

Histopathological Spectrum of Testicular Lesions at a Tertiary Care Center in Western Rajasthan

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Received: 18-10-2024 / Revised: 21-11-2024 / Accepted: 26-12-2024

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Conflict of interest: Nil

Abstract:

Background: Both neoplastic and non-neoplastic conditions affect the testis. Although non neoplastic testicular lesions are more common, still most of the studies were done on testicular neoplasms only. Hence the present study was undertaken to study histopathological spectrum of testicular and paratesticular lesions, their age distribution and clinical presentation.

Methods: This was a retrospective record based 1 year study conducted in Department of Pathology, Sardar Patel Medical College, Bikaner and included a total of 60 Testicular specimens which were diagnosed by histopathological examination.

Results: A total of 60 cases of testicular lesions were encountered in our study. Out of the total 60 cases, 15% (9/60) were diagnosed as malignant testicular tumor. Most of these tumors were seen between 3rd and 4th decades. Germ cell tumor was the most common type (77.7%) among which seminomas (44.44%) and mixed germ cell tumors (28.57%) were most frequently encountered. Other tumor diagnosed was Non-Hodgkin lymphoma. Non-neoplastic lesions of the testis are most common in the second decade of life. The youngest patient was at birth and oldest was 71 years of age. Out of all non-neoplastic lesions, vascular lesions like torsion and infarction are the most common findings (54.90%) followed by tuberculous abscess (15.68%).

Conclusion: This study strongly recommends routine histopathological examination of all scrotal specimens for the detection of various testicular and paratesticular lesions, as well as neoplasms. Histopathology not only provides a tissue diagnosis in scrotal disorders, but it also adds to understanding etiopathogenesis and can aid in the development of future treatment options.

Keywords: Undescended testis, Germ cell neoplasm, Epididymo-orchitis, seminoma, teratoma, yolk sac tumour, non-neoplastic lesion.

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Introduction

Testicular cancers comprise 1% of all the male cancers worldwide [1]. Testicular tumors are relatively rare and comprise 1% of all male cancers worldwide with peak prevalence in the age group 15-35 years [2]. Testicular tumour is the most common malignancy among young males [3].

The male genital tract consists of a pair of testes, epididymis, vas deferens, ejaculatory duct, accessory sex glands (seminal vesicles, prostate, and bulbourethral glands) and the penis which are under the control of hormones from hypothalamus, pituitary, and gonads. Testes is an organ where the continuous process of gamete production (spermatogenesis) occurs and where testosterone is produced. Epididymis is an excurrent duct system for transport, maturation, and storage of the sperm.

Accessory glandular organs produce seminal fluid and secrete complex molecules into the final ejaculate. Penis, an erectile organ for the penetration and delivery of the gametes into the female reproductive tract. Production, release and maturation of spermatozoa all depend on specialized functions of the testicular cells and epididymal epithelium. An equally varied morphology and ultrastructural composition reflect these varied functions.

Ailments of the reproductive organs are common through the whole life span of a man. Distinct pathological conditions affect various components of male genital tract. Their incidence has continuously increased during the last decades, especially in the developed countries. They

constitute a group of lesions which are difficult to detect and treat because of their anatomical locations, biological behavior as well as their consequences [4].

Non neoplastic testicular lesions include cryptorchid (undescended) testis, testicular torsion, testicular atrophy, epidermoid cysts, infections of testis like tuberculosis, malakoplakia and vasculitis [5]. About 1% of one-year old boys are affected with undescended testis. [3] A germ cell tumour is more likely to develop in an undescended testis than a normally placed testis. Atrophy of testis may develop from crptorchidism, infections like mumps, liver cirrhosis, radiation therapy, chemotherapy, estrogens administration, AIDS and exposure to environmental toxins [6].

The present study was conducted to determine the histopathological spectrum of ovarian lesions at a tertiary care center in Western Rajasthan.

Materials and methods:

This is a retrospective study conducted over a period of one year from January 2024 to December 2024 at the Department of Pathology, at a tertiary care teaching hospital, Sardar Patel Medical College and associated group of hospitals, Bikaner.

The specimens of testicular lesions received from surgery and surgical oncology department at the Department of Pathology during the study period were included in our study as per the inclusion and exclusion criteria. Specimens with improper clinical records, Autolyzed specimens or specimens received without fixative, patients with benign and inflammatory lesions and patients who refused to give consent were excluded from the study.

