Int. J Med. Pharm. Res. (P-ISSN: 2958-3675 | E-ISSN: 2958-3683)
Available on: https://ijmpr.in/

International Journal
of Medical and Pharmaceutical Research

ORIGINAL ARTICLE **OPEN ACCESS**

Histopathological Analysis of Testicular Lesions in Tertiary Care Center

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Received: 27-01-2025
Accepted: 01-03-2025
Available online: 06-03-2025

A B S T R A C T

Introduction: Testicular tumors are relatively rare malignancies that primarily affect young men, typically between the ages of 20 and 40 years. 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 aninverse pattern to most cancers, with decreasing incidence as age increases. Surgical removal of the affected testis (orchiectomy) remains the cornerstone of treatment, often followed by chemotherapy or radiation, depending on the stage and histology.

Material and Method: This was a retrospective study, in which total 30 testicular cases were retrieved from database between July 2022 to June 2023, in the department of pathology, SMIMER, Surat.

Results: There was a total of 30 specimens received in the department of pathology, during the study period. 30%(9 specimen) of the total specimen does not have definite diagnosis(descriptive), 16.6% (5 specimen) was of torsion of testis, 13.3% (4 specimen) was of cryptorchidism, 6.6% (2 specimen) was of atrophy of testis, 6.6% (2 specimen) was of inflammation of testis, 6.6%(2 specimen) was of granulomatous inflammation of testis, 6.6% (2 specimen) was of ectopic testis, 3.3% (1 specimen) was of classic seminoma, 3.3% (1 specimen) was of spermatolytic tumor, 3.3%(1 specimen) was of Leydig cell tumor, 3.3% (1 specimen) was of Germ cell tumors derived from germ cell neoplasia in situ (GCNIS) - mixed Germ cell tumor- Teratoma- post pubertal type (Immature teratoma) (70%) + Yolk sac tumor (30%).

Conclusion: Testicular tumors are uncommon in our population.Non-neoplastic lesions are more prevalent than neoplastic ones. According to new WHO classification 2022 5th edition there are new changes. These are the changes· Spermatocytic tumor and seminoma both are germ cell tumors. Spermatocytic tumor is included in Germ cell tumor unrelated to germ cell neoplasia in situ. Seminoma is included in Germ cell tumors derived from germ cell neoplasia in situ (GCNIS).

KeyWords: Testicular lesions, Germ cell neoplasia in situ (GCNIS).

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 paediatric 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.

Who classification of tumors of the testis- 2022[6]

1) Germ cell tumors derived from germ cell neoplasia in situ (GCNIS):

Non-invasive germ cell neoplasia

- Germ cell neoplasia in situ
- Specific forms of intratubular germ cell neoplasia (e.g., intratubular seminoma, intratubular embryonal carcinoma)
- Gonadoblastoma
-

The germinoma family of tumors

- Seminoma:

Seminoma with syncytiotrophoblast cells

Nonseminomatous germ cell tumors

- Embryonal carcinoma
- Yolk cell tumor, post pubertal type
- Choriocarcinoma
- Placental site trophoblastic tumor
- Epithelioid trophoblastic tumor
- Cystic trophoblastic tumor
- Teratoma, post pubertal type
- Teratoma with somatic type malignancy

Mixed germ cell tumors of the testis

- Mixed germ cell tumors:
  Polyembryoma
  Diffuse embryoma
- Germ cell tumors of unknown type:
  Regressed germ cell tumors

2) Germ cell tumors unrelated to germ cell neoplasia in situ:

Spermatocytic tumor

- Spermatocytic tumor with sarcomatous differentiation

Teratoma, prepubertal type

- Dermoid cyst
- Epidermoid cyst

Yolk sac tumor, prepubertal type

Testicular neuroendocrine tumor, prepubertal type

Mixed teratoma and yolk sac tumor, prepubertal type

3) Sex cord stromal tumors of the testis:

Leydig cell tumors

- Leydig cell tumor
- Malignant Leydig cell tumor

Sertoli cell tumors

- Sertoli cell tumor
- Large cell calcifying Sertoli cell tumor

Granulosa cell tumors
- Adult granulosa cell tumor
- Juvenile granulosa cell tumor

