicular hematoma	0	0
Total	8	100

Table(6): Distribution of sonographic findings according to age of Patients

Age years	Hydrocele		Varicocele		Scrotal hernia		Torsion		Epididymitis		Epidydmo-orchitis		Epidydmal cyst		Testicular focal lesion		Trauma		Normal	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0-10	8	20.5	0	0	0	0	0	0	1	14.3	0	0	0	0	0	0	3	37.5	3	42.8
11-20	3	7.7	2	8.3	0	0	2	66.7	1	14.3	2	28.5	0	0	0	0	0	0	1	14.3
21-30	4	10.3	12	50	2	66.7	1	33.3	1	14.3	1	14.3	2	11.8	0	0	3	37.5	1	14.3
31-40	10	25.6	5	20.8	1	33.3	0	0	1	14.3	1	14.3	3	17.6	1	33.3	2	25	1	14.3
41-50	7	17.9	4	16.7	0	0	0	0	2	28.5	2	28.5	5	29.4	1	33.3	0	0	0	0
51-60	4	10.3	1	4.2	0	0	0	0	1	14.3	0	0	4	23.5	0	0	0	0	1	14.3
61-70	2	5.1	0	0	0	0	0	0	0	0	1	14.4	1	5.9	0	0	0	0	0	0
71-80	1	2.6	0	0	0	0	0	0	0	0	0	0	2	11.8	1	33.4	0	0	0	0
TOTAL	39	100	24	100	3	100	3	100	7	100	7	100	17	100	3	100	8	100	7	100

Table 7: Grading of varicocele

Degree	**No.**	**%**
Grade I	6	25 %
Grade II	15	62.5 %
Grade III	3	12.5 %
Total	24	100 %