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Original Research Article

# Histopathological Profile in Cystoscopic Bladder Biopsies: A Retrospective Study at Tertiary Care Centre

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**Conflict of interest: Nil**

**Abstract**

**Background:** Urinary bladder conditions encompass a wide range of infections, inflammatory disorders, metaplastic changes, as well as benign and malignant tumors, significantly impacting morbidity and mortality. Among these, neoplastic conditions are more frequently encountered. The present study aimed to study the histopathology of various lesion of the bladder through cystoscopic biopsy.

**Materials and Methods:** This descriptive retrospective study was undertaken in the Department of Pathology, MGM Medical College and Hospital, Chh. Sambhajinagar [MS], India. The data were collected from records for the period of July 2019 to June 2024 in the Department of Pathology, MGM Medical College, Chh. Sambhajinagar, Maharashtra India, after obtaining Institutional Ethical Clearance.

**Results:** Majority of cases i.e 23(38.3%) were between age-group of 71-80 years, followed by 61-70 years of 11(18.3%), 51-60 years of 10(16.7%). Male to Female ratio was 1.3:1.0. Neoplastic lesions i.e 49(82.0%) were more commonly encountered than non-neoplastic lesions i.e. 09(15.0%) and 02(3.0%) cases of normal lesion of Urinary bladder. Out of 49 neoplastic cases, 3(6.1%) and 46 (93.9%) cases of benign and malignant respectively. Among malignant tumors, 25(62.5%) cases are of high-grade urothelial carcinoma.

**Conclusion:** The commonest bladder neoplasm was high grade papillary urothelial carcinoma followed by low grade ones. The papillary urothelial neoplasm of low malignant potential was noted to be lowest in frequency. Cystoscopic biopsies help in the early diagnosis and treatment of various bladder lesions. Analysis of cystoscopic biopsies was done to ascertain the type of urinary bladder lesions.

**Keywords:** Urinary Bladder, Cystoscopic Biopsies, Neoplastic Lesions.



## Introduction

Urinary bladder diseases, especially inflammation (cystitis), are significant contributors to various clinical signs and symptoms [1]. Several risk factors have been associated with bladder cancer, including cigarette smoking, prolonged industrial exposure to acrylamide, infection with Schistosoma haematobium, use of cyclophosphamide, consumption of artificial sweeteners, and long-term use of analgesics. While the precise mechanisms through which these factors contribute to cancer development remain uncertain, they are believed to trigger various cytogenetic and molecular alterations, which are diverse and complex in nature [2]. Urinary bladder conditions encompass a wide range of infections, inflammatory disorders, metaplastic changes, as well as benign and malignant tumors, significantly impacting morbidity and mortality. Among these, neoplastic conditions are more frequently encountered [3,4]. Bladder cancer is the second most prevalent malignancy of the urogenital system, following prostate can cerin males. As per GLOBOCAN 2022 data, it is the ninth most commonly diagnosed cancer, with approximately 6,14,000 new cases and 2,20,000 related deaths reported that year. Bladder tumors account for around 6% of cancer cases in men and 2% in women [5]. Apart from cystoscopy and biopsy other common methods to diagnose bladder lesions are imaging, urine cytology, fluorescence in situ hybridization, and urine protein detection. But cystoscopy remains a standard diagnostic tool for direct visualization of the bladder mucosa and biopsies of the suspected lesions. Cystoscopy biopsies ensure a material

necessary for histopathological diagnosis.

With a histomorphological diagnosis, the degree of differentiation, depth of tumor invasion, and the prognosis of the disease can be assessed [6,7].

The present study aimed to study the histopathology of various lesion of the bladder through cystoscopic biopsy.

**Material and Methods:**

This descriptive retrospective study was undertaken in the Department of Pathology, MGM Medical College and Hospital, Chh. Sambhajinagar [MS], India. The data were collected from records for the period of July 2019 to June 2024.

**Inclusion Criteria:** All the cystoscopic biopsies received in the department of Pathology, MGM Medical College, Chh. Sambhajinagar.