The clinical and relevant data were recorded from requisition form and clinical records. The specimens received were fixed in 10% buffered formalin. Gross examination was done, and findings recorded. The tissues were sectioned as per protocol and processed by wax block method. Slides were stained with Hematoxylin and Eosin (H&E) stain and examined

under light microscope. Various histopathological spectrum of lesions in the testis were observed and classified as benign and malignant on the basis of World Health Organization histological classification of the testicular tumors.

Statistical analysis was done using Microsoft Excel 2019. Data was collected and entered into excel and analysis was done by calculating ratios, proportion, and percentage.

Results:

There was a total of 60 testicular biopsies reviewed during January 2024 to December 2024. Seventy percent (70%) of these testicular biopsies were orchidectomy specimen and 30% were small biopsies. Thirty percent (30%) of the total specimen comprised of undescended testis. Out of the total 60 cases, 15% (9/60) were diagnosed as neoplastic lesions and 85% (51/60) were non-neoplastic lesions.

Table 1 and Table 2 shows age wise distribution and histological diagnosis of neoplastic and non-neoplastic lesions of testis respectively.

As shown in table 1 testicular tumors were more prevalent in the age group of 31-40 years. Only one case of Non-Hodgkin lymphoma was seen after 50 years of age. Out of the 9 malignant tumors in this study, 77.77% (7 cases) consisted of germ cell tumors. Table 2 shows age wise distribution of non-neoplastic lesions of testis.

Our youngest patient was at birth while the oldest patient was 71-year male. Maximum numbers of patients presented in second decade of life (29.41%). Second highest age incidence was found in 3rd and 4th decade of the life, comprising 17.64% each. Various lesions were observed in wide range of age. Torsion and infarction of testis was seen in 28 cases (54.9%) followed by testicular abscess (n=8; 15.6%). Since tuberculosis is more common in our context, tuberculosis of testis was found in 4 cases (7.8%). (Table 3)

Table 1: Histological diagnosis of testicular tumor along with age distribution.

Age group	Seminoma	MGCT	NHL	Immature Teratoma	Total
31-40	2	2	1	-	5 (55.55%)
41-50	1	-	-	1	2 (22.22%)
51-60	-	-	-	-	0
61-70	-	-	1	-	1 (11.11%)
71-80	-	-	-	-	0
81-90	1	-	-	-	1 (11.11%)
Total	4 (44.44%)	2 (22.22%)	2 (22.22%)	1 (11.11%)	9 (100%)

Table 2: Frequency of nonneoplastic testicular lesions at various age group

Age in years	Number of cases (n=51)	Percentage (%)
0-10	2	3.92 %
11-20	15	29.41 %
21-30	9	17.64 %
31-40	9	17.64 %
41-50	6	11.76 %
51-60	6	11.76 %
61-70	3	5.88 %
> 71	1	1.96 %

Table 3: Histopathological diagnosis of non-neoplastic lesions.

HPE Diagnosis	Number of Cases (n=51)	Percentage (%)
Undescended testis	4	7.84 %
T.B. Epididymo-orchitis	5	9.80 %
Granulomatous Orchitis	1	1.96 %
Testicular Abscess	8	15.68 %
Non-specific Epididymo-orchitis	5	9.80 %
Torsion and Infarction	28	54.90 %

