Original Research Article

Histopathological analysis of testicular lesions- a three year experience in a tertiary care center, Telangana

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Abstract

Introduction: Testicular lesions can be of varied etiologies including non-neoplastic and neoplastic lesions. Non-neoplastic lesionsare most common compared to neoplastic lesions. Inflammatory lesions, torsion, atrophy and cryptorchidism are major non-neoplastic conditions. Germ cell neoplasms, among which seminoma is the most common malignancy. Though rare, incidence of these neoplasms is on rise for the past 1 or 2 decades in western countries. **Aim and Objectives:** Thisstudy is undertaken to analyse all the testicular lesions reported in CAIMS, Karimnagar, which is atertiary care center in Telangana and to see the incidence of testicular neoplasms in this region. **Materials and Methods:** This is a retrospective study of 3 year period from July 2015 to June 2018. Total of 80 cases have been studied and analyzed descriptively. **Results:** Out of 80 cases 65 were non-neoplastic and 15 were neoplastic lesions. Non specific Epididymoorchitis is the most common non-neoplastic lesion followed by testicular atrophy with maturation arrest. Seminoma is the most common malignant tumor followed by seminomatous mixed germ cell tumor. **Conclusion:** Our study is mostly comparable with the other studies.

Key words: Testicular lesions, Spectrum, Non-neoplastic and Neoplastic.

Introduction

Normal adult testis is a paired organ that lies within the scrotum suspended by spermatic cord [1]. Testis is affected by variousnon-neoplastic and neoplastic diseases at various stages of life. Cryptorchidism, otherwise known as undescended testes is one of the congenital malformations seen approximately in 1% of one year old boys [2].

Other non-neoplastic lesions include inflammatory lesions like acute and chronic Epididymoorchitis, vascular lesions like torsion of testis, atrophy with maturation arrest of spermatogenesis. Neoplastic lesions of testis are rare tumors accounting for approximately 1% of all male cancers [3]. They present in a younger age group between 15-35 years and it shows inverse relationship to the age of occurrence [4-7].

There is a great geographical variation in the incidence of testicular cancers [5]. Incidence of testicular cancers is rising in western countries for the past 50 years [5, 8].

Manuscript received: 10th April 2019
Reviewed: 20th April 2019
Author Corrected: 28th April 2019
Accepted for Publication: 1th May 2019

Clinically patients present with scrotal swelling with or without pain, fever and empty scrotum. Testicular cancers usually present with painless unilateral scrotal swelling. Despite the all the modalities of diagnosis histopathology plays an important role in accurate diagnosis and help in accurate treatment of the patient.

Hence this is an attempt to analyse all the orchidectomy specimens encountered in CAIMS, Karimnagar and to categorize intonon-neoplastic and neoplastic lesions of testis.

Surgical removal of testes also known an orchidectomy. Indications for orchidectomy include non-neoplastic and neoplastic conditions of testis.

Also bilateral orchidectomy is done to know any spread of malignancy from adjacent organs like from prostate or penis.

Cryptorchidism is one of the major risk factors for development of testicular cancer.

Aims & Objectives

1. To analyse all orchidectomy specimens and categories into non-neoplastic and neoplastic lesions.
2. To see the spectrum of all testicular lesions.
3. To see the age wise distribution of lesions and laterality of the testis affected.
4. To see the relative incidence of various testicular neoplasms.
5. To compare with other studies.

Materials &Method

Place & Type of Study: It is a retrospective study carried out in Department of Pathology- Chalmeda Anand Rao Institute of Medical Science, Karimnagar, Telangana from July 2015 to June 2018.

Sampling Method: Clinical data was taken from the requisition forms and the specimens were fixed in 10% buffered formalin.

Sample Collection: Gross examination of the specimens was carried out, appropriate tissue bits were taken and processed by automated tissue processor.

After paraffin embedding tissue blocks were prepared and were cut into 3-4micron thin sections by rotary microtome. These tissue sections were submitted for routine H&E staining.

Inclusion criteria: All orchidectomy specimens received at histopathology department, CAIMS, Karimnagar were included in the study.

Exclusion criteria: Small testicular biopsies which were sent for infertility evaluation were excluded from the study.

Statistical Method: Data were collected from requisition forms and specimens, entered and prepared master chart for further statistical analysis, data is shown by using proportions in various tables and analysis was done using Microsoft Excel 2010 and SPSS V.25

Ethical Consideration & Permission: The necessary approval to conduct this study was obtained from the Institutional Ethics Committee (IEC) of the college before starting the study. In the present study scoring system or any surgical procedure were not used.