**Exclusion Criteria:** Autolyzed and inadequate biopsies.

**Study Procedure:** The cystoscopic bladder biopsies taken were fixed in 10% buffered formalin and then processed with embedding in paraffin wax. Multiple sections of 3-5 µ thick were taken and stained with regular Hematoxylin and Eosin stain (H&E). The histological features were studied and relevant findings were noted. Patient's history, clinical diagnoses were also obtained from the patient's record file and histopathological requisition forms. Standard diagnostic criteria's were used to diagnose based in morphological findings.

**Statistical Analysis:** Data was entered in excel sheet and was analyzed. Categorical variables were summarized as percentage.

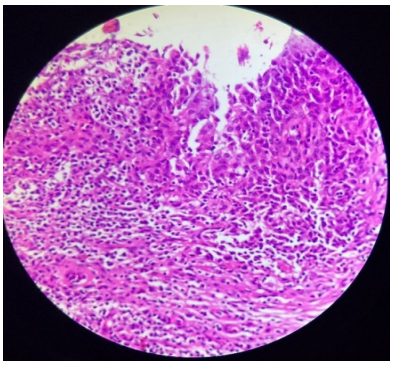

**Figure 1: H&E-40X: Cystitis**

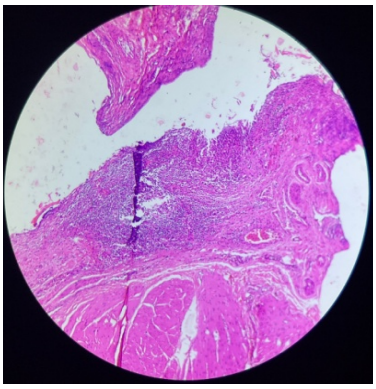

**Figure 2: H&E- 10X: Follicular Cystitis**

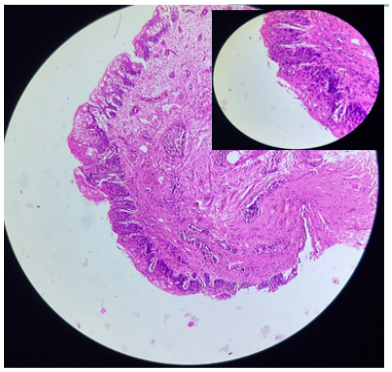

**Figure 3: H&E-10X & 40X: Squamous metaplasia**

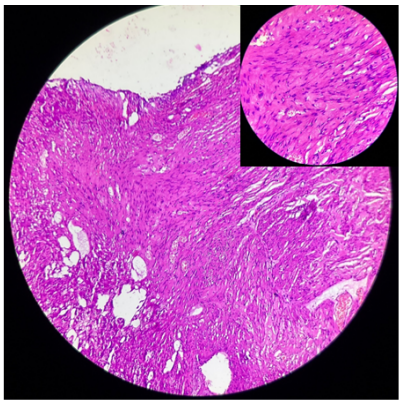

**Figure 4: H&E- 10X and 40X: Leiomyoma**

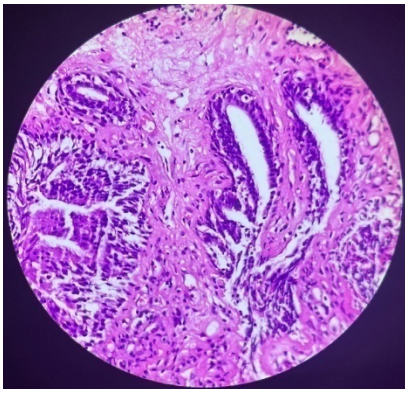

**Figure 5: H&E-10X & 40X: Urothelial Papilloma Showing discrete papillae**

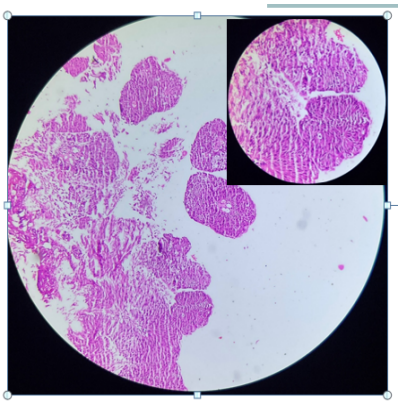

**Figure 6: H&E- 10X & 40X: Low Urothelial low malignant potential**

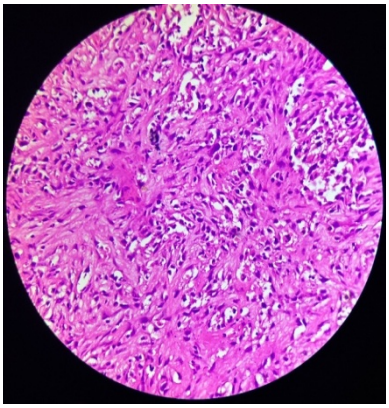

**Figure 7 : H&E-40X: Low grade invasive urothelia carcinoma**

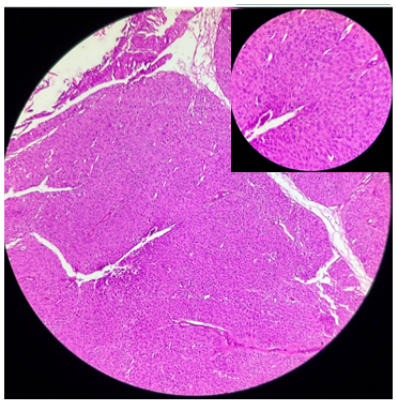

