Section: Pathology

Original Research Article

HISTOPATHOLOGICAL SPECTRUM OF TESTICULAR LESIONS- A RETROSPECTIVE STUDY OF 62 ORCHIDECTOMY SPECIMEN

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ABSTRACT

Background: Testicular tumors are rare, comprising 1% of all male cancers worldwide. Testicular lesions have a varied histomorphological spectrum and are categorized as nonneoplastic or neoplastic. The aim and objective are to study the incidence of testicular lesions, the histomorphological spectrum including non-neoplastic and neoplastic lesions, and to determine the age-wise distribution and laterality of testicular lesions. **Materials and Methods:** The present study is an observational study, carried out in the Department of Pathology, NAMO Medical Education and Research Institute, Silvassa, India over a period of three years (January 2022 to December 2024). A total of 62 orchidectomy specimens were examined for gross and microscopic findings. **Result:** 62 orchidectomy specimens were analyzed. Of these, 59 cases were non-neoplastic and 03 were neoplastic. The highest number of patients presented in the 2nd & 5th decade of life. Torsion of the testis was the most common non-neoplastic lesion (20.9%), followed by atrophic testes and Gangrenese testis (19.3%). Mixed Germ Cell Tumors was the most common neoplastic lesions, followed by single case of Sex cord stromal tumor. Most patients present with scrotal swelling and inguinal hernia. The right and left testes were equally involved in all the cases. **Conclusion:** Non-neoplastic lesions were more common than neoplastic lesions. Germ cell tumors accounted for the highest percentage of cases, with the most common subtype being seminoma, followed by mixed germ cell tumors. Histopathological examination can help accurately diagnose and determine the prognosis of these rare tumors and tumor-like lesions of the testis.

INTRODUCTION

Testicular tumors are relatively rare and comprise 1% of all male cancers worldwide with peak prevalence in the age group 15-35 years.[1,2] As incidence of testicular tumors is high among young adults of reproductive age, it is believed that high estrogen levels in-utero may contribute to development of testicular cancers.[3] A reverse trend in comparison to the general observation has been seen with the testicular cancers where the incidence decreases with increasing age.[4]

Testis is affected by both neoplastic and non neoplastic conditions. Non neoplastic testicular lesions include cryptorchid (undescended) testis, testicular torsion, testicular atrophy, epidermoid cysts, infections of testis like tuberculosis, malakoplakia and vasculitis.[5] Tuberculosis, leprosy, syphilis and sarcoidosis can also involve testis. 2016 WHO classification of testicular tumors introduced several updates which including germ cell tumors, sex cord stromal tumors, tumors containing both germ cells and sex-cord stromal cells and paratesticular tumors.[6] Known risk factors for developing testicular tumor include a family history of testicular tumor in a first degree relative, infertility, cryptorchidism, Klinefelter's syndrome, birth weight, gestational age and inguinal hernia.[7,8] Thus, a combination of genetic, and environmental factors contributes to the etiology of testicular tumors.

Despite advances in radiological and newer techniques in tumor marker assays, histopathological examination of orchidectomy specimens and testicular biopsies are important for diagnosis of testicular tumors.

Aims and objectives

1. To study the morphological characteristics of testicular lesions.
2. To study the histomorphological spectrum of testicular lesions including non-neoplastic and neoplastic lesions.

3. To determine their incidence and laterality in various age groups.

MATERIALS AND METHODS

Study setting: This study includes a years retrospective analysis of all surgical specimens related to testis obtained at the Department of Pathology, NAMO Medical Education and Research Institute, a tertiary care hospital, Silvassa, India.
Study period: The study period was conducted from January 2022 to December 2024.
Study subjects: There were total of 62 cases.
Inclusion criteria:
All tumors and tumor like lesions of the testes were included in the study and were categorized according to the 2016 WHO classification of testicular tumors.
Exclusion criteria:
Recurrent tumors and tumors occurring secondary to radiation induced damage were excluded from the study.

Method of data collection: Relevant data like age, clinical presentation and type of surgical procedure were collected from medical records. Gross specimens, slides and blocks were retrieved and reviewed. Hematoxylin & Eosin stained histopathology slides were studied in detail. Special stains like PAS and Zeil Neilson stain were done wherever necessary.
World Health Organization classification was used for classifying the tumors.
Data were analyzed to determine the incidence of various lesions, age at presentation, laterality, and histopathological features.

RESULTS

First, this was a retrospective study. In total 62 cases of testicular lesions were studied. 59 cases were non-neoplastic (95.1%) and three were neoplastic(4.8%).