Results

All orchidectomy specimens were analyzedand categorized into non-neoplastic and neoplastic lesions. Age wise distribution of all cases were studied. Various non-neoplastic lesions and neoplastic lesions observed in this region was noted.

Total of 80 cases studied over a period of 3 yrs. Out of 80 cases 65 were non-neoplastic and 15cases were neoplastic accounting for 81.25% &18.75% respectively. Acute and chronic non-specific Epididy moorchitisis the most common non-neoplasticlesion together 25 cases accounting for 38.5% followed by testicular atrophy with maturation arrest of spermatogenesis, 15 cases accounting for 23.08%. Testicular Torsion with hemorrhagic infarction constituted 12.3% with 8 cases. Next followed by cryptorchidism only 3cases accounting for 4.6%. Another major category included are cases with normal study. Total 14 cases with 21.5% (Table:1)

Table-1: Relative frequency of non-neoplastic lesions with percentage

Histologic type	Number of cases	Percentage
1) Nonspecific Epididymoorchitis	25	38.5%
2) Atrophy with maturation arrest	15	23.1%
3) Hemorrhagic infarction	8	12.3%
4) Cryptorchidism	3	4.6%
5) Normal study	14	21.5%
Total	**65**	**100**

Among neoplastic lesions germ cell tumors were more common compared to non-germ cell tumors, 14 out of 15 cases constituting 93.33%. Others were 1 case of non-Hodgkin's lymphoma. Among all tumors seminoma was most common 6 cases out of 15 cases 40.5%, followed by mixed GCT seminomatous 3cases with 20%, non seminomatous mixed GCT 2cases constituted 13.33% of all tumors. Mature Teratoma 2 cases with 13.33%, Yolk sac tumor 6.66% & NHL 6.66 %.(table: 2)

Table-2: Spectrum of neoplastic lesions

Spectrum of Neoplastic lesions	No. of cases	Percentage
1 seminoma	6	40%
2) mixed GCT (seminomatous)	3	20%
3) mixed GCT (non-seminomatous)	2	13.33%
4) mature Teratoma	2	13.33%
5) yolk sac tumor	1	6.66%
6) NHL	1	6.66%
Total	**15**	**100%**

Majority of patients presented with unilateral scrotal swelling, 70 out of 80 cases, accounting for 87.5%. Pain is the second most common symptom noted in 50 out of 80 cases constituting 62.5%, followed by fever in 30 cases accounting for 37.5%.

Majority of cases presented with right sided involvement, 41 out of 80 cases constituting 51.25%. Left sided involvement was in 25 out of 80 cases accounting for 31.25%. Remaining cases 14 out of 80 presented with bilateral orchidectomy accounting for 17.5 % (Table:3)

Table-3: Laterality of the specimens.

Laterality of Specimens	Number	Percentage
Right sided	41	51.25%
Left sided	25	31.25%
Bilateral	14	17.50%
Total	**80**	**100%**

Age distribution of non-neoplastic lesions showed highest incidence of Epididymoorchitis presented in 7th decade with 8 cases out of 25, corresponding to 32%, followed by 6th decade with 6 cases out of 25 corresponding to 24%. Testicular Atrophy with maturation arrest majority of cases presented in 7th decade, 5 out of 15 cases with 33.3%, followed by equal incidence in 2nd, 4th, 5th, 6th, decades, 2 cases in each with13.3%. Hemorrhagic infarction majority presented in 2nd decade, 3 out of 8 cases with 37.5%, followed by equal incidence in 3rd& 5th decades, 2 cases in each with 25%. Cryptorchidism 3 cases with equal incidence 1 case each in 2nd, 5th& 6th decades corresponding to 33.3% each. Normal study majority of cases presented in 7th decade, 7 cases out of 14cases, corresponding to 50% followed by 6th decade 3 out of 7 cases with 21.4%(table:4).

Table-4: Age range of non-neoplastic lesions.

Non- Neoplastic Lesions	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80
1) NonspecificEpididymoorchitis	0	0	0	4	5	6	8	2
2) Atrophy	0	2	1	2	2	2	5	1
3) Hemorrhagic infarction	0	3	2	1	2	0	0	0
4) Cryptorchidism	0	1	0	0	1	1	0	0
5) Normal study	0	2	0	0	0	3	7	2
Total	**0**	**8**	**3**	**7**	**10**	**12**	**20**	**5**

Age distribution of neoplastic lesions mostly presented in 3rd decade,5 out of 15 cases with 33.33%. Most common neoplastic lesion seminoma presented with a wide age range between 18-73 years, predominantly in 2nd decade. Seminomatous mixed germ cell tumor, 2 out of 3 cases presented in 3rd decade. Non seminomatous mixed GCT, 2 cases presented each in 3rd & 5th decade. One case of yolk sac tumor presented in 20year old patient another case of NHL presented in 80 years old. 2 cases of mature Teratoma presented each in 3rd& 4th decade (Table: 5).