**Figure 8 : H&E-10X: low grade non-invasive urothelial carcinoma**

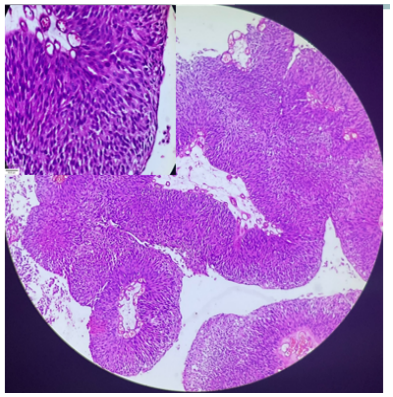

**Figure 9 : H&E- 10X & 40X: High grade non-invasive urothelial carcinoma**

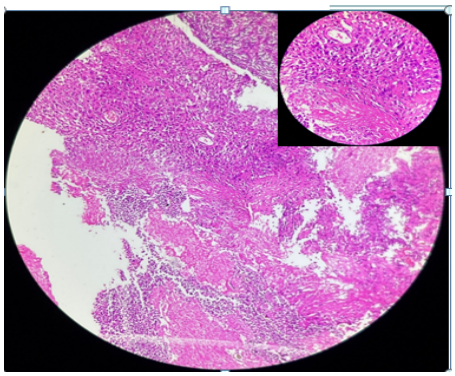

**Figure 10: H&E- 10X & 40X: High grade invasive urothelial carcinoma**

**Observations and Results:**

**Table 1: Distribution of cases according to Age-group**

| Age-group | Number of cases | Percentage |
|---|---|---|
| 21-30 | 03 | 5.0 |
| 31-40 | 02 | 3.3 |
| 41-50 | 08 | 13.3 |
| 51-60 | 10 | 16.7 |
| 61-70 | 11 | 18.3 |
| 71-80 | 23 | 38.3 |
| >80 | 03 | 5.0 |
| Total | 60 | 100 |

Majority of cases i.e 23(38.3%) were between age-group of 71-80 years, followed by 61-70 years of 11(18.3%), 51-60 years of 10(16.7%).

**Table 2: Distribution of cases according to Gender**

| Gender | Number of cases | Percentage |
|---|---|---|
| Male | 34 | 56.7 |
| Female | 26 | 43.3 |
| Total | 60 | 100 |

In present study majority of 34(56.7%) were male and 26(43.3%) were female. Male to Female ratio was 1.3:1.0.

**Table 3: Lesion of Urinary bladder**

| Lesion of Urinary bladder | Number of cases | Percentage |
|---|---|---|
| Neoplastic | 49 | 82.0 |
| Non-Neoplastic | 09 | 15.0 |
| Normal | 02 | 03.0 |
| Total | 60 | 100.0% |

Neoplastic lesions i.e 49(82.0%) were more commonly encountered than non-neoplastic lesions i.e. 09(15.0%).