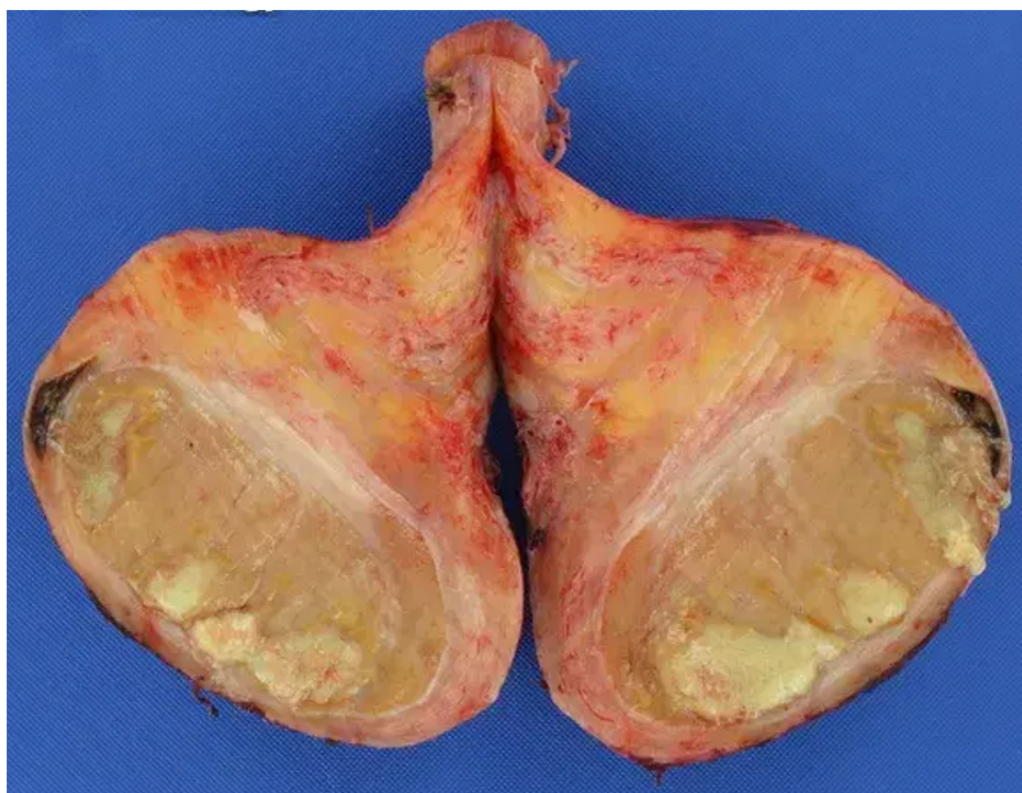


Figure 1: A:- Gross of Epididymo- orchitis. Sections shows destruction of native architecture of both testis and epididymis. Findings included a mixed inflammatory infiltrate, seminiferous tubule destruction, abscess formation (corresponding to the yellow foci in testis) and fibrosis. The inflammatory process extends into paratesticular soft tissues which are greatly expanded as seen in this gross specimen photograph.

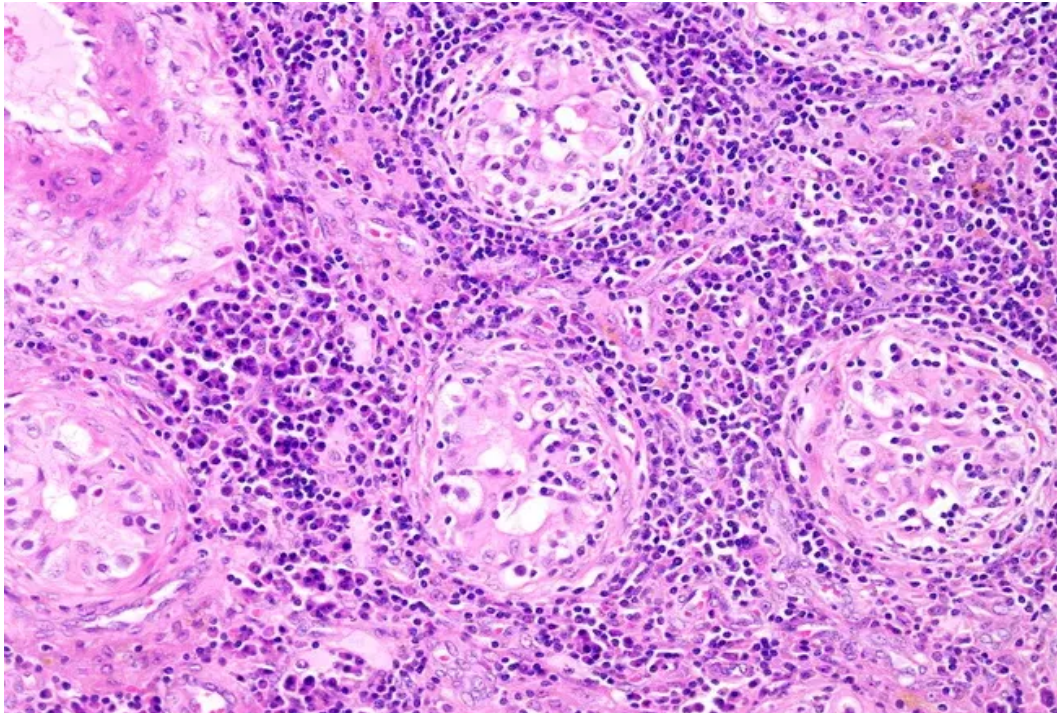


Figure 1: B:-Microscopy of Epididymo- orchitis -The seminiferous tubules contain residual germ cells and Sertoli cells; however, there is no evidence of spermatogenesis. The inflammatory infiltrate is mixed consisting predominantly of lymphocytes, plasma cells, and histiocytes along with neutrophils. (H&E, 200X)



