



Diagnostic Accuracy of Ultrasound in Malignant Testicular Swelling & Its Management-A Study of 34 Cases

Authors

Dr Harekrishna Majhi¹, Dr Bhupesh Kumar Nayak²

¹Associate Professor, Department of General Surgery, VSS IMSAR, Burla

²Senior Resident, Department of General Surgery, VSS IMSAR, Burla

Email: majhihk49@gmail.com, Contact No.: 9437137230

Abstract

Testicular swelling is a lump or a growth (mass) involving the genitalia is a common presentation in outdoor patients ranging from young to old. Occur in one or both the testicles. Proper diagnosis can prevent unnecessary surgical exploration to a certain extent where larger groups of non-surgical acute testicular cases co-exist. Most testicular masses are malignant. The main dilemma lies in the diagnosis of the testicular Tumour, of which 99% of cases are malignant. A testicular lump that doesn't hurt may be a sign of cancer. (Bosl et al, 1981; prout et al, 1984). Although testicular tumour are relatively rare (having an incidence of about 0.01% of male), they are the most common solid tumour of managed 15-35 years and second most common of managed 35-40 years. The advent of Ultrasonography and its application for testicular masses has changed the picture in the recent past. A clinical pattern of malignant testicular swellings with ultrasound was carried out in the Deptt. of General and Laproscopic Surgery, VSSIMSAR, Burla, Odisha between 2016 to 2017.

Introduction

Lance Armstrong has once said **“IF THERE WAS A GOD, I DID STILL HAVE BOTH NUTS”**

IN 1996, his aggressive form of testicular cancer metastasized into lymph nodes, lungs, brain. Arm strong underwent 2 surgeries, one to remove his cancerous testicles & another to remove metastatic lesions in brain.

This simple non invasive test, affordable by common mass is advocated in all patients with scrotal swelling to aid in final diagnosis

Aims & Objectives

1. To study the diagnostic accuracy of ultrasound in malignant testicular swellings

Inclusion Criteria- any case presenting to the out-patient of surgery department with hard testicular swelling loss of sensitive with transillumination negative

Exclusion Criteria-cases presenting to the OPD with soft swelling with transillumination positive

Materials & Methods

We collected data from OPD patients regarding clinical examination, ultrasound investigation, surgical procedure, complications, follow up and entered in to a standard format and the processing was done using Microsoft excel.

34 chronic cases with clinical suspicion of testicular mass, selected from those cases attending the surgical outpatients, department of General Surgery and Department of Urology, VIMSAR, Burla. The cases will be subjected to scrotal Ultrasonography in the Department of Radiodiagnosis, VIMSAR, Burla. The duration of study was from September 20 to September 20 , a period of 25 months

Testicular Swelling

Testicular swelling may be which cannot be distinguished from testicular swelling clinically can cause dilemma in diagnosis.

ICD-9 codes	
ICD-9 codes covered if selection criteria are met:	
186	Malignant neoplasm of testis
222	Benign neoplasm of testis
236.4	Neoplasm of uncertain of testis
456.4	Scrotal
603.0 -603.9	Hydrocele
604.0 -604.99	Orchitis and epididymitis
608.1	Spermatocoele
608.20 -608.24	Torsion of testis
608.3	Atrophy of testis
959.14	Other injury of external genitals

Clinical Features

Swelling of testis in 23 cases and the rest 11 cases were clinically suspected testicular swelling with associated hydrocele.

Epididymis along with testis was found in 5 cases (35%).

Mild tenderness with enlargement of the testis was the presenting features in 3 cases (16.66%).

The palpable abdominal nodes where is 1 case (5.55%).

Duration of Symptoms

The duration of symptoms as given in Table no-IV shows 9 cases (50%) presented between 3-6 months.

Thus majority of cases presented between 3 month to 9 months following the onset of disease.