Table-5: Age range of neoplastic lesions.

Age	Seminoma	S-MGCT	Non S-MGCT	Mature teratoma	Yolk sac tumor	NHL
0-10	0	0	0	0	0	0
11-20	2	-	-	-	1	
21-30	1	2	1	1	-	-
31-40	1	-	-	1	-	-
41-50	-	1	1	-	-	-
51-60	-	-	-	-	-	-
61-70	1	-	-	-	-	-
71-80	-	-	-	-	-	1
Total	**6**	**3**	**2**	**2**	**1**	**1**

Discussion

Testis is affected by both non-neoplastic and neoplastic lesions. Our study comprised of total of 80 cases studied over a period of 3yrs. Majority are non-neoplastic lesions compared to neoplastic lesions. This is in concordance with Mansi Sharma et al, Mahesh B Patel et al, Hemavathi Reddy et al, Sundari Devi et al (table:6).

Table-6: Comparison of non-neoplastic and neoplastic lesions with other studies.

Table	Non-neoplastic lesions	Neoplastic lesions.
Mansi S et al [7]	93%	7%
Mahesh B Patel [3]	80%	20%
Hemavathi R et al [4]	86%	14%
Sundari Devi et al [9]	94.20%	5.80%
Present study	**81.25%**	**18.75%**

Commonest mode of clinical presentation is unilateral scrotal swelling which is similar in our study, followed by pain [3,4]. In our study right sided involvement is more common similar to Mahesh B et al and Mansi S et al in contrast to left sided involvement which is seen in Reddy H et al [3,4,7].

Among non-neoplastic lesions most common histologic type is non- specific Epididymoorchitis constituting 38.5% followed by testicular atrophy with maturation arrest accounting for 23.08%.

Table-7: Comparison of various non-neoplastic testicular lesions with other studies.

Histologic type with %	Mansi etaI	Mahesh et al	Hemavathi et al	Sundari Devi et al	Present study
1) Nonspecificepididymo orchitis	15.1	9.41	3.5	39.28	38.5
2) Atrophy with maturation arrest	16.96	-	19.8	14.28	23.08
3) Hemorrhagic infarction	18.86	55.29	22.1	17.85	12.03
4) Cryptorchidism	39.62	8.24	14	-	4.6
5) Normal study	-	-	-	22.3	21.5

There is varying incidence of different non-neoplastic lesions form study to study in different regions. Our study is mostly in concordance with Sundari Devi et al [9](table:7)

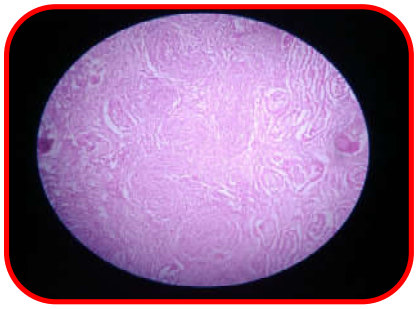

Figure-1: Microscopic picture of chronic nonspecific Epididymoorchitis

Acute and chronic non-specific epididymoorchitis is most common (n=25) in this region, presenting with a wide age range (35 to 75 years). Peak incidence is seen 7th and 6th decades. This is similar to Mahesh B Patel and Kaveret al [3,16].

Spread from adjacent urinary tract infection caused by E.Coli is the most common cause of Epididymoorchitis. Older age of presentation may be attributed to partial obstruction of urethra by prostate enlargement or stricture of urethra. Chronicnon-specificEpididymoorchitis histopathology showed chronic inflammatory cell infiltration of testis and epididymis with fibrous scarring. Leydig cells are spared (Fig 1)

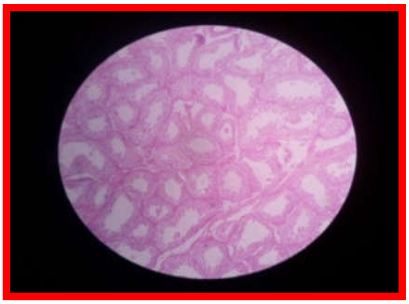

Figure-2: Microscopic picture of atrophy with maturation arrest

Acute pyogenic Epididymoorchitis histopathology presented with acute supportive inflammation of testis and epididymis with dense infiltration by neutrophils.

