

A study to correlate colour doppler features of extra-testicular scrotal disorders with surgical findings

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Abstract

Background: Color Doppler flow imaging is main diagnostic modality now a days for scrotal diseases. This study was aimed to correlate surgical/histopathological findings to CDFI of extratesticular scrotal disorders **Methods:** 17 Patients from all age groups of with signs and symptoms related to extratesticular scrotal diseases were included in this study **Results:** All 8 cases of varicocele showed accentuation on valsalva maneuver and some amount of reflux with increased blood flow in testicular/spermatic vessels. Left side was involved in all cases. Thus CDFI diagnose varicocele with 100% sensitivity. Colour doppler study shows no flow in hematocoele and abscess shows rim hyperemia. **Conclusions:** It was concluded that colour doppler flow imaging study is a useful tool in the diagnosis of extratesticular scrotal lesions **Key Word:** Color Doppler Flow Imaging, Testicular contrast enhancement, Rim hyperemia

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INTRODUCTION

Various imaging modalities have been tentatively used to complement the physical findings and clinical presentation in the differential diagnosis of scrotal pathology. Color Doppler (CDUS) and Pulsed Doppler sonography has further increased the diagnostic accuracy of acute scrotum by providing information about morphology and perfusion. The most common indications for Doppler sonography are acute testicular torsion, inflammation, infertility, undescended testis and scrotal trauma. Computed tomography (CT) and Magnetic resonance imaging (MRI) are the other noninvasive

investigations for diagnosis of scrotal diseases. High incidence of scrotal pathologies has propelled storming research since long, for their non-invasive radiological diagnosis. The present study is undertaken to assess the usefulness of sonography both Grey Scale and Color Doppler, in various extratesticular scrotal lesions and to correlate these features with surgical / histopathological findings wherever possible. Wantabe *et al*¹ conducted a study to evaluate testicular enhancement patterns at dynamic contrast enhanced subtraction MRI in 42 patients with scrotal symptoms. They found that extratesticular scrotal disorders showed gradual and progressive increase in homogenous testicular contrast enhancement.

METHODS

The study was conducted in the various units of surgery attached to Dr. S. N. Medical College, Jodhpur (Rajasthan) over a period extending from October 2004 till March, 2006. 17 Patients from all age groups of with signs and symptoms related to extratesticular scrotal diseases were included in this study. Thorough clinical examination was done in all the patients and relevant clinical investigation such as x-ray chest, urine-

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routine/microscopic examination and culture, ESR and ELISA for tuberculosis was done. USG was performed as per requirement and comparison with CDUS done as pre requirement. Radiological Examination Colour Doppler Colour Doppler Flow Imaging (CDFI) of scrotal lesions was carried out These examinations were carried out on Vingmed System-5 scanner computed colour doppler ultrasonography system using 10 Mhz hand held linear array transducer. Technique The examination was performed in a setting that affords adequate comfort and privacy to the patient. Examination began with careful palpation of the scrotal contents. Aquasonic gel was applied to the scrotal skin in adequate amount to avoid pressure and pain.

The following doppler parameters were studied in each case:

1. Position of the testes.
2. Vascular anatomy with quantitative and qualitative data: grades of vascularity, pattern of blood flow, PSV, EDV AND RI.
3. Echo texture and size of epididymis
4. Intra tumoral flow

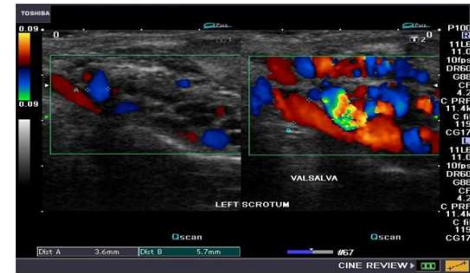


Figure 1: CDFI- Left varicocele and accentuation after valsalva maneuver

RESULTS

Table 1: Classification of Extratesticular Scrotal Lesions

S. no.	Pathology extra testicular	No. Of cases
1.	Varicocele	8
2.	Extratesticular abscess	1
3.	Funiculitis	2
4.	Epididymal cyst	4
5.	Inguinal hernia	2

Table 2: CDFI of Varicocele (N=8)

Sr. No.	Flow in Testicular/Spermatic Vessels (CDFI)	No. of cases	% age
1.	Grade 0 : No flow	0	
	Grade 1 : Spotty flow	0	
	Grade 2 : Scattered flow	2	25
	Grade 3 : Continuous flow	6	75
	Accentuation on		
2.	Valsalava	8	100
	Erect posture	7	87
3.	Tortuosity		
	Present	6	75
4.	Absent	2	28
	Maximum diameter of Spermatic/intra testicular vein		
	2-3 mm	2	25
	3-4 mm	3	37.5
5.	>4 mm	3	37.5
	Spectral analysis		
	Maximal flow velocity		
5.	> 6cm/Sec	1	12.5
	4-6	3	37.5

Table 3: Funiculitis (n=3) All 3 cases shows grade 3 (continuous) flow in spermic vessels during CDFI, All 3 cases shows PSV>15 cm/sec.

