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Original Research Article

Histomorphological Spectrum of Testicular Lesions: A Five-Year Retrospective and Prospective Study at a Tertiary Care Center in North Karnataka

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Abstract:

Background: Testicular lesions include a wide range of conditions, from inflammation and degeneration to benign and malignant tumors. A thorough histopathological assessment is crucial for making a clear diagnosis, guiding treatment, and evaluating prognosis.

Objectives: This study aims to examine the types of testicular lesions over a five-year period. It will also assess the occurrence of non-neoplastic and neoplastic conditions among patients at a tertiary care center in North Karnataka.

Materials and Methods: We conducted a combined retrospective and prospective descriptive study in the Department of Pathology at KIMS, Hubballi, from April 2014 to March 2019. We analyzed all testicular specimens received during this time for both gross and microscopic features. We gathered data on age, laterality, and clinical presentation.

Results: We studied a total of 131 testicular specimens. Non-neoplastic lesions were more common, with 109 cases (83.2%), compared to neoplastic lesions, which had 22 cases (16.8%). The most common non-neoplastic lesion was torsion (22.9%), followed by atrophic testis (16.5%) and nonspecific epididymo-orchitis (13.8%). Among neoplastic lesions, germ cell tumors made up 95.5% of all testicular tumors, with seminoma as the most frequent type (40.9%). The correlation between FNAC and histopathology showed a sensitivity of 75% and a specificity of 100%.

Conclusion: Non-neoplastic lesions are significantly more common than neoplastic lesions, showing that inflammatory and degenerative processes prevail in testicular conditions. Seminoma is the most common type of cancer. Histopathological evaluation remains the best method for accurately classifying testicular lesions.

Keywords: Testicular lesions, Histopathology, Seminoma, Torsion testis, Germ cell tumors.

Introduction

Testicular lesions include various pathological conditions that affect the male gonads. These range from developmental and inflammatory issues to benign and malignant tumors. The testis is unique because it produces sperm and secretes hormones. This dual function makes it vulnerable to different problems that appear as lesions with similar clinical signs.

Worldwide, testicular tumors make up only 1 to 2% of all male cancers. However, they are the most common solid tumors in young men aged 15 to 40 years [1]. The overall rate of testicular cancer has been rising, especially in Western countries, but mortality remains low due to better diagnostic and treatment methods [2]. In contrast, non-cancerous testicular lesions are more common in India, with conditions like testicular torsion, infection, and atrophy being frequent causes for orchiectomy [3, 4].

The World Health Organization (WHO, 2016) classifies testicular tumors mainly into two categories: germ cell and non-germ cell [5]. Germ cell tumors (GCTs) account for about 95% of testicular tumors. They include seminoma, embryonal carcinoma, teratoma, yolk sac tumor, and choriocarcinoma. The rest consist of sex cord-stromal tumors and secondary cancers like lymphoma [6].

Given the wide range of causes and overlapping clinical signs, histopathological evaluation is essential for identifying, predicting outcomes, and planning treatment. This study aims to analyze the histomorphological spectrum of testicular lesions seen

at a tertiary care hospital in North Karnataka over five years.

Materials and Methods

Study Design: A retrospective and prospective descriptive study took place in the Department of Pathology at the Karnataka Institute of Medical Sciences (KIMS) in Hubballi over five years, from April 2014 to March 2019.

Study Population: All surgically removed testicular specimens received in the pathology department during the study period were included.

Inclusion Criteria:

- All testicular specimens obtained through orchidectomy or biopsy.
- Properly fixed and processed tissues.

Exclusion Criteria:

- Poorly fixed or autolyzed specimens.
- Paratesticular and epididymal lesions.

Methodology: The specimens were fixed in 10% neutral buffered formalin, examined systematically, sectioned, processed, and embedded in paraffin wax. Sections measuring 4–5 µm were stained with hematoxylin and eosin (H&E). Special stains and immunohistochemistry were used as needed. All lesions were classified according to the 2016 WHO classification of testicular tumors.

