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HISTOMORPHOLOGICAL SPECTRUM OF TESTICULAR LESIONS IN A TERTIARY CARE HOSPITAL – A CROSS-SECTIONAL ANALYSIS

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ABSTRACT

Introduction: Testicular lesions requiring orchidectomy can be both neoplastic and non-neoplastic conditions. Non-neoplastic lesions are more prevalent than neoplastic ones. Incidence rates of testicular tumors show considerable geographical variation, and interestingly, they exhibit an inverse pattern to most cancers, with decreasing incidence as age increases.

Aim and objectives: This study aims to investigate spectrum of testicular lesions in suburban tertiary care center, their age-wise distribution, and various histomorphological patterns.

Materials and Methods: This is cross sectional observational study analysing all orchidectomy cases. Variables considered arehistopathological examination of H&E stained slides and other demographic variables extracted from case files. Any case files with missing demographic variable or HPE slides were excluded.

Results: Total of 120 cases were included in the study. 113 cases were non-neoplastic, and 7 cases were neoplastic. Youngest patient is 6 months old, oldest is 86 yrs old. Left sided testis is affected more, with an incidence of 57%. Epididymo-orchitis is most common benign lesion and seminoma was most common tumor.

Conclusion: Non-neoplastic lesions being more common, requires orchidectomy compared to neoplastic lesions.

***Key words**: histopathology, orchidectomy, Testicular lesions*

INTRODUCTION

Testis is affected by various non-neoplastic and neoplastic diseases at various stages of life[1]. There is a great geographical variation in the incidence of testicular tumors[1]. The testicular lesions ranging from pediatric to adult age groups, usually present with scrotal swelling, pain, and mass per abdomen[2].

Non neoplastic lesions are most common when compared to neoplastic conditions[1].Non-neoplastic lesions include inflammatory lesions such as acute and chronic epididymo-orchitis, granulomatous orchitis[2]. Other non-neoplastic lesions include cryptorchid testis, testicular torsion, and testicular atrophy. These non-neoplastic lesions are the main cause of male infertility. The testicular tumors constitute 4thmost common cause of death from

neoplasia in younger males[2].Testicular carcinoma follows a reverse pattern unlike most cancers showing decreasing incidence with increasing age[2]. Although rare, they are of great interest and importance because of their varied histological appearance[3].The tumors include germ cell tumors, sex cord stromal tumors, mixed germ cell and sex cord stromal tumors, primary tumors not specific to the testis, and metastatic tumors[4]. Despite new techniques of imaging and tumor marker assays, the diagnosis of testicular lesions is primarily dependent on histopathological examination[5]. Histopathological diagnosis plays a major role in prognostic evaluation and management.

AIM

- To evaluate the spectrum of testicular lesions in sub-urban tertiary care centers.

OBJECTIVES

- To enlist the histomorphological spectrum of testicular lesions.
- To document the histomorphological spectrum of testicular lesions with clinical features.
- To determinethe laterality of testicular lesions.

MATERIAL AND METHODS

This is a cross-sectional study conductedfor a period of 6 months in the Department of Pathology, Sri Venkateswara Ramarayan Ruia Government General Hospital/S.V.Medical College, Tirupati, Andhra Pradesh.

Inclusion criteria: The study included orchidectomy specimens of testicular lesions with written consent from the patients.

Exclusion criteria: Prophylactic orchidectomy for prostatic carcinoma and autolysed specimens were excluded from the study.

Methodology: Orchidectomy specimens received in 10% formalin were studied with respect to gross examination (size, laterality, gross appearance, solid and cystic areas, hemorrhage and necrosis. Samples taken from the representative sites were processed and embedded in paraffin wax and sections measuring 3-5µm thickness were obtained and stained with hematoxylin and eosin.Microscopic features were evaluated and immunohistochemical analysis with respective immuno-markers were done where ever necessary using Leica-Bond III IHC station.

Statistical Analysis: The details of the study will be analysed in terms of percentages and proportions and the statistical data will be shown by in form of tabular columns. Simple statistical analysis of chi square test will be used for evaluation of p value for demographic and laterality proportions. The statistical analysis will be done in Epi Info version 7.0, CDC, Atlanta and Microsoft Excel 2010 licenced version will be used for tabulation.