Side of Involvement

The side of involvement represented in Table no-X shows the left side of the testis to be involved in

9 cases (50%) of testicular tumours. The right side was involved in 7 cases (39%). Testicular cancer is more common on right side than on the left as reported by Campbell Uro¹⁹.

Age Distribution

In this study the cases included in shortly ----from the age of 20 years.

The majority of patient with chronic testicular swelling were from the age of 21-30 years which consitituted 13 cases (38.23%). The next major group were from 31 to 40 years with 11 cases (28.94%). Most of the testicular tumours came under the age group between 21-30 years I .e. 7 cases (38.88%) The next major case of testicular tumour presented between 31-40 years i.e. 6 cases (33.33%) Table-V

Age Incidence of Different Types of Testicular Tumours

Age in year	Semi-noma	Terato	Embryonal cell carcinoma	Yolk sac tumour	Seminoma + Embryonal	Teratocarcino ma+	Embryonal +yolk sac	Metas-tasis
0-10	-	-	-	-	-	-	-	-
11-20	-	-	1	-	-	-	-	-
21-30	2	2	-	1	-	1	1	-
31-40	3	1	1	-	-	1	-	-
41-50	1	-	-	-	-	-	-	-
51-60	-	-	-	-	1	-	-	-
>60	-	-	-	-	-	-	-	2

Out of the 39 testes, testicular tumour were detected in 18 testes.

Maximum cases of seminoma were from 31-40 years age group.

Teratocarcinoma was highest in the age group of 21-30 years. Metastatic testicular swellings were detected in the age group more than 60 years.

Swelling of the testis and loss of testicular sensation were the common presenting features in the study series.12 cases were secondary hydrocele due to testicular tumour, Enlargement of para-aortic lymph nodes were presented in 1 case.

Side of the involvement of chronic testicular swellings

Side	No. of cases	Total & Percentage (%)	No. of testicular tumours	& Percentage (%)
Right	14	41.17	7	38.88
Left	15	44.11	9	50
Bilateral	5	14.7	2	11.11
Total	34	100	18	100

Out of the testicular tumours, 9 cases had left sided involvement and 7 cases had right sided involvement. 5 cases out of total chronic testicular swelling constituting of 14.7%, were reported to involve bilaterally in the present series of study. Among these, 2 cases suspected to be testicular tumour on ultrasonography were found to be tubercular and 1 cases to be inflammatory on histopathological study; the rest 2 cases of secondary metastasis to testis (primary from prostate) were of bilateral involvement.

Histological types and corresponding sonographic pattern of 18 chronic testicular swellings

Histological types	No. of patients	Sonographic pattern
Seminoma-pure	6	Lucent, homogenous, sharp border
Teratocarcinoma	3	Complex, cystic spaces, irregular margin
Embryonal cell carcinoma	2	Complex, cystic spaces, calcification
Yolk sac tumour	1	Complex, cystic spaces, calcification
Embryonal + Teratocarcinoma	2	Relatively homogenous, partly cystic, calcified mass
Embryonal + yolk sac	1	Complex, cystic spaces, irregular margin
Metastasis	2	Hypoechoic mass

The common feature seen in ultrasonography in testicular malignancies is of focal poor reflective intra-testicular lesions showing within the lesion disorganized structure compared with the normal testicular tissue.

The ultrasonographic pictures of 7 cases were depicted as complex cystic with irregular margin and 3 cases as partly cystic, calcified mass. These lesions had a mixed or bizarre echo pattern. When subjected to histopathological examination, 3

cases came out to be teratocarcinoma, 2 cases as embryonal carcinoma, 1 cases came out to be teratocarcinoma, 2 cases as embryonal carcinoma, 1 cases as yolk sac tumour, 1 case as embryonal carcinoma with yolk sac tumour, 2 as embryonal carcinoma with teratocarcinoma, 1 case as embryonal carcinoma with seminoma. 2 cases of secondary metastasis from prostate showed hypoechoic mass over the bilateral testis.