Statistical Analysis: Data were gathered and analyzed using descriptive statistics. The sensitivity, specificity, and diagnostic accuracy of FNAC were calculated for cases with available correlation.

Overall Distribution: A total of 131 testicular lesions were studied. Among these, 109 cases (83.2%) were non-neoplastic, and 22 cases (16.8%) were neoplastic.

Results

Table 1: Distribution of Testicular Lesions

Category	Number of Cases	Percentage (%)
Non-neoplastic	109	83.2
Neoplastic	22	16.8
Total	**131**	**100.0**

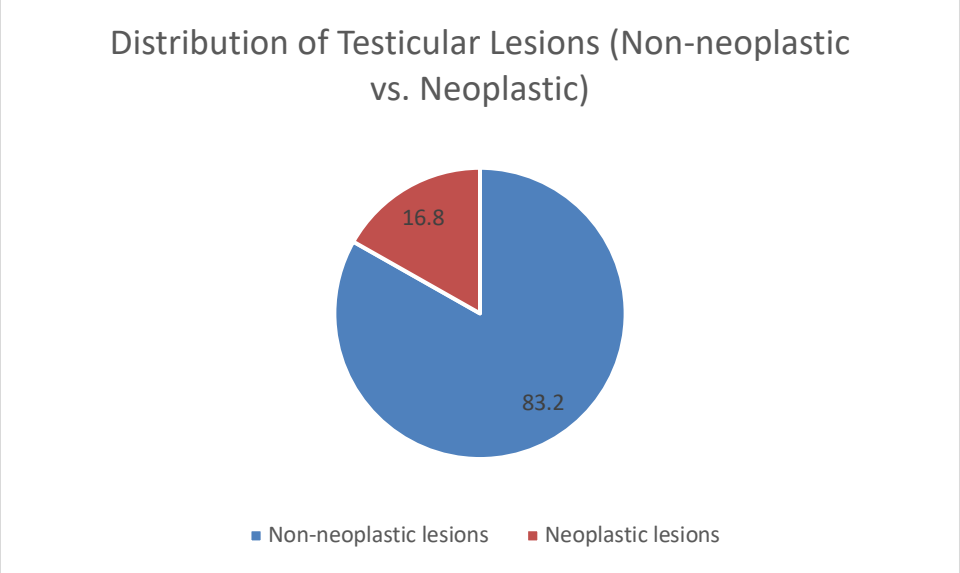

Figure 1: Pie chart showing proportion of non-neoplastic (83%) vs. neoplastic (17%) testicular lesions.

Laterality: Right-sided lesions were slightly more common (57 cases, 43.5%) compared to left (49 cases, 37.4%), with bilateral involvement in 25 cases (19.1%).

Mode of Presentation: The predominant clinical presentation was scrotal swelling (72.1%), followed by pain (41.5%), fever (9.8%), empty scrotum (9.8%), and tenderness (8.1%).

Table 2: Mode of Presentation

Clinical Feature	Number of Cases	Percentage (%)
Scrotal swelling	95	72.1
Pain	54	41.5
Fever	13	9.8
Empty scrotum	13	9.8
Tenderness	11	8.1