RESULTS

In the present study, 120 cases of testicular lesions were studied. The age group of the patients ranged from 15 years to 86 years. Most of the patients were in the age group of 6^{th} and 7^{th} decade.Out of 120 cases, 113 cases were non-neoplastic and 7 cases were neoplastic accounting for 95% and 5% respectively. Inflammatory lesions were most common non-neoplastic lesions comprising for 67.2% followed by torsion testis comprising for 11.5%. Testicular atrophy with maturation arrest comprising for 11.5% followed by cryptorchidism, hematocele and hydrocele each comprising for 3.5%,3.5% and 3.5% respectively in Table no: 1.

Among neoplastic lesions Germ cell tumors were common when compared to non-germ cell tumors. Among Germ cell tumors, seminoma was most common constituting about 28.5%, one case of mature teratoma (14.3%), one case of mixed germ cell tumor (14.3%), one case of spermatocytic tumor (14.3%), one case of testicular lymphoma (14.3%) and plasmacytoma (14.3%) as detailed in Table no: 2.

Majority of the cases (70 out of 120 cases) presented with left sided involvement constituting 58%. Right sided involvement (50 out of 120 cases) accounting for 42%. Tabulated in

Table no: 3.

Age distribution of non-neoplastic lesions showed highest incidence of non specific orchitis in 7th decade,comprising 32% of all cases followed by 6th decade,comprising 25% of all cases. Highest incidence of granulomatous orchitis in 8th decade constituting 5%of all cases

Testicular atrophy, majority of cases presented in 7th decade, comprising of 39% of all cases. Torsion testis - majority of cases presented in 2nd decade, comprising of 54% of all cases. Cryptorchidism, with equal incidence 1 case in 1st, 2nd, 3rd and 5th decade. Hematocele and hydrocele, showed highest incidence in 5th and 6th decade respectively as in Table no: 4.

Age distribution of neoplastic lesions shows highest incidence in 4th decade, accounting for 43% of cases. Most common neoplastic lesion is seminoma (2 cases) constituting of 28.5% of cases, followed by one case each of mixed Germ cell tumour, mature teratoma, spermatocytic tumor, testicular lymphoma, plasmacytoma each constituting 14.3% of cases as depicted in Table no: 5.

DISCUSSION

Testis is affected by non-neoplastic and neoplastic lesions. Our study comprised of total of 120 cases. Majority are non-neoplastic lesions (95%) compared to neoplastic lesions (5%). This is in corelation with Mansi sharma et al[6], Mahesh B Patel et al[7], Hemavathi Reddy et al[8], Sundari devi et al**[9]** (Table no: 6)

All the cases in our study presented with unilateral scrotal swelling, which is similar to Tekumalla et al study[1]. In our study, left sided involvement is more common (58%), similar to Hemavathi Reddy et al[8]. Other studies like Mahesh B Patel et al[7] and Mansi et al[6]showed right sided involvement as common presentation.

Among non-neoplastic lesions most common histological diagnosis in our study is non-specific epididymo-orchitis accounting 53.9% of cases followed by testicular atrophy constituting 11.5% of cases. (Table no: 7)

In the present study, among non-neoplastic lesions epididymo orchitisis the most common diagnosis constituting 66.3% of cases, this entity include non specific orchitis, granulomatous orchitis and pyocele showing wide range of age distribution from 30-90 years. Peak incidence is seen in the 7th and 6th decades, similar to studies by Mahesh B Patel et al[7], Kaver et al[10] and Tekumalla et al[1].

Epididymo-orchitis is most commonly caused by the spread of a urinary tract infection triggered by E. coli bacteria. Older men are more likely to develop this condition due to potential blockages in the urethra caused by an enlarged prostate or narrowing of the urethra. Microscopic examination of the testis and epididymis revealed ongoing inflammation and scarring in chronic nonspecific epididymo-orchitis. Chronic granulomatous orchitis, which may be due to tuberculous infection, microscopy examination revealed necrosis with multinucleated giant cells and granulomas (Fig: 1). In the pyocele, there is infiltration of neutrophils in the testis and epididymis.
In the present study 13 cases of testicular atrophy with maturation arrest and 4 cases of cryptorchidism, which are in the age group of 18 to 80 years. This condition could be a result of final stage of a chronic non-specific inflammation or could be due to cryptorchidism. The testicles were abnormally small. Microscopic examination revealed damaged tubules with a maturation arrest in sperm production at various stages, from the spermatogonia to spermatids.