Figure 2: A:-Gross of Seminoma- Section shows Classic seminoma consisting of a pink-tan, Firm, multinodular tumor bulging from the surrounding testicular parenchyma. Fibrotic bands can be seen on the cut surface. Histopathologic examination did indeed show extensive sclerosis throughout the tumor. The yellow structure above the tumor is the epididymis.

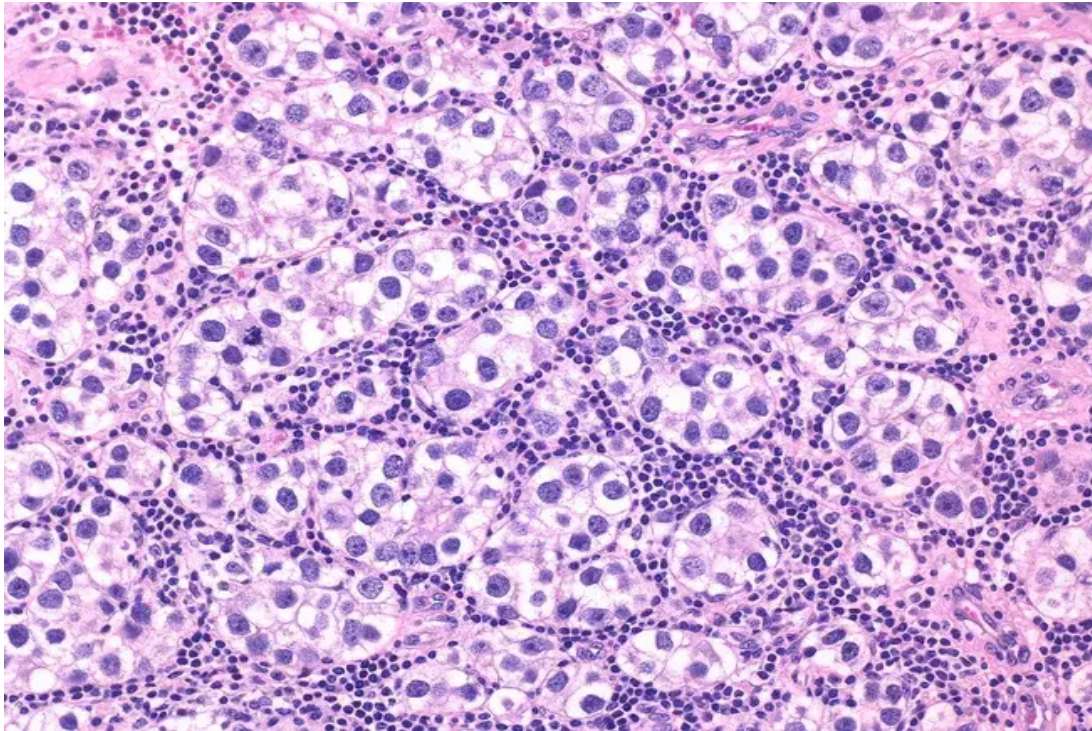


Figure 2: B:- Microscopy of Seminoma. The classic histologic appearance consists of a uniform population of tumor cells with ample clear cytoplasm (due to glycogen content), prominent cell membranes, and a large nucleus with a prominent nucleolus. The tumor cells are arranged in small nests or clusters separated by fibrous trabeculae containing lymphocytes and plasma cells. (H&E, 200X)