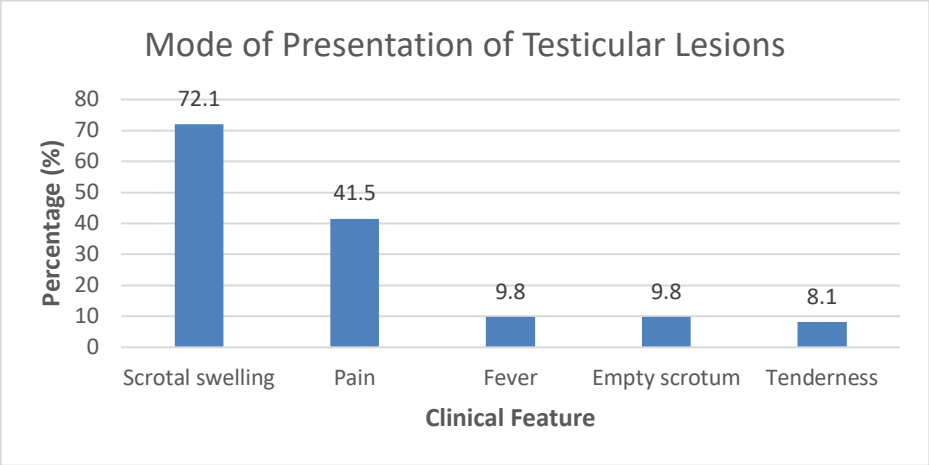

Figure 2: Bar graph showing distribution of clinical presentations.

Age Distribution: Lesions were encountered between 6 months and 78 years of age. The most affected age group was 31–40 years (22.1%), followed by 21–30 years (18.3%).

Table 3: Age-Wise Distribution of Testicular Lesions

Age Group (Years)	No. of Cases	Percentage (%)
0–10	6	4.6
11–20	19	14.5
21–30	24	18.3
31–40	29	22.1
41–50	21	16.0
51–60	11	8.4
61–70	15	11.5
71–80	6	4.6

Non-Neoplastic Testicular Lesions: Of the 109 non-neoplastic cases, torsion testis was the most frequent (25 cases, 22.9%), followed by atrophic testis (16.5%) and nonspecific epididymo-orchitis (13.8%).

Table 4. Spectrum of Non-Neoplastic Testicular Lesions

Lesion	Number of Cases	Percentage (%)
Torsion testis	25	22.9
Atrophic testis	18	16.5
Undescended testis	11	10.1
Nonspecific epididymo-orchitis	15	13.8
Acute suppurative orchitis	11	10.1
Tubercular orchitis	5	4.6
Testicular abscess	5	4.6
Granulomatous orchitis	4	3.7
Normal histology	15	13.7
Total	**109**	**100.0**

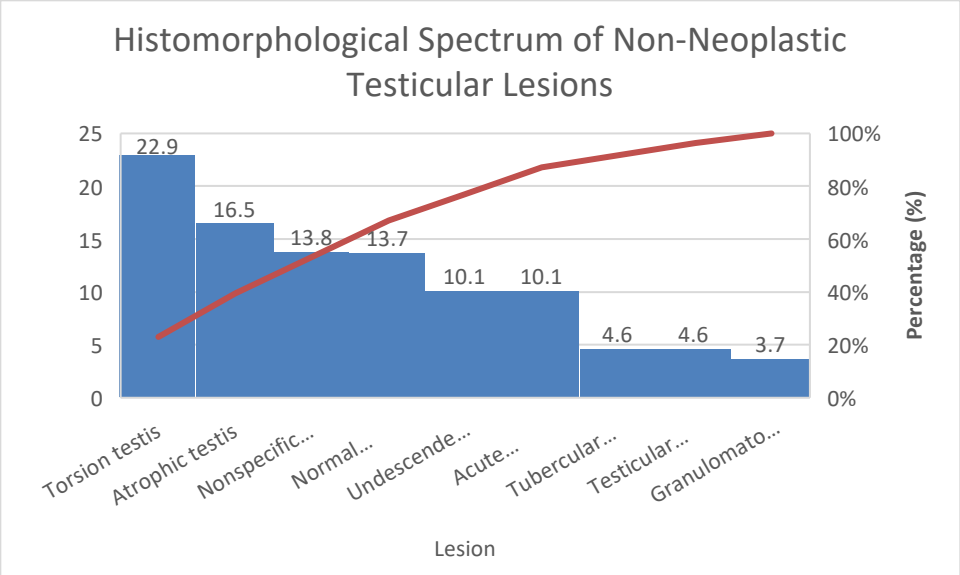

Figure 3: Histogram showing distribution of non-neoplastic testicular lesions.