There were 13 cases of torsion testis with hemorrhagic infarction (11.5%), which is similar to study done by Tekumalla et al[1]. Among which majority (10 out of 13 cases) are seen below 39 years. The testis was slightly enlarged, soft to the touch, and hemorrhagic. Microscopic examination revealed severe congestion, extravasation of blood, and hemorrhagic infarction.

Testicular cancer accounts for 0.5% to 1.5% of all cancers in males,seen in young men between the ages of 15 to 34 years.In the present study, seminoma is the most common neoplastic lesion constituting 28.5% of cases, similar to Mansi et al study[6] (Table no: 8).

In the present study, seminoma presented in 4th decade all cases showed right sided involvement. Grossly, seminoma showed uniformly enlarged testis, cut section shows solid,

homogenous areas white gray without involvement of tunica albuginea, epididymis or spermatic cord. Histopathology showed uniform sheets of round to polygonal cells with clear cytoplasm and central nucleus, separated into lobules by fibrous septa infiltrated by lymphocytes (Fig: 2).

In our study, one case of spermatocytic tumour presented in 5th decade is seen. Histopathology examination showed giant cells, many intermediate cells and small lymphocytes (Fig: 3)

One case of mixed germ cell tumour is seen in 4th decade, grossly, there is irregularly enlarged testis , cut section showed variegated appearance with areas of necrosis and hemorrhage. Microscopic examination revealed 90% yolk sac tumour component, 5% seminomatous component and 5% teratomatous component (Fig: 4, 5, 6).

One case of plasmacytoma presented at the age of 72 years. Microscopic examination revealed, visible sheets of cells with plasmacytoid morphology. The tumour appeared to infiltrate the epididymis but did not extend into tunica vaginalis or proximal spermatic cord. Immunohistochemistry showed positive for CD79a and CD138 (Fig: 7, 8, 9). There are no clinical or radiological features suggestive of multiple myeloma.

Testicular plasmacytoma whether occurring as primary extramedullary plasmacytoma or extramedullary multiple myeloma, is a rare clinical entity, estimated to have an incidence between 0.03% and 0.1% respectively. The proportion of extramedullary plasmacytoma in the context of multiple myeloma ranges between 0.6% -2.7%. the underlying cause of testicular plasmacytoma has prognostic implications. Secondary extramedullary spread into the testis, in a known case of multiple myeloma indicates aggressive disease, whereas primary extramedullary plasmacytoma appears to have good prognosis.

One case of testicular lymphoma is seen presented in a 56 years old male. Microscopic examination revealed diffuse infiltration of monotonous atypical small lymphocytes. The tumour cells were uniform and round to oval in shape and had scant eosinophilic cytoplasm. The nuclei were small to medium in size and round, oval or irregular in shape. Immunohistochemistry showed positive for CD3 and CD45 (Fig: 10, 11, 12).

Testicular lymphoma is a rare type of Extranodal Non Hodgkin's lymphoma accounting for 1-2% of all malignant neoplasms and 1-5% of all primary testicular malignancies. The median age of presentation is between 66-68 years of age. It commonly presents as a painless unilateral testicular mass without any constitutional symptoms for weeks or months. The most common histological subtype of primary testicular lymphoma is diffuse large B- cell lymphoma (88-98%). Primary testicular lymphoma follows an aggressive course with poor overall survival and progression free survival[11,12].

CONCLUSION

Non neoplastic lesions are most commonlyseen in 6th to 7th decade. Among neoplastic lesions, germ cell tumours, seminoma are most common, also seen are rare cases of one primary extramedullary plasmacytoma and one primary testicular lymphoma in this study. Despite new techniques in imaging and tumour marker assay the diagnosis of testicular lesions primarilydependent upon histopathological examination. Histopathological examination plays a significant role in forming an accurate diagnosis for testicular lesions.It also contributes to the grading and staging of testicular tumours to help with the adequate treatment modality.