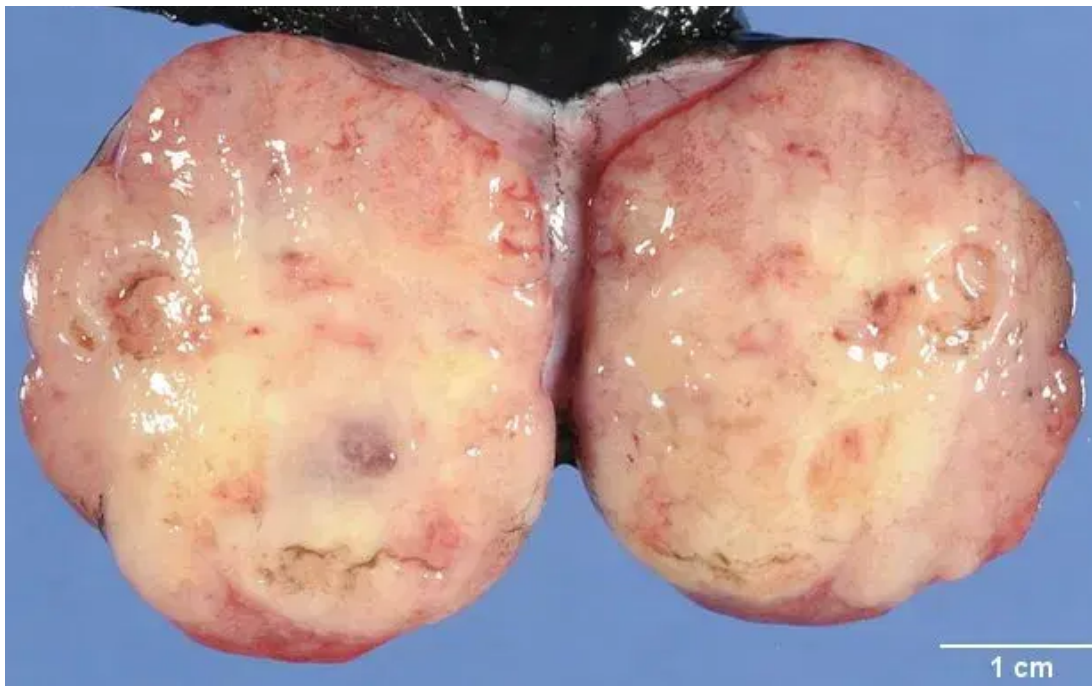


Figure 3-A: Gross of Yolk sac tumour showing Pure yolk sac tumors are usually soft, solid tumors with a myxoid or gelatinous quality. The cut surface is yellow-tan to greyish-white. Larger tumors may have foci of hemorrhage and necrosis or small cystic areas. In such cases, the possibility of a mixed germ cell tumor should be considered, especially in an adolescent or a young adult patient.

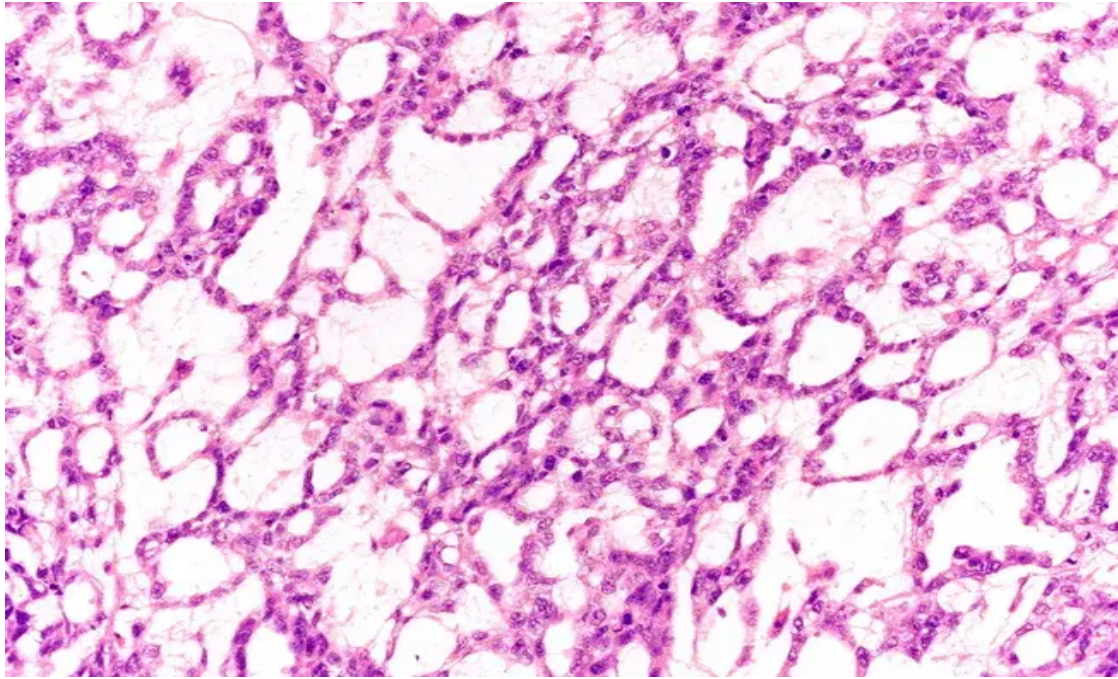


Figure 3-B: Microscopy of Yolk sac tumour showing Microcystic pattern in a yolk sac tumor. There are interconnecting ribbons and cords of tumor cells enclosing round/irregular extracellular spaces and creating a honeycomb-like meshwork. Microcystic is the most common architectural pattern in yolk sac tumor. (H&E, 200X)