Table 1: Histopathological spectrum of testicular lesions

Lesions	Number (n=62)	Percentage (%)
Torsion of Testis	13	20.9
Inflammatory lesion of testis	8	12.9
Normal testis	8	12.9
Gangrenese testis	12	19.3
Malignant lesion of testis	3	4.8
Atrophic testis	12	19.3
Microfilarial parasites infestation with Ischemic changes in the testis	1	1.6
Undescended testis	5	8.0
Total	62	100

[Table 1] documents the major non-neoplastic and neoplastic histomorphological groups in this study. Non-neoplastic lesions include torsion of testis, with 13 cases (20.9%) followed by atrophic testis and Gangrenous testes, each representing 12 cases (19.3%). Orchitis were observed in 8 cases (12.9%), therapeutic orchidectomy (normal testes) in 8 cases (12.9%) and Undescended testis in 5 cases (8.0%). Microfilaria parasite infestation was reported 1 case (1.6%). Neoplastic lesion represent total 3 cases (4.8 %), which included Malignant Mixed Germ Cell Tumor with component seminoma and yolk sac tumor, Malignant Non Seminomatous Mixed Germ Cell Tumor and Sex Cord Stromal Tumor most probably Leydig Cell Tumor, were reported one case (1.6%) each.

Table 2: Age wise distribution of testicular lesions.

Lesions	0-10 yr	11-20 yr	21-30 yr	31-40 yr	41-50 yr	51-60 yr	61-70 yr	71-80 yr
Torsion of Testis	2	10	0	0	0	0	0	1
Inflammatory lesion of testis	0	1	1	2	1	1	1	1
Normal testis	0	0	0	1	2	3	0	2
Gangrenese testis	1	3	1	1	1	4	1	0
Malignant lesion of testis	0	1	2	0	0	0	0	0
Atrophic testis	2	1	1	0	2	4	1	1
Microfilarial parasites infestation with Ischemic changes in the testis	0	0	0	1	0	0	0	0
Undescended testis	1	1	2	0	1	0	0	0
TOTAL	6	17	7	5	7	12	3	5

Age of the patients ranged from 2 months to 76 years. There were 10 cases of torsion of testis in the second decade and 2 cases in the first decade. Atrophic testis were encountered commonly in fifth decades. Inflammatory lesions of testis and gangrenous testis were observed mainly in 11 years to 70 years age groups. There were 5 cases of undescended testis, most common between first decade to fourth decade.

A single case of microfilarial parasites infestation with Ischemic changes in the testis was seen in 37-year-old patient. One case of Malignant Mixed Germ Cell Tumor with component seminoma and yolk sac tumor at the age of 24 year. One case of Malignant Non Seminomatous Mixed Germ Cell Tumor at the age of 24 year. One case of Sex Cord Stromal Tumor

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Most Probably Leydig Cell Tumor at age of 13 year [Table 2].

Among all the specimens received 31 cases (50%) showed right testicular involvement and 31 cases (50%) showed left testicular pathology.

Frequent findings among these specimens were torsion of the testis (13 cases), grossly showing coagulative necrosis of seminiferous tubules and epididymis with interstitial hemorrhage, dilated and congested blood vessels. Atrophic testicular changes (12 cases), were grossly reduced in size. Smaller tubules, reduced germ cells, thickened basement membrane and interstitial fibrosis were commonly observed by microscopy.

A single case of Malignant Mixed Germ Cell Tumor with component seminoma and yolk sac tumor and one case of Malignant Non Seminomatous Mixed Germ Cell Tumor in the present study. Grossly, variegated, hemorrhagic, necrotic and cystic areas replacing the entire testis. Microscopy revealed that the tumor cells are predominantly arranged in diffuse sheets and nests. At places tumor cells are arranged in micro-cystic /loose reticular pattern and focal glandular structures. At places tumor cells have a high N:C ratio, enlarged pleomorphic with multiple macronucleoli and amphophilic cytoplasm. Bisk mitotic activity with atypical mitosis were also observed. One case of Sex Cord Stromal Tumor most probably Leydig Cell Tumor, grossly, well encapsulated and cut surface is spongy brownish in color with a grayish white nodule. Microscopy revealed tumor cells arranged in nodules that were separated by fibrous septa. The cells were polygonal in shape with abundant eosinophilic cytoplasm and uniform round nuclei. Uninucleated and multinucleated cells were observed.

DISCUSSION

The present study included 62 patients with testicular lesions. Among the testicular lesions, there were three cases of malignancy 3/62 (4.8%), and the remaining lesions were non-neoplastic 59/62 (95.1%). This is comparable to other studies in which similar results were obtained [Table 3].

Table 3: Comparison of incidence of benign and malignant testicular lesions.

Authors	Benign lesions	Malignant lesions
Reddy H et al,[5]	86%	14%
Patel MB et al,[9]	85%	15%
Karki S et al,[10]	88.5%	11.4%
Charak A et al,[11]	90.1%	9.8%
Sharma M et al,[4]	93%	7%
Deore KS et al,[12]	91.7%	8.2%
Present study	95.1	4.8

In the present study, testicular torsion was the most common non-neopastic testicular lesion observed in 13 cases (20.9%). Reddy H et al,[5] Patel MB et al,[9] and Jaiswal, Shruti,[13] frequently encountered torsion testis which is compatible with present study. This is in contrast to other studies where Sharma M et al,[4] and Charak A et al,[11] found undescended testis as a common benign lesion. [Table 4]

Table 4: Comparison of the distribution of non-neoplastic testicular lesions.