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Conflicts of Interest: None

TABLE 1: HISTOLOGICAL TYPE OF NON-NEOPLASTIC LESIONS WITH PERCENTAGE

Histological type of non-neoplastic lesions	No of cases	%of cases
Inflammatory lesions	75	67.2%
Torsion testis	13	11.5%
Testicular atrophy with maturation arrest	13	11.5%
Cryptorchidism	4	3.5%
Hematocele	4	3.5%
Hydrocele	4	3.5%
Total	113	100%

TABLE 2: HISTOPATHOLOGICAL SPECTRUM OF NEOPLASTIC LESIONS

Histological type of testicular tumors	No of cases	% of cases
Seminoma	2	28.5%
Mature teratoma	1	14.3%
Mixed germ cell tumour	1	14.3%
Spermatocytictumour	1	14.3%
Plasmacytoma	1	14.3%
Testicular lymphoma	1	14.3%
Total	7	100%

TABLE 3: LATERALITY OF LESIONS OF TESTIS

Laterality of testis	Number	Percentage
Left sided	70	58.3%
Right sided	50	42%
Total	120	100%

TABLE 4: AGE WISE DISTRIBUTION OF NON-NEOPLASTIC LESIONS

Histological diagnosis	0-9 yrs	10-19 yrs	20-29 yrs	30-39 yrs	40-49 yrs	50-59 yrs	60-69 yrs	70-79 yrs	80-89 yrs	Total
Nonspecific orchitis	0	0	0	8	10	15	19	7	1	60
Granulomatous orchitis	0	0	0	0	2	0	1	3	0	6
Pyocele	0	0	0	0	1	1	5	0	1	9
Testicular atrophy with maturation arrest	0	1	0	2	1	2	5	1	1	13
Torsion	2	7	1	0	1	1	1	0	0	13
Cryptorchid testis	1	1	0	1	0	1	0	0	0	4
Hematocele	0	0	0	0	2	0	1	0	1	4
Hydrocele	0	0	0	0	0	2	1	1	0	4
Total	**4**	**9**	**1**	**11**	**17**	**22**	**33**	**12**	**4**	**113**

TABLE 5: AGE WISE DISTRIBUTION OF NEOPLASTIC LESIONS

Age	Seminoma	Mature teratoma	MGCT	Spermatocytic tumor	Testicular lymphoma	Plasmacytoma	Total
0-9 yrs	0	0	0	0	0	0	0
10-19 yrs	0	0	0	0	0	0	0
20-29 yrs	0	0	0	0	0	0	0
30-39 yrs	2	0	1	0	0	0	3
40-49 yrs	0	1	0	1	0	0	2
50-59 yrs	0	0	0	0	1	0	1
60-69 yrs	0	0	0	0	0	0	0
70-79 yrs	0	0	0	0	0	1	1
Total	2	1	1	1	1	1	7

TABLE 6: COMPARISON OF PERCENTAGE NON-NEOPLASTIC AND NEOPLASTIC LESIONS WITH OTHER STUDIES

	Non-neoplastic lesions (%)	Neoplastic Lesions(%)
Mansi S et al[6]	93%	7%
Mahesh B et al[7]	80%	20%
Hemavathi R et al[8]	86%	14%
Sundaridevi et al[9]	94.20%	5.8%
Present study	94.9%	5.04%

TABLE 7: COMPARISON OF VARIOUS NON-NEOPLASTIC TESTICULAR LESIONS WITH OTHER STUDIES

Histological type	Mansi et al [6]	Mahesh et al[7]	Hemavathi et al[8]	Sundari Devi et al[9]	Tekumalla et al[1]	Present Study
Epididymo-orchitis	15.1%	9.41%	3.5%	39.28%	38.5%	66.3%
Atrophy with maturation arrest	16.96%	-	19.8%	14.28%	23.08%	11.5%
Hemorrhagic	18.86%	55.29%	22.1%	17.85%	12.03%	11.5%

infarction						
Cryptorchidism	39.62%	8.24%	14%	-	4.6%	3.5%

TABLE 8: COMPARISON OF HISTOLOGICAL TYPES OF NEOPLASTIC TESTICULAR LESIONS WITH OTHER STUDIES

Histological type	Mansi et al[6]	Hemavathi et al[8]	Mahesh et al[7]	Tekumalla et al[1]	Present study
Seminoma	25%	42.9%	40%	40%	28.5%
MGCT	25%	43%	-	33.3%	14.3%
Teratoma	25%	-	33.3%	13.3%	14.3%
Yolk sac tumor	25%	-	6.6%	6.6%	-
Others	-	7.2%	20%	6.6%	28.6%

FIGURE 1: MICROSCOPIC PICTURE OF CHRONIC GRANULOMATOUS INFLAMMATION (H&E, 40X)