The fibroma thecoma family of tumors
- Tumors in the fibroma thecoma group

Mixed and other sex cord stromal tumors
- Mixed sex cord stromal tumors
- Signet ring stromal tumor
- Myoid gonadal stromal tumor
- Sex cord stromal tumor NOS

4) Metastatic tumor

AIMS AND OBJECTIVES

The purpose of this study was to analyze the pattern and distribution of testicular lesions[Neoplastic/Nonneoplastic] in SMIMER Hospital, Surat in Gujarat.

MATERIALS & METHODS

Paraffin-embedded sections were stained routinely with Hematoxylin and Eosin. PAS (Periodic Acid Schiff) and reticulin stains were performed wherever necessary. Immunohistochemical staining was also done whereverrequired.
The immunomarkers included Cytokeratin, Human Chorionic Gonadotrophin (HCG), Placental Alkaline Phosphatase (PLAP), Alpha Feto Protein (AFP), Leukocyte Common Antigen (LCA), Pan-Band Pan-T. All of these monoclonal antibodies are commercially available and were obtained from DAKO.

RESULTS

There was a total of 30orchidectomyspecimens received in the department of pathology, during the study period. Non-neoplastic lesions are more prevalent than neoplastic ones.These are the non-neoplastic lesions:30% (9 specimen) of the total specimen does not have definite diagnosis (descriptive), 16.6% (5 specimen) was of torsion of testis, 13.3% (4 specimen) was of cryptorchidism, 6.6% (2 specimen) was of atrophy of testis, 6.6% (2 specimen) was of inflammation of testis, 6.6% (2 specimen) was of granulomatous inflammation of testis, 3.3% (1 specimen) was of ectopic testis. These are the neoplastic lesions 3.3% (1 specimen) was of classic seminoma, 3.3% (1 specimen) was of spermatolytic tumor, 3.3% (1 specimen) was of Leydig cell tumor, 3.3% (1 specimen) Germ cell tumors derived from germ cell neoplasia in situ (GCNIS) - mixed Germ cell tumor- Teratoma- post pubertal type (Immature teratoma) (70%) + Yolk sac tumor (30%).

Table: 1 Diagnosis wise distribution

HistologicalDiagnosis	No. of Patients	%
Leydig cell tumor	1	3.3%
Mixed teratoma and yolk sac- tumor, prepubertal type	1	3.3%
Spermatocytic tumor	1	3.3%
Classic seminoma	1	3.3%
Ectopic testis	2	6.6%

Granulomatous inflammation	2	6.6%
Inflammation	2	6.6%
Atrophy	2	6.6%
Cryptorchidism	4	13.3%
Torsion	5	16.6%
Others	9	30.0%

Table: 2 Classification According to WHO 2022

Histological Diagnosis	**Classification Acc. To WHO 2022**
LeydigCellTumor	Sexcordstromaltumorofthetestis
Spermatocytictumor, Mixed Teratoma and Yolk sac tumor-Prepubertal type	Germcelltumor unrelated oftogerm Cellneoplasiainsitu
ClassicSeminomas	Germcelltumor derivedfromgerm cell neoplasia in situ (GCNIS)

Table: 3 Age wise Distribution

Agegroup studied	1-10	11-20	21-30	31-40	41-50	51-60	60 &above
No. of patients (Out of 30)	1	2	8	2	7	5	5

Table: 4 Laterality of Lesions of Testis

SideofTestis	No.ofPatient	Total 100 %
Right testis	17	56.7%
Lefttestis	11	36.7%
Bilateraltestis	02	6.6%

Table: 5 Age wise distribution of various Neoplastic lesions

Tumor type	**0-10**	**11-20**	**21-30**	**31-40**	**41-50**	**51-60**	**>60**	**Total**	**%**
Classical Seminoma	0	0	0	1	0	0	0	1	25%
Leydig Cell Tumor	0	0	1	0	0	0	0	1	25%
Spermatocytic Tumor	0	0	0	0	0	1	0	1	25%
Mixed teratoma + Yolk sec tumor	0	0	1	0	0	0	0	1	25%
Total	0	0	2	1	0	1	0	4	100%

