

Histopathological Spectrum of Lesions in Urinary Bladder Biopsy and TURBT Specimens in Northwest Rajasthan

Ankita¹, Saroj Ola², Durga Shankar Jaipal³

^{1,3}Assistant Professor, Department of Pathology, SP Medical College, Bikaner, Rajasthan

²Associate Professor, Department of Pathology, SP Medical College, Bikaner, Rajasthan

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Corresponding author: Dr. Durga Shankar Jaipal

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Abstract:

Background: Malignancies of urinary bladder or urothelial malignancies are quite common. Urothelial carcinoma account for 90% of all primary tumors of the bladder. Transitional cell carcinoma (TCC) is the commonest bladder cancer followed by squamous cell carcinoma (SCC).

Methods: This is a retrospective descriptive study for the period of two years from Jan 2021 to Dec 2022. All the urinary bladder specimens received in form of TURBT and cystoscopic biopsies during the study period were included. Autolysed specimen, Inadequate biopsies were excluded. Biopsy specimens were processed as per routine histopathological technique. Gross examination was done and findings recorded. The tissues were sectioned as per protocol and processed by wax block method. Slides were stained with H&E stain and examined under light microscope. Then bladder lesions were studied according to WHO/ISUP (2016) classification.

Results: We received a total of 106 TURBT and UB biopsies specimens, out of that a total of 87 (82.08%) urinary bladder specimens were neoplastic. The age of the patients ranged from 16-76 years of age (mean \pm std. dev. 46.14 ± 8.78 years). There were 78 (73.78%) males and 28 (26.42%) females with a male to female (M: F) ratio of 2.78:1. There was clustering of cases in the seventh decade of life with 40 (37.73%) cases followed by fifth decade with 26 (26.91%). Out of 19 non-neoplastic lesions, chronic nonspecific cystitis was the most common type of lesion constituting 13 (68.42%) of all cases. Second most common lesion encountered was acute on chronic cystitis with 3 (5.26%) cases. Others were granulomatous cystitis (2 (10.53%) cases) and cystitis cystica et glandularis with 1 (5.26%) case. Invasive urothelial carcinoma (IUC) was more common with 36 cases (41.37%) which included 16 cases of superficially invasive bladder cancer (invasion up to lamina propria) and 20 cases of muscle invasive bladder cancer (invasion into muscularis propria). There was various histological differentiations seen among IUC which included squamous, clear cell and sarcomatoid variant constituting 13.8%, 2.3% and 3.4% respectively. Apart from IUC, various non-invasive lesions, revealing 5 (5.75%) cases of Papilloma, 6 cases (6.90%) of papillary urothelial neoplasm of low malignant potential, 35 cases (40.23%) of non-invasive urothelial carcinoma - low grade, 4 cases (4.60%) of non-invasive urothelial carcinoma - high grade and 1 (1.15%) case of leiomyoma of urinary bladder.

Conclusion: Urothelial carcinoma is prevalent and represents a substantial proportion of malignancies in developing nations. Among all carcinoma cases, high-grade urothelial carcinoma with lamina propria and muscle invasion was the most frequently observed. Pathological grade and the extent of muscle invasion stand out as crucial prognostic indicators for survival. There is a critical need for public awareness regarding hematuria, as neglecting its symptoms often leads to the presentation of advanced-stage bladder cancer at the time of diagnosis.

Keywords: Urothelial Carcinoma, TURBT, Transitional cell carcinoma.

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Introduction

Urinary symptoms are an important occurrence in OPDs. Various lesions affecting the urinary bladder can arise from a spectrum of non-neoplastic to neoplastic conditions, presenting challenges in diagnosis, management, and prognosis. The Inflammatory lesions of urinary bladder include

cystitis, often caused by bacterial infections, and interstitial cystitis, characterized by chronic inflammation and pain. Benign Neoplastic Lesions includes papilloma and Urothelial Hyperplasia. Whereas most common Malignant Neoplastic Lesions include Transitional Cell Carcinoma,

Squamous Cell Carcinoma and Adenocarcinoma. Histopathological examination of bladder lesions is essential for understanding their nature, determining appropriate treatment strategies, and predicting patient outcomes.

Urinary bladder malignancies, or urothelial malignancies, are prevalent, with urothelial carcinoma representing 90% of all primary bladder tumours.[1] Globally, it ranks as the 9th most common malignant tumour, being the 4th most frequent in men and the 8th in women.[2] According to data from the Indian Cancer Registry, it stands as the 9th most common cancer, comprising 3.9% of all cancer cases.[3] The incidence is higher in males, and major contributors to its etiology are smoking and exposure to industrial carcinogens.[4-6] Transitional cell carcinoma (TCC) holds the primary position among bladder cancers, followed by squamous cell carcinoma (SCC).[2,4-6] Notably, SCC exhibits a significant prevalence in the Middle East and African countries, where it deviates from global trends due to its higher association with Schistosomiasis in these regions, contributing to an elevated incidence.[6]