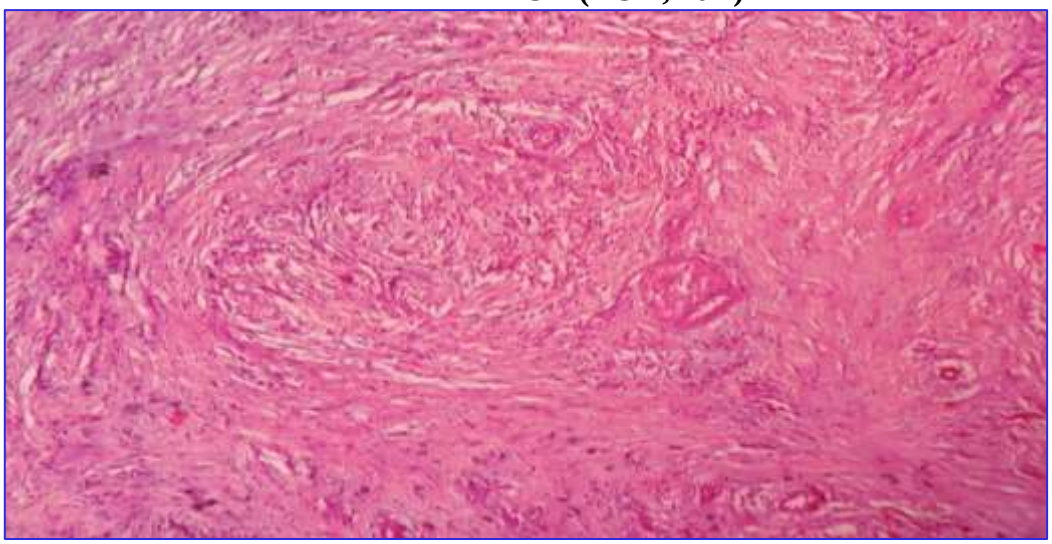

FIGURE 2: MICROSCOPIC PICTURE OF SEMINOMA (H&E, 40X)

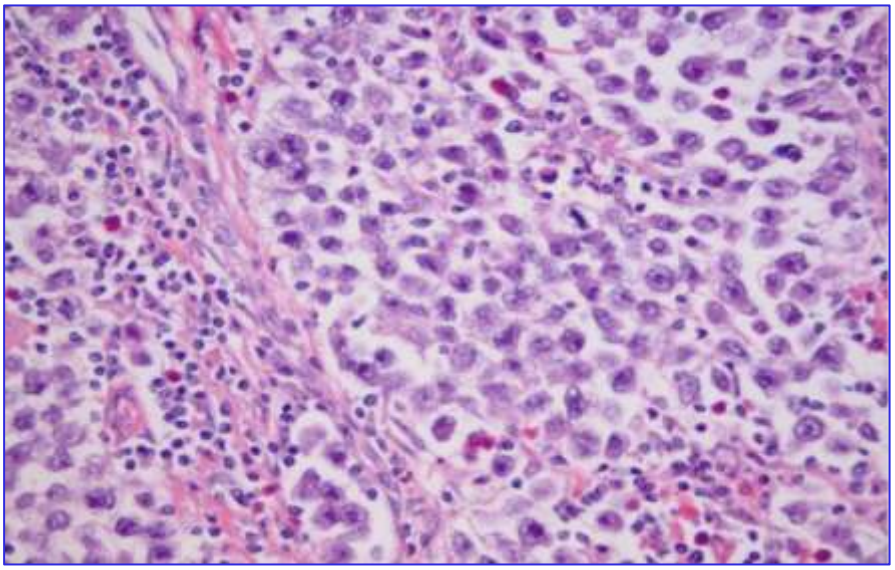

FIGURE 3: MICROSCOPIC PICTURE OF SPERMATOCYTIC TUMOR (H&E, 40X)