Testicular Atrophy with maturation arrest 15cases were studied presented with a wide age range (18 to 71 years).This may be due to cryptorchidism or due to end stage chronic non-specific inflammation. Grossly smaller size of the testis with histopathology showing hyalinized tubules with maturation arrest of spermatogenesis at various levels, starting from spematogonia to spermatids (Fig. 2)

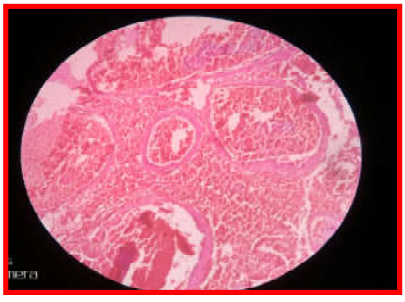

Figure-3: Microscopic picture of torsion with hemorrhagic infarction

Testicular Torsion with hemorrhagic infarction 8 cases studied, presented in a younger age group (12to 50 years). Grossly slightly enlarged testis, soft and hemorrhagic, histopathology showing intense congestion, extravasation of blood into interstitial tissue and hemorrhagic infarction (Fig. 3).

Cryptorchidism, 3 cases showed grossly normal to atrophied testis with maturation arrest (Fig 4)

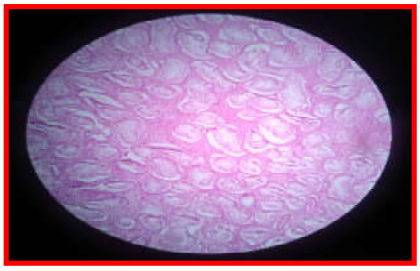

Figure-4: Microscopic Picture of Cryptorchidism

Normal study of testis was observed in bilateral testes which were removed to see if there is any spread from adjacent cancers like adenocarcinoma of prostate or rarely for squamous cell carcinoma of penis and papillary urothelial carcinoma of penile urethra.

Cancer of testis is one of rare malignancies accounting for 0.5 to 1.5 % of all male cancers. Highest incidence is seen in European countries compared to Asian and African countries. It is the most common malignancy occurring in young men between 15-34 years [5].

Among neoplastic lesions most common lesion is seminoma constituting 40% followed by seminomatous mixed germ cell tumor 20% and non seminomatous mixed GCT 13.33%.

Table- 8: Comparison of histological types of neoplastic testicular lesions with other studies

Histologic type with %	Mansi et al	Gupta A et al [10]	Sanjay M et al [11]	Hemavathi et al	Mahesh B et al	Present study
Seminoma	25%	48%	38.90%	42.90%	40%	**40%**
Mixed GCT seminomatous and non seminomatous	25%	16%	33.33%	43%	-	**33.30%**
Teratoma	25%	12%	11.11%	-	33.30%	**13.33%**
Yolk sac tumor	25%	4%	5.50%	-	6.60%	**6.66%**
Others	-	4%	11.11%	7.20%	20%	**6.66%**

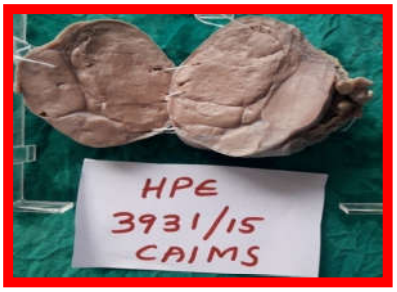

Figure-5: Gross picture of Seminoma

Our study is mostly in concordance with Sanjay M et al(table:8). Variations may occur from region to region due to various predisposing factors.

Seminoma presented with a wide age range 18-73 yrs. Maximum number presented in 2nd decade. All cases were from right sided involvement. Grossly seminoma presented with uniformly enlarged testis. Cut section was showing solid, homogenous gray white without any involvement of tunica albugenia, epididymis or spermatic cord (Fig. 5).

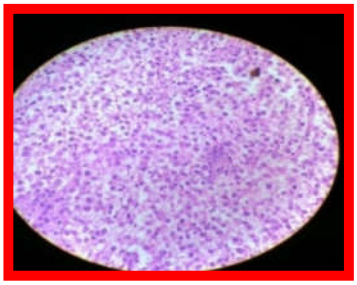

Figure-6: Microscopic Picture of Seminoma

Histopathology showed sheets of uniform large round to polygonal cells with central nucleus and clear cytoplasm, divided into lobules by fibrous septae which are infiltrated by lymphocytes. (Fig. 6) One case showed microscopic extension of tumor tissue into spermatic cord.