Neoplastic Testicular Lesions: A total of 22 cases (16.8%) were neoplastic. Germ cell tumors (GCTs) constituted the majority (21 cases, 95.5%), whereas non-germ cell tumor (lymphoma) accounted for one case (4.5%).

Table 5. Distribution of Testicular Tumors

Tumor Type	Number of Cases	Percentage (%)
Seminoma	9	40.9
Teratoma	4	18.2
Yolk sac tumor	3	13.6
Mixed germ cell tumor	3	13.6
Spermatocytic tumor	2	9.1
Non-Hodgkin lymphoma	1	4.5
Total	**22**	**100.0**

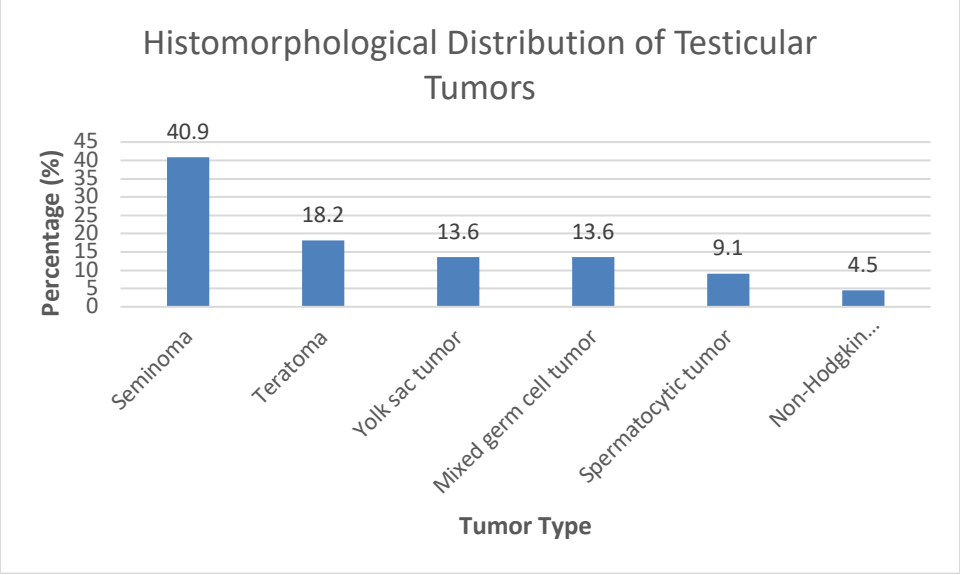

Figure 4: Bar chart showing histological distribution of testicular tumors.

Seminoma was the predominant tumor, commonly affecting the 31–50-year age group. Teratomas and yolk sac tumors were seen mainly in younger individuals. One case of spermatocytic tumor occurred in an elderly patient aged 62 years.

FNAC–Histopathological Correlation: Out of 33 cases where FNAC was performed, histopathological correlation was possible in 24. FNAC correctly identified 6 malignant and 17 benign lesions. One seminoma was misdiagnosed cytologically as orchitis.

Table 6: FNAC–Histopathological Correlation

Parameter	Value (%)
Sensitivity	75.0
Specificity	100.0
Positive Predictive Value (PPV)	100.0
Negative Predictive Value (NPV)	95.2
Diagnostic Accuracy	95.8