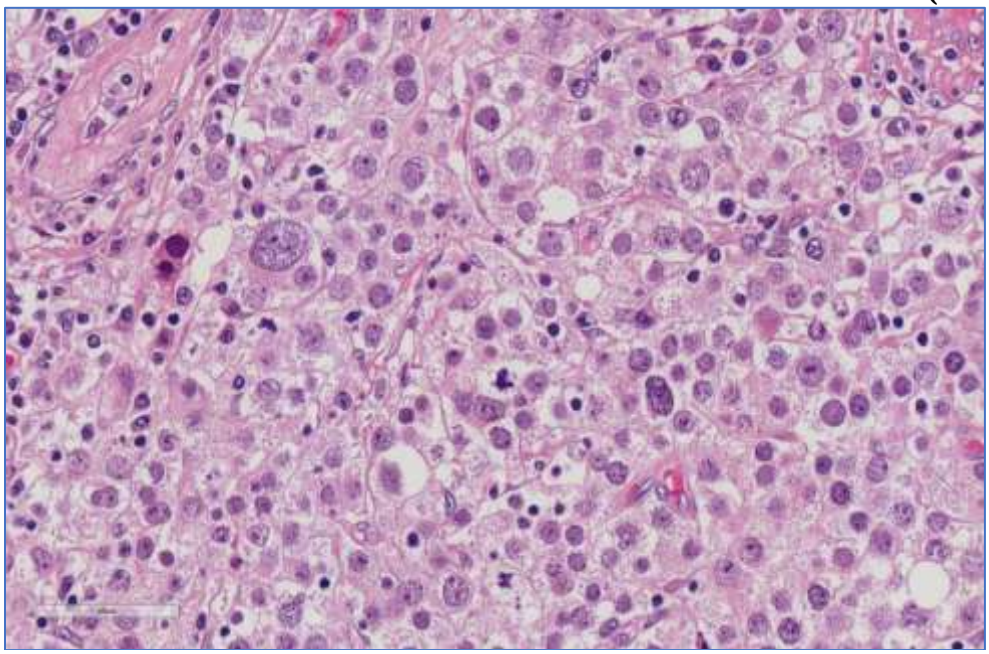

FIGURE 4: MICROSCOPIC PICTURE OF MIXED GERM CELL TUMOR (SEMINOMA COMPONENT) (H&E, 40X)

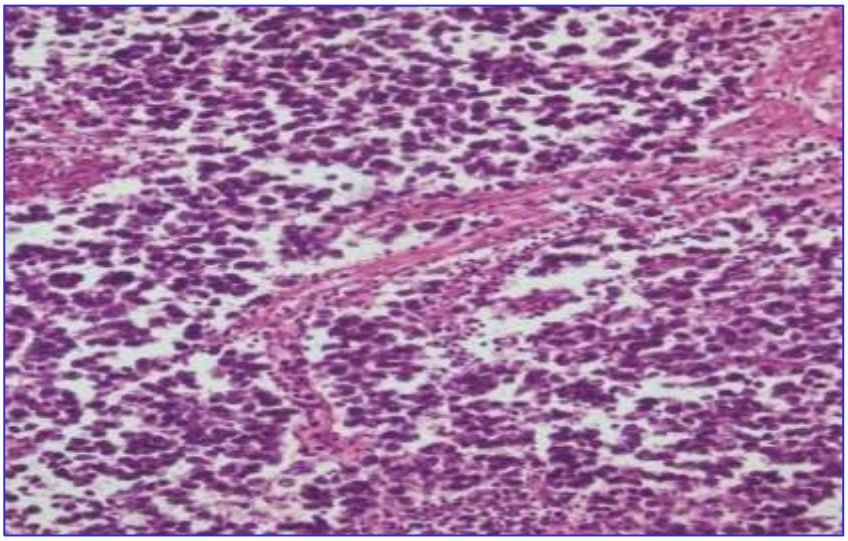

FIGURE 5: MICROSCOPIC PICTURE OF MIXED GERM CELL TUMOR (YOLK SAC TUMOUR - SCHILLER DUVAL BODIES) (H&E, 40X)