Other 6 cases of testicular tumour were reflected as lucent, homogenous with sharp circumscribed border. These lesions were uniformly echo poor. On histopathological examination, these were 6 pure seminoma cases.

Comparison of ultrasonographic finding and histopathological data on all testicular tumours revealed consistent difference between the sonographic characteristics of non-seminomatous testis than those of seminoma group. Uniform and homogenous patterns were noted in some portion of the embryonal cell (non-seminomatous) cancers but all these tumours were characterized by complex and cystic internal spaces and irregular margins extending into the surrounding testicular parenchyma.

Ultrasonography in Scrotal Swelling

Though palpation is the initial and often adequate means of assessment of the scrotum and its contents, its limitations detect different types of pathology and its impracticability where there in acute & ---- that other methods are often required. Chief among these is ultrasonography which is attractive because of its interactiveness acceptance by patients and most important being a non-invasive technique (David O. Cosgrove et al, 1993)²⁸. Immersion and high resolution ultrasonography may aid in the clinical evaluation of the scrotal masses (Friedrich et al, 1981)⁵⁰.

Investigation

The routine investigations of blood, stool, urine, etc. were done. Special investigations in special cases as indicated by history and clinical examination were conducted like:

Then all the 52 cases were subjected to ultrasonographic examination of scrotal swelling at the Department of Radiodiagnosis, VIMSAR, Burla.

Ultrasonography of Scrotal Swelling

Machine

Real time (B-Mode) ultrasound scanning with Colour Doppler.

Transducer

Philips HD-7 Linear Array Transducer

Frequency – 7.5 MHz

All the 34 cases and 39 testicles (5 cases presented with bilateral swelling) with chronic presentation suspected to have testicular tumour clinically as well as ultrasonographically were subjected to operation after preoperative preparation.

Operation

Patients were operated under General anaesthesia. The side of the testis, bearing the tumour or suspected to have the tumour were exposed through an inguinal incision. A soft clamp was applied at the highest point of the cord and care was taken not to meddle very much with the testis so as to prevent dissemination of the tumour. Chevassu' manoeuvre was done. Tumours diagnosed by the naked eye examination and Chevassu's manoeuvre were subjected to orchidectomy. Biopsy of the testicular tissue was taken from the suspicious testis and sent for histopathological examination. Then the testes were closed by interrupted absorbable sutures.

Postoperative Management

Postoperative intravenous fluid, antibiotics were given. Skin stitches were removed on 7th day.

Pathological Study

The histopathological study was undertaken in the Department of pathology, VIMSAR, Burla.

- Marcoscopic features – the size, shape, surface, colour, consistency and cut section were studied and findings were notes.
- Histopathology – biopsy specimens were routinely obtained from all cases. The

biopsy specimens were transferred to tubes containing 10% formal saline as preservative. The tissues were then processed in the Department of pathology in histoknette through graded solution of alcohol, xylol and finally embedded in paraffin. The paraffin blocks were prepared. The microsections obtained by the help of a microtome were taken over slides, dried and stained with haematoxylin and eosin. Then the stained slides were studied under microscope both in low (10X) and high power (45X) objectives and histological pattern in each case was noted.

Histopathological study

Histological types	No. of patients	Percentage
Seminoma-pure	6	26.08
Teratocarcinoma	3	13.04
Embryonal cell carcinoma	2	8.69
Yolk sac tumour	1	4.34
Embryonal + teratocarcinoma	2	8.69
Embryonal + seminoma	1	4.34
Embryonal + yolk sac	1	4.34
Metastasis	2	8.69

Follow Up

All the patients were observed for immediate postoperative complications and managed accordingly. All the patients were advised to attend outpatients Department of regular follow up. The patient managed conservatively and postoperative patient without orchidectomy were followed long-term with clinical Check-up and ultrasonography.

No case of testicular abscess was encountered.