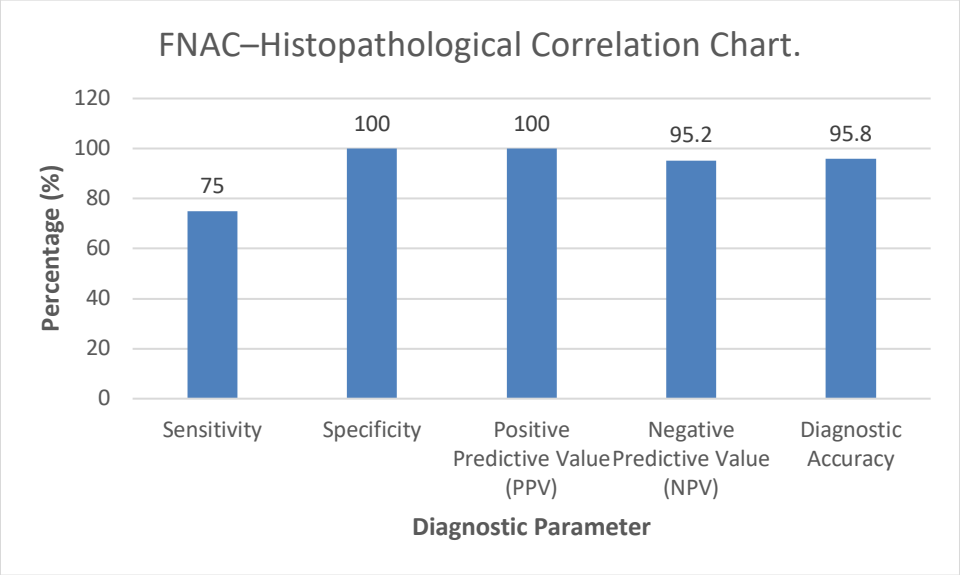

Figure 5: Column chart showing FNAC–Histopathological correlation parameters.

Discussion

This five-year combined retrospective–prospective analysis demonstrates that non-neoplastic testicular lesions predominate (83.2%), while neoplastic lesions constitute 16.8%. These proportions are in line with several Indian series, where non-neoplastic pathology accounted for 80–85% of cases [7,8].

Non-Neoplastic Lesions: In the present study, torsion testis (22.9%) was the most frequent non-neoplastic lesion, followed by atrophic testis (16.5%) and nonspecific epididymo-orchitis (13.8%). Sheeja et al. [9] and Mahesh et al. [10] reported torsion as the commonest non-neoplastic lesion with similar frequency (21–23%), supporting our findings. The proportion of tubercular orchitis (4.6%) in our study matches that reported by Abba et al. [11], confirming the persistent burden of tuberculosis in endemic Indian regions.

Atrophic and undescended testes were noted in 26% of our cases combined, consistent with reports by Shah et al. [12] who observed similar associations with infertility and increased risk of germ cell tumor development.

Neoplastic Lesions: Testicular tumors accounted for 22 cases (16.8%), with germ cell tumors (95.5%) predominating, comparable to Reddy et al. [13] (93.8%) and Patel et al. [14] (92%). Seminoma (40.9%) was the most common tumor, in agreement with other studies: Reddy et al. [13] reported 42.9% and Patel et al. [14] 40%, reflecting its consistent dominance in adult testicular neoplasia. Our mixed germ cell tumors (13.6%) correspond with

the 12–15% frequency noted by Deore et al. [15] and Gupta et al. [16].

The occurrence of teratoma (18.2%) and yolk sac tumor (13.6%) in our study aligns with pediatric and young adult patterns reported by Deore et al. [15].

The single case of spermatocytic tumor (9.1%) was found in an elderly male, consistent with literature emphasizing its occurrence beyond 50 years of age [17]. Non-Hodgkin lymphoma (4.5%) was also observed in a 68-year-old patient, similar to reports by Gupta A et al. [16], highlighting lymphoma as the most frequent secondary testicular malignancy in older men.

FNAC–Histopathological Correlation: FNAC achieved 100% specificity and PPV, demonstrating its reliability in identifying benign and malignant lesions, though sensitivity was moderate (75%). Comparable studies by Gupta VP et al. [18] and Sheeja et al. [9] report similar diagnostic accuracy (~94–97%), confirming that FNAC serves as a useful preoperative diagnostic tool, particularly when biopsy is contraindicated.