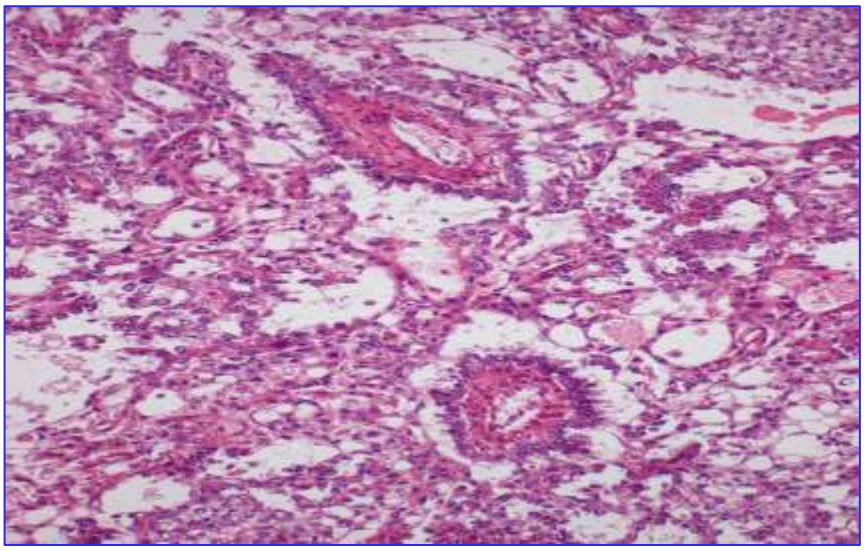

FIGURE 6: MICROSCOPIC PICTURE OF MIXED GERM CELL TUMOR (TERATOMA COMPONENT) (H&E, 40X)

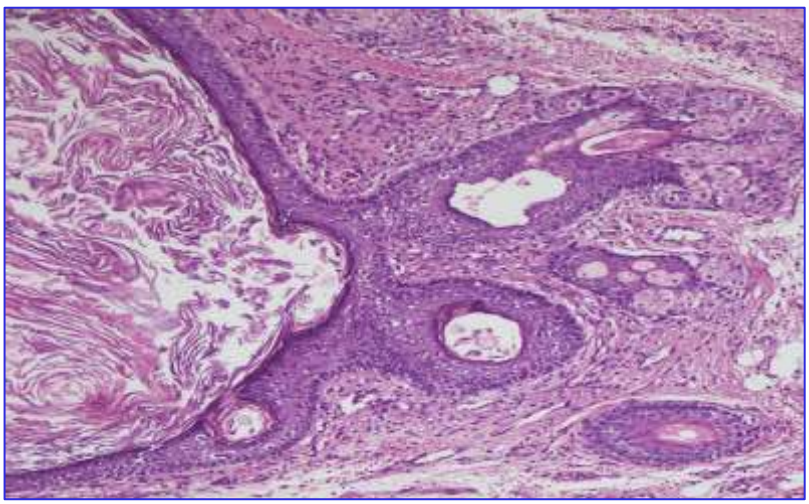

FIGURE 7: MICROSCOPIC PICTURE OF PLASMACYTOMA (H&E, 40X)

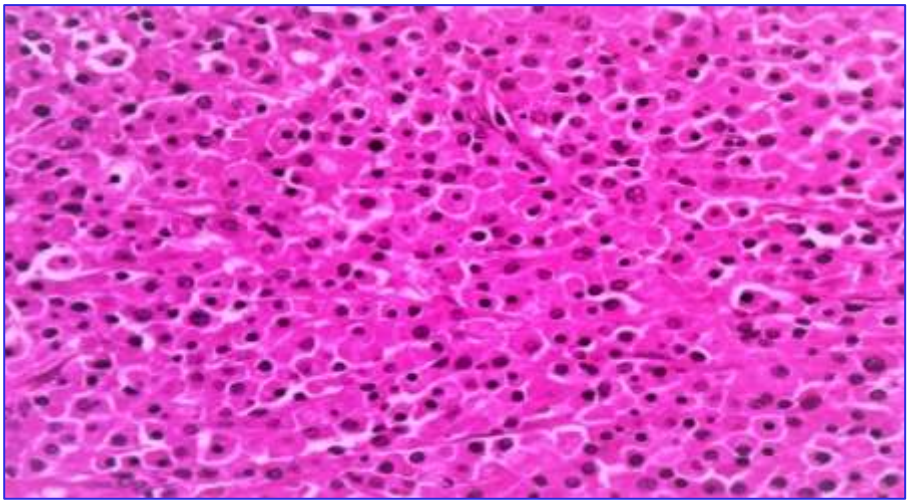

FIGURE 8: IHC SHOWS NUCLEAR POSITIVE FOR CD79a (PLASMACYTOMA)