Figure 4-A: Gross of Immature teratoma in testis showing the gross appearance of teratomas is heterogenous and depends upon the components present. Soft, fleshy, encephaloid (brain-like) or hemorrhagic areas (such as those seen in this orchiectomy specimen) correspond to foci of immature embryonic tissue.

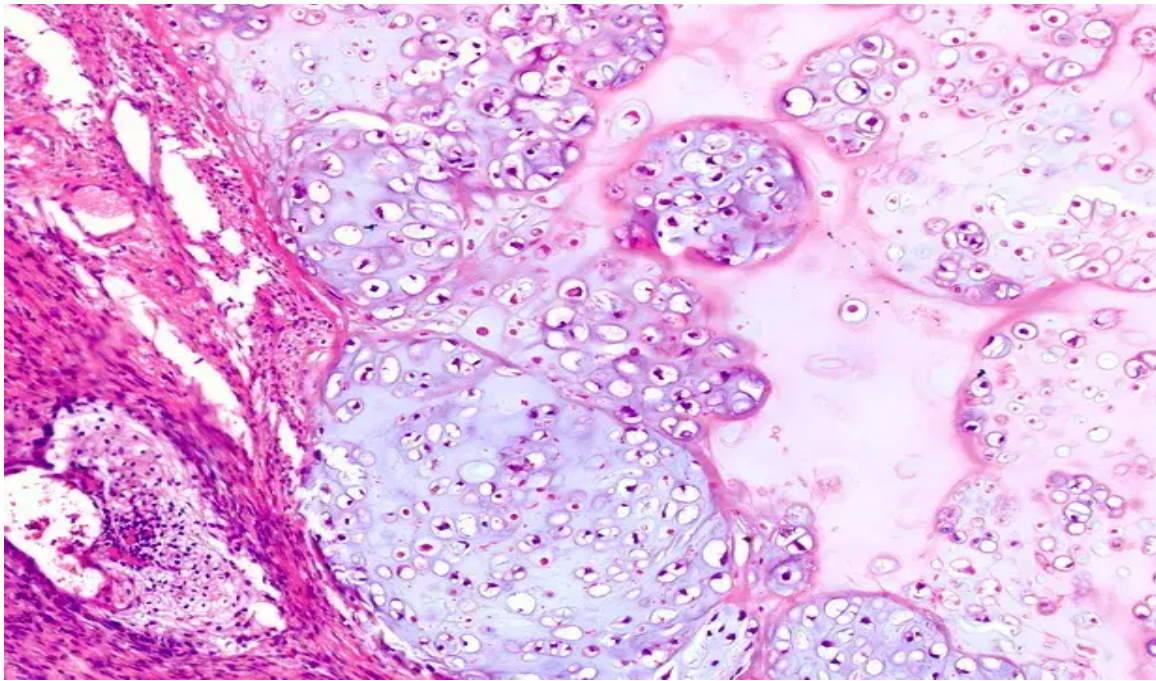


Figure 4-B: Microscopy of Immature teratoma Nodules of hyaline cartilage on the left and present adjacent to a focus with immature tissue consisting of primitive tubules, blastema, and spindle stroma. (H&E, 200X)