**Table 4: Non-Neoplastic Lesion of Urinary bladder**

| Non-Neoplastic | Number of cases | Percentage |
|---|---|---|
| Cystitis | 07 | 77.8 |
| Chronic Cystitis with Squamous Metaplasia | 01 | 11.1 |
| Tuberculosis | 01 | 11.1 |
| Total | 09 | 100.0% |

Among 09 Non- Neoplastic Lesion, histopathological examination showed 07(77.8%) cases of cystitis, 01(11.1%) Chronic Cystitis with Squamous Metaplasia and 01(11.1%) case of Tuberculosis.

**Table 5: Neoplastic Lesion of Urinary bladder**

| Neoplastic | Number of cases | Percentage |
|---|---|---|
| Benign | 03 | 6.1 |
| Malignant | 46 | 93.9 |
| Total | 49 | 100.0% |

Among 49 Neoplastic Lesion, histopathological examination showed 03(6.1%) cases of benign and 46(93.9%) cases of malignant.

**Table 6: Distribution of cases according to Neoplastic (Malignant) Lesion of Urinary bladder**

| Neoplastic (Malignant) Lesion of Urinary bladder | Male | Female | Total |
|---|---|---|---|
| Papillary urothelial neoplasm of low malignant potential | 1(50%) | 1(50%) | 2(4.3%) |
| Low Grade Urothelial carcinoma | 4(50.0%) | 4(50.0%) | 8(17.3%) |
| Moderately differentiated TCC | 1(100%) | 00 | 1(2.17%) |
| High Grade Urothelial carcinoma | 12(48.0%) | 13(52.0%) | 25(54.34%) |
| Moderately differentiated squamous cell carcinoma | 02(66.7%) | 01(33.3%) | 3(6.66%) |
| High Grade Urothelial with squamous cell carcinoma | 02(50.0%) | 02(50.0%) | 4(8.69%) |
| Poorly differentiated malignant neoplasm | 2(66.7%) | 01(33.3%) | 3(6.66%) |
| Total | 24(100%) | 22(100%) | 46(100%) |

The most common malignant lesion observed was High Grade Urothelial Carcinoma, comprising 54.34**%** of all neoplastic bladder lesions (25 cases), with a nearly equal gender distribution: 12 males (48%) and 13 females (52%). Low Grade Urothelial Carcinoma accounted for 17.3% (8 cases), with an equal male-to-female distribution (4 each, 50%). High Grade Urothelial Carcinoma with Squamous Cell Carcinoma**:** 4cases (8.69%), again evenly distributed by gender. Poorly Differentiated Malignant Neoplasms and Moderately Differentiated Squamous Cell Carcinomas: each constituted 3 cases (6.66%), both showing male predominance (66.7%). A single case (2.17%) of Moderately Differentiated Transitional Cell Carcinoma (TCC) was observed, seen only in a male patient. Overall, male patients (24 cases, 52.17%) were more affected than female patients (22 cases, 47.8%) across all malignant bladder lesions.

**Table 7: Grade and muscle invasion in Urothelial Carcinoma**

| Neoplastic (Malignant) | | Male | Female | Tota |
|---|---|---|---|---|
| Low Grade Urothelial carcinoma | Invasive | 0 | 01(100%) | 01 (100%) |
| | Non-Invasive | 4(57.1%) | 03(42.9%) | 07 (100%) |
| High Grade Urothelial carcinoma | Invasive | 12(54.5%) | 10(45.5%) | 22(100%) |
| | Non-Invasive | 01(33.3%) | 02(66.7%) | 03(100%) |

Out of 08 cases of low-grade urothelial carcinoma, 07(87.5%) cases was non-invasive and 01(12.5%) case of invasive whereas out of 25 cases of 22(88.0%) cases were invasive and 03(12.0%) cases were non-invasive.

**Discussion:**

In present study majority of cases i.e 23(38.3%) were between age-group of 71-80 years, followed by 61-70 years of 11(18.3%), 51-60 years of 10(16.7%). The mean age of 68.47±12.93 years. Similarly, S. Preethmol et al. [8] and Somya Agarwal et al [9] found maximum number of cases in 61-80 years of age. Whereas the study done by Aparna et al [10] also reported the occurrence of majority of cases between 41-60 years of age (42%) cases.