Comparative Summary: A comparative overview of major parameters is shown below.

Table 7: Comparison of Present Study with Similar Studies

Study	Duration	Non-neoplastic (%)	Neoplastic (%)	Commonest Non-neoplastic	Commonest Neoplasm
Present study	2014–2019	83.2	16.8	Torsion	Seminoma
Sheeja et al. [9]	2010–2015	81.5	18.5	Torsion	Seminoma
Mahesh et al. [10]	2009–2014	80.0	20.0	Atrophy	Seminoma
Reddy et al. [13]	2011–2016	—	100 (tumor cases)	—	Seminoma
Patel et al. [14]	2010–2014	—	100 (tumor cases)	—	Seminoma
Gupta VP et al. [18]	2014–2018	—	—	—	Seminoma

Limitations: As a single-center study, it did not adequately represent rare cases like sex cord-stromal tumors, and long-term patient follow-up was not possible.

Conclusion

• Non-cancerous testicular lesions make up most testicular issues, with torsion being the main reason for orchiectomy.

• Seminoma is the most common malignant tumor, followed by teratoma and mixed germ cell tumors.

• FNAC is a useful first diagnostic method, but histopathology is still the best way to confirm and classify.

• A routine histopathological exam of all testicular specimens is crucial for proper diagnosis, prognosis, and patient management.

References

1. Parkin DM, Bray F. Testicular cancer: Global patterns and trends. Eur Urol. 2014;65:1095–106.
2. Ferlay J et al. Global cancer statistics 2018: GLOBOCAN estimates. CA Cancer J Clin. 2019;68:394–424.
3. Mahesh B, Patel M. Histopathological spectrum of testicular lesions: A five-year study. J Pathol India. 2015;62:120–8.
4. Sheeja S, et al. Non-neoplastic testicular lesions: A histopathological study. Indian J Basic Appl Med Res. 2017;6:687–94.
5. WHO Classification of Tumours Editorial Board. WHO Classification of Tumours of the Urinary System and Male Genital Organs. 4th ed. IARC; 2016.
6. Ulbright TM. Germ cell tumors of the testis. Am J Surg Pathol. 2016;40(8):e83–e95.
7. Tekumalla PK, et al. Histomorphological spectrum of testicular lesions in a tertiary care hospital. J Clin Diagn Res. 2016;10:EC01–EC05.
8. Mahesh B, et al. Spectrum of testicular pathology. Int J Res Med Sci. 2017;5:3301–6.
9. Sheeja S, et al. Non-neoplastic testicular lesions: A histopathological study. Indian J Basic Appl Med Res. 2017;6:687–94.
10. Mahesh B, et al. Histopathological evaluation of testicular lesions. Indian J Pathol Microbiol. 2015;58:230–6.
11. Abba K, et al. Tubercular orchitis: Clinical and histopathological features. Trop Med Int Health. 2016;21:927–32.
12. Shah K, et al. Cryptorchidism and testicular atrophy: A correlation study. J Clin Diagn Res. 2016;10:EC01–EC04.

13. Reddy H, et al. Testicular tumors: A histopathological analysis. Indian J Pathol Microbiol. 2016;59:243–50.
14. Patel MB, et al. Spectrum of testicular tumors: Histopathological study. Int J Med Res Rev. 2015;3:302–7.
15. Deore KS, et al. Pediatric testicular tumors: A clinicopathologic review. J Pediatr Urol. 2015;11:76.e1–76.e6.
16. Gupta A, et al. Testicular tumors: Clinicopathological study. Indian J Cancer. 2016;53:216–20.
17. Ulbright TM. Germ cell tumors of the testis. Am J Surg Pathol. 2016;40(8):e83–e95.
18. Gupta VP, et al. Cytological diagnosis of testicular lesions: Correlation with histopathology. Diagn Cytopathol. 2018;46:905–12.