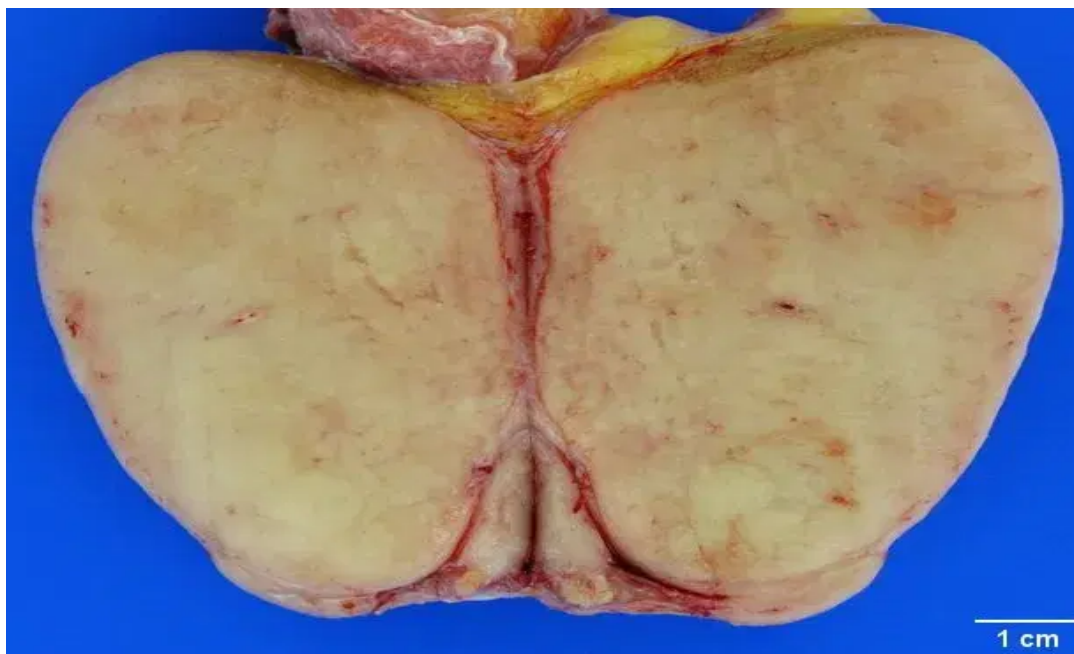


Figure 5-A: Gross of Non-Hodgkin Lymphoma. Testicular Lymphoma - Gross Pathology: In orchiectomy specimens, testicular lymphomas appear as discrete, firm or fleshy, yellow-tan/white/grey nodules ranging in size from < 1 cm to > 10 cm. The tumor may replace the entire testis, sometimes leaving only a thin rim of uninvolved parenchyma (as in this case). Foci of necrosis may be present. Testicular lymphomas can mimic seminomas grossly; however, they are more likely to show extra testicular spread as compared to seminomas.

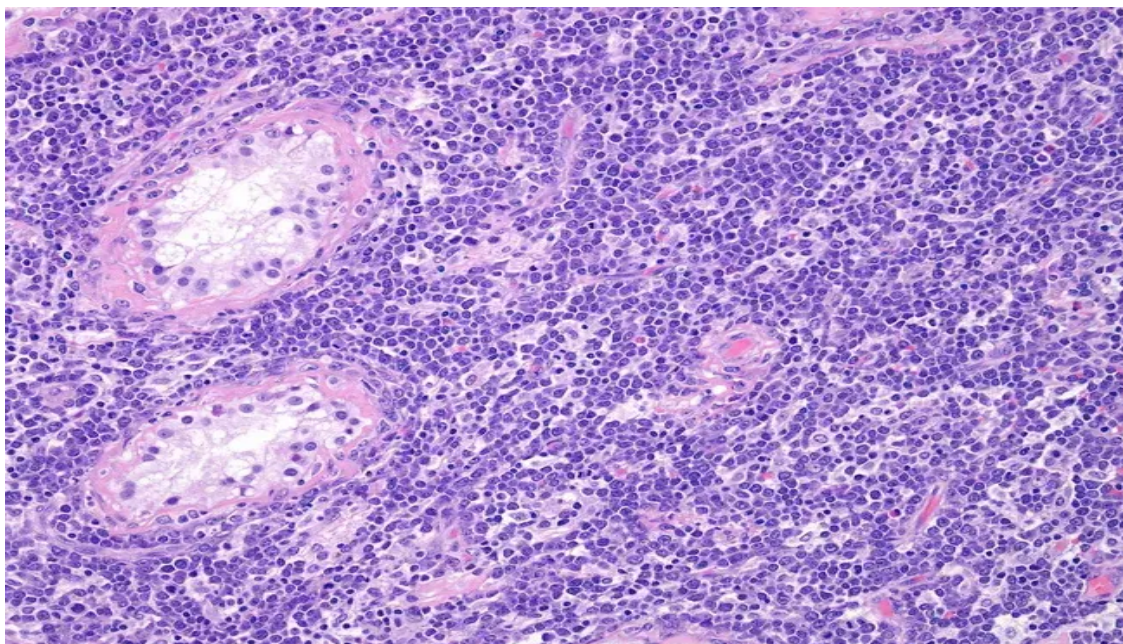


Figure 5-B: Microscopy of Non-Hodgkin Lymphoma Diffuse Large B-cell Lymphoma of the Testis: The large atypical lymphoid cells invade the periphery of the seminiferous tubules, displacing the germ cells and Sertoli cells centrally or completely replacing them. Prominent intratubular involvement is seen in rare cases. The remnants of atrophic tubules are visible as lighter pink islands in a sea of blue/purple tumor cells at low magnification. (H&E, 200X)