Pyocele had not been included in this series of study since to eventual tension over testicular vessel,

Final diagnosis in 34 patients and 68 testes

Types	Final diagnosis	No. of cases	No. of testis
Normal		0	29
Abnormal			
Benign		16	19
	Cystic	11	11
•	Hydrocele	9	9
•	Spermatocele	1	1
•	Hydrocele with varicocele	1	1
	Solid	5	8
•	Granulomatous epididymis involving testis	3	5
		1	2
		1	1
•	Non-specific chronic inflammatory testis		
•	Old clotted haematocele		
	Malignant	18	20
	Pure germ cell tumour	12	12
•	Embryonal cell carcinoma	6	6
		2	2
•	Teratocarcinoma	3	3
•	Yolk sac tumour	1	1
	Mixed germ cell tumour	4	4
•	Embryonal + seminoma	1	1
•	Embryonal + teratocarcinoma	2	2
		1	1
•	Embryonal + yolk sac tumour		
	Metastasis	2	4
	Secondary metastasis	2	4
Total		34	68

Conclusion

Ultrasound examination of chronic testicular swelling was done on 34 patients and 68 testicles. Of the 68 testicles, 29 were considered normal on clinical examination and no evidence of abnormalities was found on ultrasonographic study.

The remaining 39 testicles were considered abnormal clinically and ultrasonographic examination revealed 19 benign testicular lesions and 20 malignant testicular lesions.

20 testicular tumours from 18 cases were identified and included 6 seminoma, 3 teratocarcinoma, 2 embryonal cell carcinoma, 1 yolk sac tumour, 1 embryonal + seminoma, 2 embryonal + teratocarcinoma, 1 embryonal + yolk sac tumour and 4 secondary metastasis. 2 cases had bilateral metastatic testis with primary source from prostate carcinoma.

The ultrasound examination detected testicular tumour in 28 testes from 23 cases and those ultimately came out to be 20 tumours only. Among the rest 8 benign testes, 5 were found to be granulomatous epididymitis involving testis, 5 were found to be granulomatous epididymitis involving testis, 2 were found to be chronic non-specific inflammatory and 1 was an old clotted haematocele.

Out of 28 cases, 6 cases turned out to be pure seminoma. The cell was of varying size with clear cytoplasm and well defined borders. There well lymphatic infiltrations in many of these cases.

3 cases turned out to be teratocarcinoma containing totipotent cells like premature nerve tissue, smooth muscle, fibroblasts and glands in tests.

2 cases turned out to be embryonal carcinoma. The cells had primitive epithelial appearance varied from acinary to papillary architecture. The stroma cells contained fibroblasts and few mononuclear cells.

2 cases had mixed embryonal carcinoma with teratocarcinoma. The teratoma found was mature variety in one case and immature in other.

One case had mixed embryonal cell carcinoma with seminoma.

One case had mixed embryonal cell carcinoma with yolk sac tumour.

One case had yolk sac tumour.

2 cases revealed histopathologically secondary metastatic feature in bilateral testes.

Results of ultrasonography	Chronic
True positive	20
False positive	8
True negative	11
False negative	0
Accuracy	79.49%
Sensitivity	100%
Specificity	57.89%
Positive predictive value	71.43%
Negative predictive value	100%

In our study of chronic testicular swellings, true positive swellings were 20 testes diagnosed as tumour by ultrasonography, true negative

swellings were 11 in number. There were 8 false positive swellings diagnosed as tumour by ultrasonography, but ultimately turned out to be indolent inflammations.

The overall calculated accuracy in this present study was 79.49%, sensitivity was 100% and specificity was 57.89%, positive predictive value Was 71.43% and negative predictive value was 100 %.

Ultrasonography has proved to be an effective and clinically acceptable means evaluating scrotal disease. In predicting whether a given lesion is benign or malignant in the absence of palpable tumour, ultrasonography is safe, rapid, readily available, non-invasive and acute as a diagnostic modality. Until recently clinical confirmation usually required surgical.

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