Sr. No.	CDFI in Spermatic vessels	No. of cases	% age
1.	Grade 0: No flow		
	Grade 1: Spotty flow		
	Grade 2 : Scattered flow		
	Grade 3: Continuous flow	3	100
2.	PSV > 15 cm/sec	3	100

Table 4: Epididymal Cyst (N=4) Finding in CDFI was no flow or spotty flow in epididymis in a small circumscribed area while rest of epididymis shows normal flow. Head of epididymis was most common site of epididymal cyst.

Sr. No.		No. of cases	% age
1.	Number		
	Single	3	75
2.	Multiple	1	25
	Location		
	Head	3	75
3.	Tail	1	25
	Body		
	CDFI In epididymal cyst		
	Grade 0 : No flow	3	75
4.	Grade 1 : Spotty flow	1	25
	Grade 2 : Scattered flow		
	Grade 3 : Continuous flow		
4.	CDFI features in epididymis except cystic area	4	100
	Normal flow		

Table 5:

Sr. No.	CDFI Features in Vessels in Hernial Sac	No. of cases	% age
1.	Grade 0 : No flow		
	Grade 1 : Spotty flow		
	Grade 2 : Scattered flow	1	50
	Grade 3 : Continuous flow	1	50
2.	RI>0.5	2	100

Inguinal Hernias (N=2) Both two cases were omentocoele and flow was present in omental vessels with high resistance arterial and venous flow pattern.

Table 6: Testicular and Extra Testicular Abscess

S. No.		No. of cases	Percentage (%)
1.	Location		
	Extra testicular	1	50
	Testicular	1	50
2.	CDFI Features in Testicular Vessels	02	100
	Grade : I No flow with rim hyperemia	0	0
	Grade: II Scattered flow with Hyperemia	0	0
	.Grade : III Continues flow	0	0

on CDFI in both cases of abscess rim hyperemia with no flow was present.

DISCUSSION

In the present study 8 cases of varicocele were included. They comprised 14.4 % of the total number of cases and 11.4% of total no of pathological lesions. One case of intra testicular varicocele (1.4%) among all scrotal lesions was also encountered. Das *et al*² in their studies in 1040 patients reported an incidence of 1.9% of intra testicular varicocele among patients with scrotal lesions. In 2 (25%) patients scattered flow was present while in 6 (75%) continuous flow was present during CDFI study. Grade II and Grade III flow was present in all cases. These findings are in accordance with Dogra *et al*³. All cases demonstrated accentuation of blood flow in testicular/spermatic vessels on Valsalva maneuver while 7 (87.5%) cases showed accentuation on erect posture.

Hoekster and Witt⁴ also found similar findings. Tortuosity of vessels was noted in 6 cases (75%). Vessel Diameter greater then 3mm was present in 6 cases (75%). On spectral analysis these vessels demonstrated increased flow pattern with characteristic venous wave form which shows flow reversal and persistent increase in blood flow on performing valsalva maneuver. Grade 3 reflux in valsalva maneuver was noted in 4 cases. All cases demonstrated some amount of reflux. Thus detection of reflux was found to be sensitive for diagnosing varicocele. Greenberg *et al*⁵ found reflux in all 75 men with varicocele. In the present study all 8 cases were diagnosed as varicocele by colour doppler demonstrating a sensitivity of 100% In our study 2 patients of funiculitis were included. All cases showed

grade 3rd (continuous flow). Increased flow in Doppler study on funiculitis was also described by Mevorach *et al*⁶ in his study. 4 cases of epididymal cyst were involved in our study which constituted 7.2% of total number of cases and 5.7% of total pathological lesions. 72% of cysts were found in the head of epididymis while 25% were encountered in the tail. No flow was detected in 3 (75%) cases and spotty flow with septillions in 1 (25%) case in a small circumscribed area while rest of epididymis has normal flow. Krone *et al*⁷ described similar findings with greater number of cysts in head region. 2 cases of inguinal hernias were included in this study. An incidence of 3.6% among all cases was noted. An incidence of 5.4% was noted by Subramanyam *et al*⁸ in their study. The low incidence may be due to low number of sample collection. In both cases omentum was present as content of hernia and on CDFI study omental vessels showed blood flow. High resistance arterial flow and venous flow in omental vessels was present on spectral analysis. Similar findings were described by Subramanyam *et al*⁸. CDFI is helpful in differentiating hernias from primary scrotal mass containing fat or from inguino scrotal collections. In 1 case of testicular abscess and another of extra testicular abscess was also included in this study. CDFI study showed rim hyperemia with no flow into complex cystic mass. Similar finding was described by Horstman *et al*⁹.

CONCLUSION

On the basis of observations of present study, it may be concluded that the colour doppler flow imaging study is a useful tool in the diagnosis of extratesticular scrotal lesions. Hematocoele and extra testicular abscess are difficult to diagnose by clinical examination, but clinical history is important as in former case history of trauma is

present. Colour doppler study shows no flow in hematocoele and abscess shows rim hyperemia. Therefore, surgical measures like drainage of abscess are done immediately. Some time it is difficult to differentiate inguinal hernias from primary scrotal mass containing fat or inguino scrotal collection but CDFI diagnose both of them.

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