All mixed germ cell neoplasms grossly presented with irregularly enlarged testis, cut section showing variegated appearance with areas of necrosis and hemorrhages.

Seminomatous mixed germ cell tumors age range is between 21-41 yrs. Maximum cases seen in 3rd decade with left sided involvement.

Seminoma component along with mature Teratoma was seen in one case and with embryonic carcinoma in another case. In later case there was also microscopic extension into tunica vaginalis and metastatic tumor deposits in 2/2 adjacent lymph nodes.

Figure-7: Gross picture of Non Seminomatous Mixed Germ Cell Tumor

Non seminomatous mixed GCT presented in 3rd& 5th decades with equal incidence in right and left sides. One case presented with components of yolk sac tumor, embryonal carcinoma and Teratoma (Fig. 7)

Other case presented with only embryonal carcinoma with Teratoma. Mature Teratoma 2 cases studied, presented with enlarged testis with cut section showing mature cartilage and gray white areas (Fig. 8)

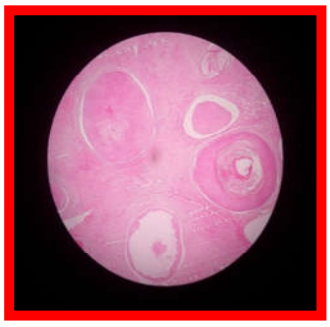

Figure-8: Gross Picture of Mature Teratoma **Figure 9: Microscopic picture of mature Teratoma**

Histopathology showed mature cartilage, many keratin horn cysts and glandular structures (Fig 9)

1 case of yolk sac tumor presented in 2nd decade with left sided involvement. Grossly presented with enlarged testis. Cut section showing gray white, yellow brown with gelatinous and cystic areas. Histopathology showed lace like arrangement of medium sized cuboidal cells with vacuolated cytoplasm. (Fig. 10) Areas of papillary structures and endodermal sinus like structures (Schiller Duval bodies) were observed. (Fig. 11)

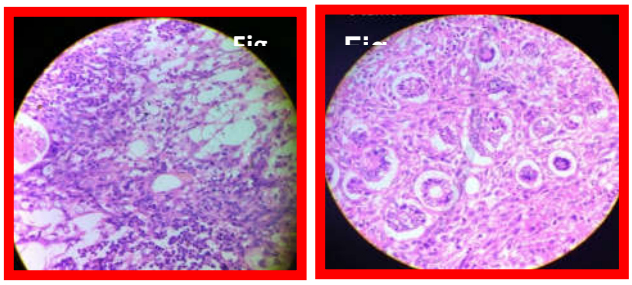

Figure-10, 11: Microscopic picture of Yolk Sac Tumour

1 case of Non Hodgkins lymphoma was encountered which presented in 7th decade with right sided involvement. Grossly testis was reduced in size and tan white on cut section. Histopathology showed as small lymphocytic lymphoma.

Vast majority of previous series showed germ cell tumors are most frequent malignancy ranging from 76 to 95% [13, 14]. Present study also correlates well by showing 93.33% of germ cell tumors.

In the present study maximum number of neoplastic lesions seen in 3rd decade with 33.33% cases. Similar results were found in Mustaq S et al[5], Gill MS et al [13], Deotra A et al [14] and Stewart BW et al[15].

Majority of tumors were presenting with right sided involvement. This is also in concordance with Preethi Rihal Chakrabarti et al [12].

Conclusion

Our study is mostly comparable with the other studies with respect to relative frequency, age distribution and other clinical features of all non-neoplastic and neoplastic testicular lesions.

Though testicular neoplasms are rare, constitute only 1% of all male cancers it is important for the accurate diagnosis and proper management of the patients.

Contribution by different authors- For this manuscript, study was done by Dr. ArunaTekumalla, Statistics and manuscript prepared by Dr. Sreedhar Ragi with the help of Dr. Ravinder Thota.

What this study adds to existing knowledge? This study enables us to know the relative frequency of testicular lesions and incidence testicular neoplasms.

Histopathology is the mainstay of diagnosis in the testicular neoplasms and helps in accurate management of the patients by further submitting for immune-histochemistry.

Findings: Nil; **Conflict of Interest**: None initiated

Permission from IRB: Yes

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How to cite this article?

Tekumalla A, Ragi S, Thota R. Histopathological analysis of testicular lesions- a three year experience in a tertiary care center, Telangana.Trop J Path Micro 2019;5(5):260-268.doi:10.17511/jopm.2019.i05.02.

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