Discussion:

Testicular lesions varies according to its occurrence in different age groups. Testicular tumours are among the most prevalent cancers in young adults, although having a low frequency. The majority of the malignant cases in the current study occurred in the third and fourth decades of life, which is consistent with data from European and African series [7,8].

The literature indicates that the tumour's behaviour and histologic pattern vary with age. While spermatocytic seminoma and lymphoma occur in the elderly, seminoma is more common in the fourth decade of life. In young people, seminoma, embryonal cancer, teratoma, and teratocarcinoma are all common.

In this study, germ cell tumours made up 77.77% (7 cases) of the 9 malignant tumors. According to Mostefi and Price, germ cell tumors constitute more than 94% of testicular tumor [9]. This study found that 2 (28.57%) of the germ cell tumour cases were mixed germ cell tumours, which is consistent with findings from earlier investigations. There were two cases of mixed germ cell tumours in this study: one had solid form yolk sac tumour and embryonal carcinoma, while the other had seminoma with choriocarcinoma as the predominant tumour type.

Seminoma (fig.2) comprises 35-71% of testicular tumors. In this study, seminoma consisted of 44.44% (4 cases) of all testicular tumors. Two Non-Hodgkin Lymphoma NHL cases (22.22%) were observed

(fig. 5). A patient who was 31 years old had one, and a patient who was 65 years old had another. Their non-Hodgkin lymphoma was of the diffuse large B-cell type.

According to Fonseca et al., the median age at which extra nodal NHL manifests itself is 68 years. The most frequent cancer in men over 60 is primary testicular lymphoma, which makes up around 1% of all lymphomas [10].

The documented occurrence of leukemic infiltration of the testis ranges from 8% to 25% in the literature; however, in the majority of studies, this percentage is below 10% [11,12]. This study did not observe leukemic infiltration.

Post pubertal (adult) testicular teratomas (fig.4) are malignant. Malignant testicular teratomas exhibit a greater metastasis rate of 20% compared to their ovarian equivalent [13]. Pure teratoma in the testis is uncommon, making up 4% of GCT in this organ. Teratomatous characteristics are more frequently noticed in mixed GCTs in the testis, instead of pure teratoma. In this study, one case (11.11%) was observed with immature teratoma.

In the present study, for tuberculous Epididymo-orchitis (fig.1) mean age was 49.6 years which is similar to Suankwan U et al. [14] In the present study, a case of granulomatous orchitis whose age was 52 years which is similar to the study given by Grunberg H [15] who found the prevalence to be the most common in 5th to 6th decade. There were 5 cases of nonspecific Epididymo-orchitis out of 51

cases (9.80%). Age ranging from 21-60 years which is similar to the study given by Kaver et al. [16] The abnormality most frequently observed, torsion and infarction, accounted for 54.90%, in this study, with an average age of 26.5 years, which is comparable to the research conducted by Cuckow et al. [17]

Limitations:

The limitation of the study is that it was carried out in a single tertiary care hospital in India; hence this may not represent the entire population of the nation. Similar studies with a larger sample size should be conducted in multiple centers which would provide a clearer picture of the Testicular lesions in India.

Conclusion:

This study strongly recommends routine histopathological examination of all scrotal specimens for the detection of various testicular and paratesticular lesions, as well as neoplasms. Histopathology not only provides a tissue diagnosis in scrotal disorders, but it also adds to understanding etiopathogenesis and can aid in the development of future treatment options. The occurrence of testicular neoplastic lesions continues to be low in our population, as indicated by the scarcity of studies in published literature.

Germ cell tumors represented the largest percentage of seminoma subtypes, followed by mixed germ cell tumors. Among all non-neoplastic lesions, vascular lesions such as torsion and infarction are the most frequently observed findings, followed by tubercular abscess.

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