Table: 6 Age wise distribution of various Non-neoplastic lesions

Lesion Type	**0-10**	**11-20**	**21-30**	**31-40**	**41-50**	**51-60**	**>60**	**Total**	**%**
Ectopic Testis	0	0	2	0	0	0	0	2	7.7%
Granulomatous Inflammation	0	0	0	0	2	0	0	2	7.7%
Inflammation	0	0	0	0	1	1	0	2	7.7%
Atrophic Testis	0	0	0	0	0	1	1	2	7.7%
Cryptorchidism	1	2	1	0	0	0	0	4	15.4%
Torsion	0	0	0	1	0	2	2	5	19.2%
Others	0	0	3	0	4	0	2	9	34.6%
Total	1	2	6	1	7	4	5	26	100%

Table:7 Distribution of Neoplastic and Non-neoplastic lesions

Lesions Type	No. of Patients	Percentages
Non-neoplastic lesions	26	86.66%
Neoplastic lesions	04	13.34%
Total	30	100%

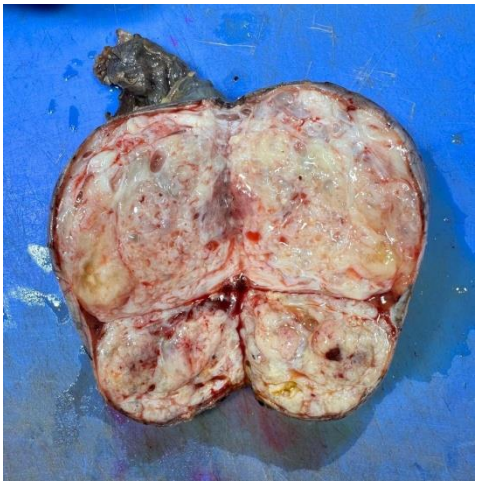
Case: Mixed Teratoma and Yolk sac tumor-Prepubertal type

History: A 24 years male patient present with complain of left side scrotal swelling since 1 month in surgery department of simmer. It was painless, gradually increasing in size and not associated with any trauma.

Gross Findings

Received specimen of left testis with spermatic cord total measuring 17x9x7 cm, testis measuring 11x9x7 cm and spermatic cord measuring 6 cm long. O/C/S well circumscribed, encapsulated, multiloculated greyish white tumor measuring 10x5.5x8 cm.

The tumor shows areas of necrosis and focal haemorrhage.



Microscopy:

Various areas showing presence of variable type of tissue having mature and immature components contains stratified squamous epithelium with keratinization, gastrointestinal glands, cartilage, neural tissue, primitive undifferentiated spindle cells, rhabdoid components and neuroectodermal tissue forming rossets.

Cells are pleomorphic, having hyperchromatic nuclei, prominent nucleoli and clear to eosinophilic cytoplasm.

Section from haemorrhagic area shows large, solid group of cells arranged in microcystic pattern, glands and finger like papillary structures with large central blood vessels surrounded by clear space (schiller-duval bodies) in myxoid stroma, with presence of hyaline globules which resembles the yolk sac component of the tumor.

Image: 1,2 (H & E Stain, 10X View)
1-Ectodermal squamous epithelium and skin adnexal structure (pilosebaceous glands, keratin pearls, keratin flakes)
2-Mesoderm-cartilge