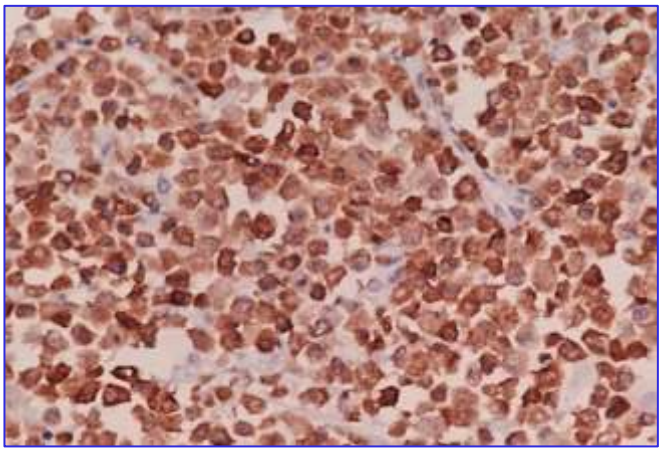

FIGURE 9: IHC SHOWS MEMBRANOUS POSITIVE FOR CD138 (PLASMACYTOMA)

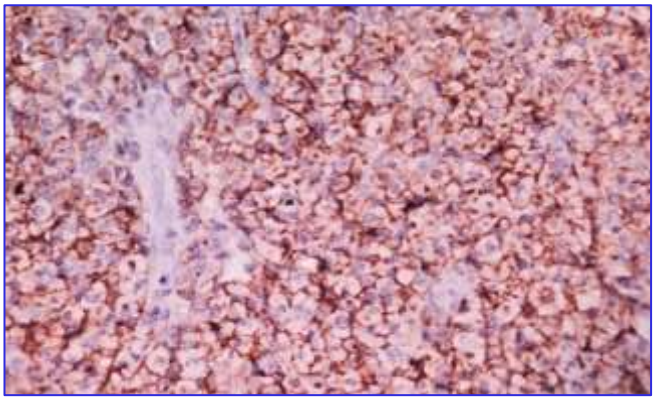

FIGURE 10: MICROSCOPIC PICTURE OF TESTICULAR LYMPHOMA (H&E, 40X)

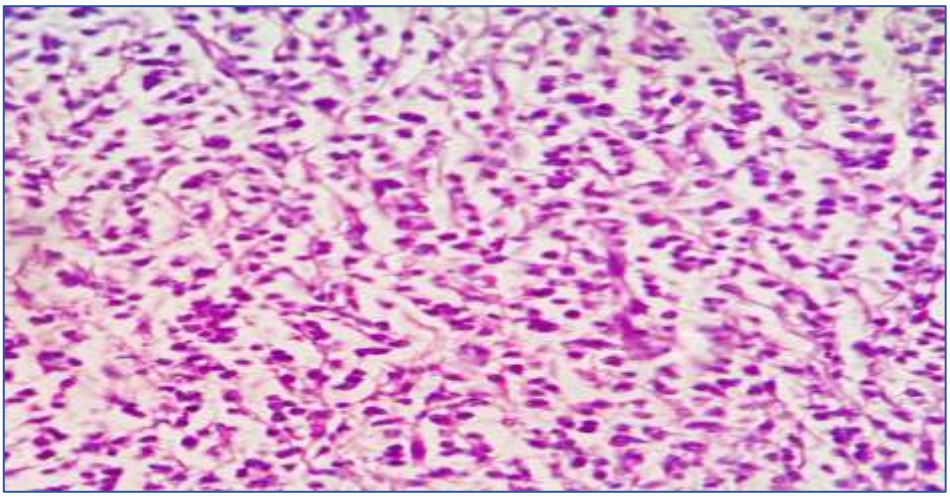

FIGURE 11: IHC POSITIVE FOR CD45 (TESTICULAR LYMPHOMA)

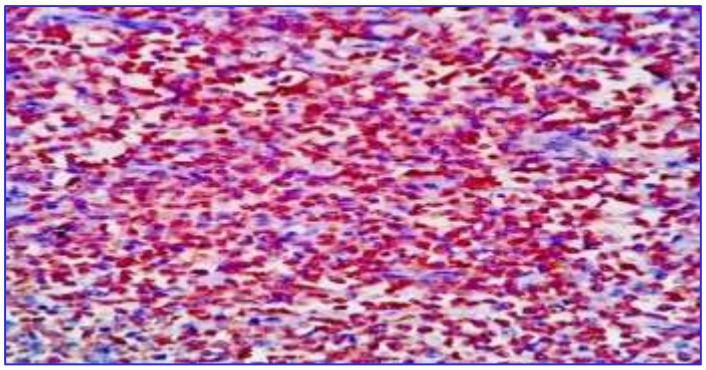

FIGURE 12: IHC POSITIVE FOR CD3 (TESTICULAR LYMPHOMA)