Lesions	Present study (n=62)	Reddy H et al (5) (n=86)	Patel MB et al (9) (n=85)	Sharma M et al (4) (n=53)	Charak A et al (11) (n=77)	Gaikwad SL et al (14) (n=120)	Abba K et al (15) (n=70)
Torsion/infarction testis	20.9%	22.1%	55.29%	18.86%	15.3%	12.8%	14.3%
Undescended testis	8.0%	14%	8.24%	39.62%	46.1%	15.6%	10%
Chronic nonspecific orchitis	12.9%	3.5%	9.4%	15.1%	-	19.7%	10%
Atrophic testis	19.3%	-	-	16.98%	9.09%	9.80%	-
Mixed Germ cell tumour	4.8%	-	-	-	-	27.8%	-
Microfilarial parasites infestation with Ischemic changes in the testis	1.6%	-	-	-	-	-	-

Torsion of testis is most common non-neoplastic entities observed in present study. Which is more common in second decade (10/13). All three cases of malignancy are seen in second and third decade.

There were 8 cases of inflammatory lesions of testis (12.9%) received from age group 11-70 years which is in compatible with Dhanya K. at al,[16] in which these lesions were common in groups between 41 and 80 years. In the present study there was single case of microfilaria infestation in testis with ischemic changes and calcification (1.6%). This was observed at age of 37 years.

In the present study there were 12 cases of atrophic testis (7/12), few of them were associated with hydrocele (3/12), pyocele (1/12) and Leydig cell hyperplasia (1/12). They showed secondary changes like thickening of tunicas, focal calcification, testicular shape change, epididymal and cord thickening. According to Michael H et al,[17] large hydrocoele and long duration impairs spermatogenesis and may lead to infertility. Dandapat HC et al,[18] also proposed that there is a direct relationship between duration of hydrocoele, its size and pathological change. Histopathologic

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examination of pyocele showed varying amounts of acute inflammatory infiltrates, congestion, edema, formation of microabscesses and more confluent areas of suppuration often involving testis.

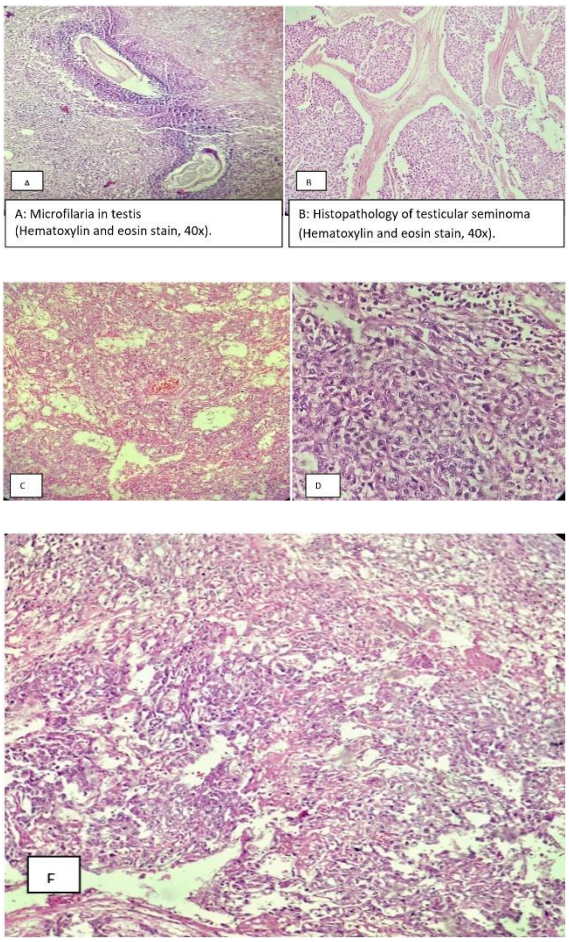

Figure 1: C, D, E: Mixed Germ cell tumour (C,E: Yolk sac tumour showing microcystic pattern, D: Marked pleomorphic cells) (Hematoxylin and eosin stain, 40x).

CONCLUSION

The testis can develop both non-neoplastic and neoplastic lesions. Benign lesions outnumbered malignant lesions and were observed in all age groups with a predominance between 11 and 60 years. Right and left side testes were involved equally. Torsion of testis was most common pathologic finding in testis. This study shows that gross morphology can provide important clues for pathological diagnosis. Microscopic examination plays a crucial role in the definitive diagnosis of these lesions.

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