Advancements in non-invasive imaging techniques are ongoing, with researchers consistently discovering and defining potential markers or substitute endpoints for the physical examination of bladder tumors. Nevertheless, the primary pillars of contemporary bladder cancer diagnosis and treatment remain the thorough evaluation through cystoscopic examination and histopathological analysis of biopsy materials. Transurethral Resection of Bladder Tumor (TURBT) specimens play a crucial role in the diagnosis and management of bladder diseases, particularly bladder tumors.[7] The histopathological examination of TURBT specimens provides valuable insights into the nature, grade, and extent of bladder lesions, guiding clinicians in determining the appropriate treatment strategies for patients. The histopathological spectrum observed in TURBT specimens encompasses a wide range of findings, reflecting the diverse nature of bladder pathologies.

The current study was conducted to observe the spectrum of lesions in histopathological examination of urinary bladder biopsies and TURBT specimens at a tertiary care centre in northwest Rajasthan.

Methods

This is a retrospective study carried out in the department of Pathology, Sardar Patel medical college, Bikaner for the period of two years from Jan 2021 to Dec 2022. We included all the urinary bladder specimens received in form of Transurethral resection of bladder Tissue (TURBT) and biopsies of patients with urinary bladder lesion

during the study period. Clinical data was collected from patient's records. Clinical, cystoscopy findings and the clinical diagnosis of all cases of urinary bladder lesion sent to the laboratory were noted from the patient's records. Autolyzed specimen, inadequate biopsies and non-neoplastic lesions were excluded from this study. Biopsy specimens were processed as per routine histopathological technique. The specimens received were fixed in 10% buffered formalin. Gross examination was done, and findings recorded. The tissues were sectioned as per protocol and processed by wax block method. Slides were stained with hematoxylin and eosin (H&E) stain and examined under a light microscope. Then bladder lesions were studied according to WHO/ISUP (2016) classification.

Results

In the present study, during the study period we received a total of 106 transurethral resection of bladder tumor (TURBT) and cystoscopic biopsy specimens of urinary bladder. Out of 106 specimens, a total of 87 (82.08%) urinary bladder specimens were neoplastic and rest 19 (17.92%) were non-neoplastic. [Image 1] The most common clinical presentation was hematuria, in 92 (87%) cases, while pain abdomen was present in 54 (51%) of cases, burning micturition was present in 38 (36%) cases and strangury was present in 24 (23%) of cases.

The age of the patients ranged from 16-76 years of age (mean \pm std. dev. 46.14 ± 8.78 years). Out of 106 patients, we observed a male predominance with 78 (73.58%) patients were males and 28 (26.42%) were females with a male to female (M:F) ratio of 2.78:1.[Table 1][Image 2][Image 3] In all the age groups, males were affected more than females and the distribution of cases between male and female were comparable in all the age groups. There was clustering of cases in the seventh decade of life with 40 (37.73%) cases followed by fifth decade with 26 (24.91%). [Image 2]

Out of 19 non-neoplastic lesions, on histopathological examination, chronic nonspecific cystitis was the most common type of lesion constituting 13 (68.42%) of all cases. Second most common lesion encountered was acute on chronic cystitis with 3 (5.26%) cases. Others were granulomatous cystitis (2 (10.53%) cases) and cystitis cystica et glandularis with 1 (5.26%) case.

Out of the 87 neoplastic lesions of various histomorphological categories, most common lesion encountered was invasive urothelial carcinoma (IUC) with 36 cases (41.38%), in which 16 cases were superficially invasive bladder cancer (invasion up to lamina propria) and 20 cases of muscle invasive bladder cancer (invasion into

muscularis propria). Different histological differentiations were observed within invasive urothelial carcinoma (IUC), encompassing squamous, clear cell, and sarcomatoid variants, constituting 13.8%, 2.3%, and 3.4%, respectively of the total malignant tumors. [Image 4] In addition to IUC, the study examined various non-invasive

lesions, revealing 5 (5.75%) cases of Papilloma, 6 cases (6.90%) of papillary urothelial neoplasm of low malignant potential, 35 cases (40.23%) of non-invasive urothelial carcinoma - low grade, 4 cases (4.60%) of non-invasive urothelial carcinoma - high grade and 1 (1.15%) case of leiomyoma of urinary bladder. [Table 2]

Table 1: Age group and gender wise distribution of cases in the present study

	Male	%	Female	%	Total
11-30	4	60.00	2	40.00	6
21-30	6	55.56	5	44.44	11
31-40	6	83.33	1	16.67	7
41-50	23	86.36	4	13.64	26
51-60	14	70.59	6	29.41	20
61-70	36	90.91	4	9.09	40
>70	8	70.00	4	30.00	12
	88	82.95	18	17.05	106