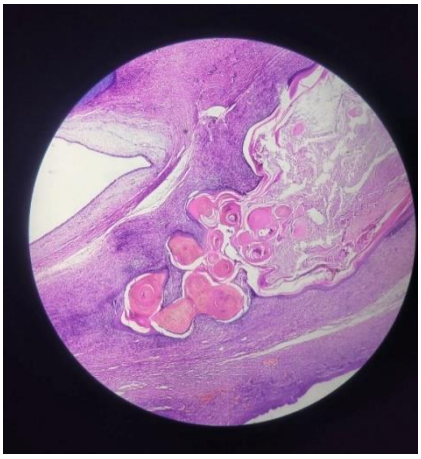
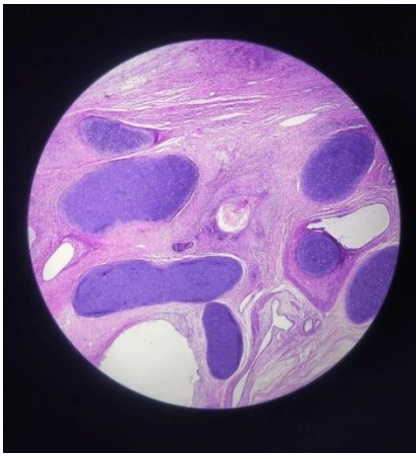



Image: 3,4 (H & E Stain, 10X View)
Immature neuroepithelium – primitive neuroectodermal rosettes (These rosettes are composed of mitotically active hyperchromatic cells with an increased N:C ratio)

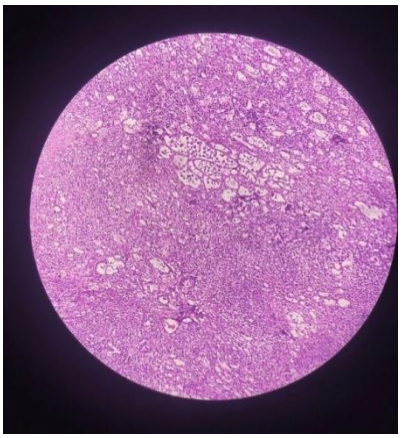
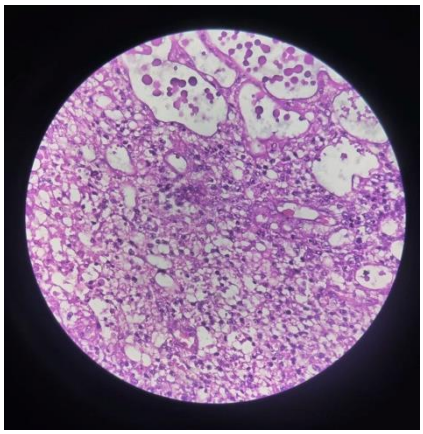



Image: 5,6 (H & E Stain, 10X and 40X View)
Reticular pattern- loose meshwork of anastomosing spaces, few hyaline globules

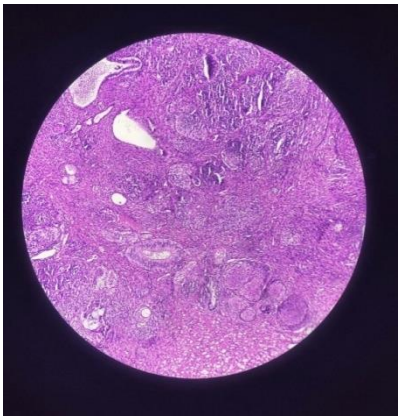
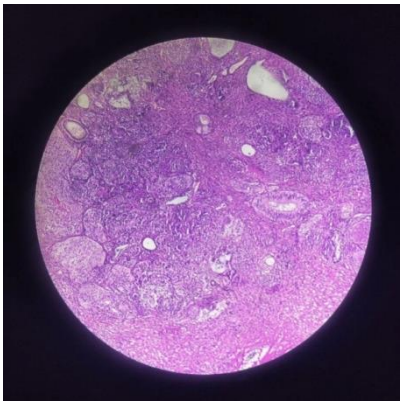
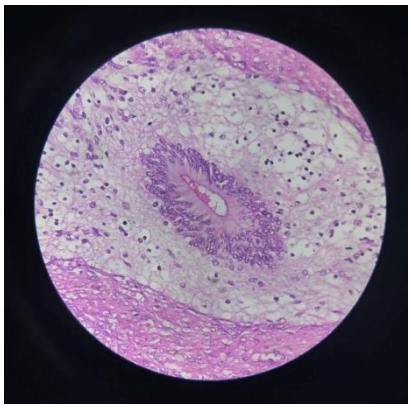
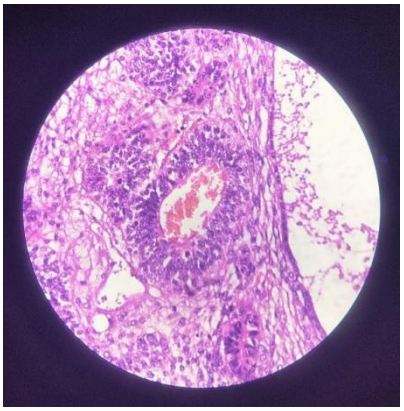