In present study majority of 34(56.7%) were male and 26(43.3%) were female and Male to Female ratio was1.3:1.0. Whereas Siddhi Kumari Pandey et al [11] observed male preponderance with M:F ratio of5.8:1. Also similar male preponderance was observed by and M:F ratio was 6.9:1, S Preethmol et al.[8], Somya Aggarwal et al.[9] M:F ratio was 5.25:1, Deepika Sharma et al.[12] in their study with M:F ratio of 6.9:1. Male dominance in the bladder lesion is probably due to higher exposure to smoking, occupational hazards, and environmental toxins [13]. Neoplastic lesions i.e 49(82.0%) were more commonly encountered than non-neoplastic lesions i.e. 09(15.0%). Siddhi Kumari Pandey et al [11] observed that most commonly encountered lesions were neoplastic (94.7%) and nonneoplastic lesions were only (5.3%) cases also study conducted by Preethmol et al. [8], Somya A et al. [9] Paudel D et al. [15] also showed 93.8%, 90% and 86% of neoplastic lesions respectively in their studies. Whereas Dhakal R, et al [4] found that (57.1%) were neoplastic lesions and (42.9%) were non-neoplastic lesions.

Among 09 Non- Neoplastic Lesion, histopathological examination showed 05(55.5%) cases of non-specific cystitis, 02(22.2%) follicular cystitis and 01(11.1%) case of chronic cystitis with squamous metaplasia and Tuberculosis, similarly Dhakal R et al [4] found that out of 30 non-neoplastic lesions, chronic cystitis 27(38.6%) was the commonest lesion. In present study, among 49 neoplastic cases; urothelial carcinoma was the most common type comprised of 44 cases (97.8%). Findings are in concordance with study done by Saumya A et al [9] showed 84% Preeti N Jhaveri et al. [16] showed 81.08%, Paudel D et al [15] showed 76.47%, Kirti Priya et al [17] showed 85.71%, Dhatwalia A et al [18] showed 94.5%, and Sathya Mylsamy et al [19] showed 74% of urothelial carcinoma as most predominant type among neoplastic lesions.

In benign lesions, 2 cases of Inverted urothelial papilloma and 1 case of leiomyoma were observed. Malignancy was found to be most common cause of urinary bladder lesions. Out of 44 neoplastic cases, 25(54.34%) cases were high grade urothelial carcinoma followed by 8(17.3%) cases were of low-grade urothelial carcinoma, 4(8.69%) cases were having high Grade Urothelial with squamous cell carcinoma, 3(7.5%) cases of Moderately differentiated squamous cell carcinoma and poorly differentiated malignant neoplasm & 1(2.17%) cases of Moderately differentiated TCC. These findings align with studies Kundlia A et al [20] found that the cases of urothelial carcinoma examined, invasive high-grade urothelial neoplasm was the most prevalent subtype, accounting for 36.7% of cases, followed by non-invasive low-grade papillary urothelial neoplasm at 20.0%.

Other sub types included non-invasive high-grade urothelial neoplasm (8.3%) and papillary urothelial neoplasm of low malignant potential (6.7%). Similarly, research by Shrestha et al. [21] highlighted the predominance of high-grade papillary urothelial carcinoma. In contrast, Jhaveri et al. [22] found invasive papillary urothelial carcinoma to be the most common neoplasm, with low-grade cases slightly more prevalent than high-grade ones. Whereas Dhakal R et al [4] found that low-grade urothelial carcinoma was the commonest urothelial tumor (57.9%) followed by high-grade urothelial carcinoma (39.5%) and PUNLMP (2.6%). Out of 08 case so flow grade urothelial carcinoma, 07(87.5%) cases were non-invasive and 01(12.5%) case of invasive.

**Conclusion**

The most common age group for blader lesions is seen between 71-80 years of age. Male to female ratio of about 1.3:1. The commonest bladder neoplasm was urothelial in origin with most common lesion being high grade papillary urothelial carcinoma followed by low grade ones. The papillary urothelial neoplasm of low malignant potential was noted to be lowest in frequency. Cystoscopic biopsies help in the early diagnosis and treatment of various bladder lesions. Analysis of cystoscopic biopsies was done to ascertain the type of urinary bladder lesions.

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