Image: 7,8(H & E Stain, 10X and 40X View)
Schiller-Duval body-composed of central blood vessels surrounded by clear space in myxoid stroma





DISSCUSION

Testis is affected by non-neoplastic and neoplastic lesions. Our study comprised of total of 30 cases. Majority are non-neoplastic lesions (86.6%) compared to neoplastic lesions (13.4%). This is in correlation with Mansi Sharma et al [7], Mahesh B Patel et al [8], Hemavathi Reddy et al [9].

In the present study, among non-neoplastic lesions Torsion is the most common diagnosis constituting 16.6% of all cases. Peak incidence is seen in the 5th and 6th decades, similar to studies by Mahesh B Patel et al [8] and Tekumalla et al [1].

Testicular cancer accounts for 0.5% to 1.5% of all cancers in males seen in young men between the ages of 20 to 40 years.In the present study, seminoma is the most common neoplastic
lesion constituting 3.3% of all cases, similar to Mansi et al study [7].

All the cases in our study presented with unilateral scrotal swelling, which is similar to Tekumalla et al study [1]. In our study, right sided involvement is more common (56.7%), similar to studies like Mansi et al [7]and Mahesh B Patel et al [8]

Another study from the neighboring state of India revealed similar age incidence for seminoma is on average of 34 years. This finding is consistent with the reported in international literature. Aapproximately 11% of testicular tumors are associatedwith cryptorchidism, seminoma being the commonest. In the patients with unilateral cryptorchidism, the contralateral, normally descended testis may also undergo malignant transformation [10].

In our studycryptorchidism was seen in 13.3% of cases and seminomas was seen in 3.3% of cases.

According to new WHO classification 2022 5th edition there are new changes. These are the changes (6)

-Spermatocytic tumor and seminoma both are germ cell tumors.
-Spermatocytic tumor is included in Germ cell tumor unrelated to germ cell neoplasia in situ.
-Seminoma is included in Germ cell tumors derived from germ cell neoplasia in situ (GCNIS). (3)

<u>These are some other changes-</u>

Primitive neuroectodermal tumor renamed embryonic neuroectodermal tumor
Seminoma placed in germinoma family of tumors
Criteria for teratoma with somatic transformation changed including size-based rather than on low-power fields criteria
Carcinoid tumors of the testis now termed pre-pubertal type testicular neuroendocrine tumor (with acknowledgement of rare post-pubertal type NETS)
Use of mitotic counts per HPF changed to per mm^2 for malignancy assessment in sex cord-stomal tumors.
Signet ring stromal tumour defined as a new entity in the WHO classification.
Myoid gonadal stromal tumour has been moved from a provisional entity to a new entity.
Well differentiated papillary mesothelial tumour defined as a separate tumour type.
Sertoli form cystadenoma removed from adnexal tumours and placed with Sertoli cell tumours.

CONCLUSION

Non neoplastic lesions are most commonlyseen in 5th to 6th decade. Among neoplastic lesions, germ cell tumors, seminoma are most common, also seen rare case of Germ cell tumor derived from germ cell neoplasia in situ (GCNIS) - mixed Germ cell tumor- Teratoma- post pubertal type (Immature teratoma) (70%) + Yolk sac tumor (30%). Despite new techniques in imaging and tumors marker assay the diagnosis of testicular lesions primarily dependent uponhistopathological 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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