Table 2: Diagnosis of cases in the present study

Diagnosis	No. of Cases	Percent
Non neoplastic		
Chronic Nonspecific cystitis	13	68.42%
Granulomatous cystitis	2	10.53%
Acute on chronic cystitis	3	15.79%
Cystitis cystica et glandularis	1	5.26%
Total non-neoplastic lesions	19	17.92%
Neoplastic lesions		
Papilloma	5	5.75%
Papillary urothelial neoplasm of low malignant potential	6	6.90%
Low-grade papillary urothelial carcinoma	35	40.23%
High grade Non-invasive Urothelial carcinoma	4	4.60%
Leiomyoma	1	1.15%
High-grade Invasive urothelial carcinoma	36	41.38%
Total Neoplastic lesions	87	82.08%
Overall Total Cases	106	

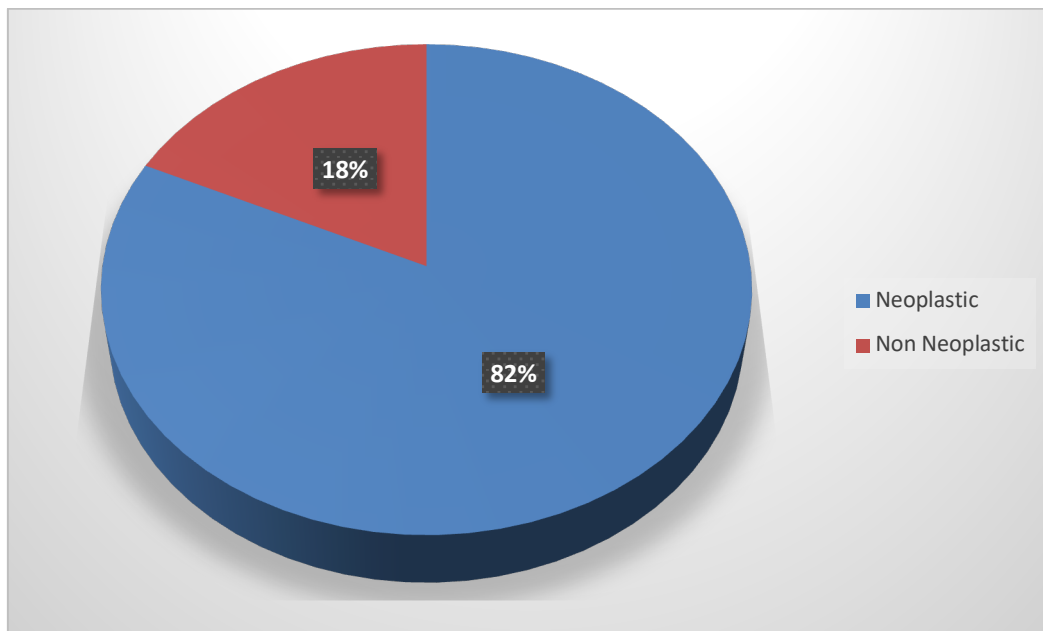


Image 1: Distribution of cases as neoplastic and Non-neoplastic

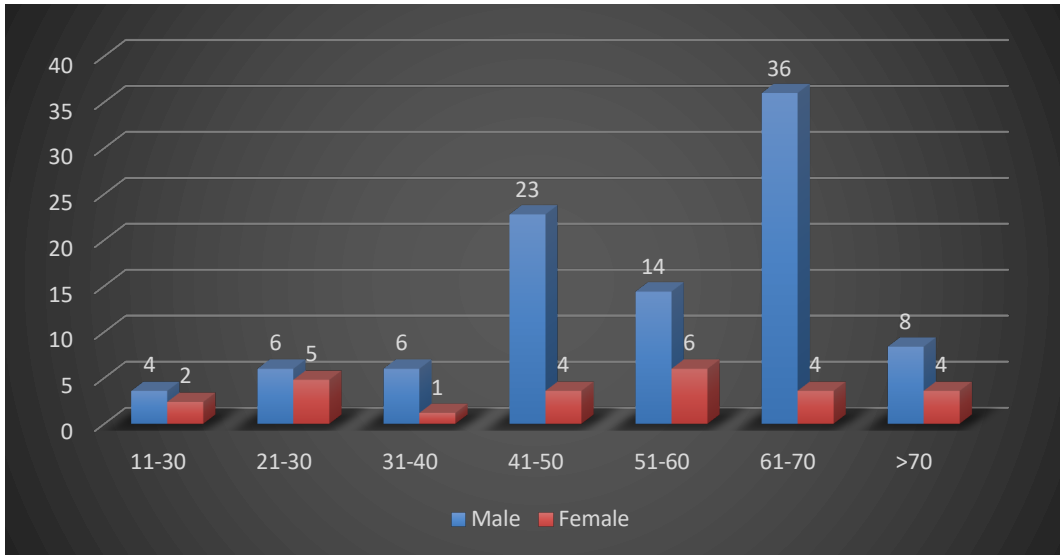


Image 2: Age group wise distribution of cases in the present study

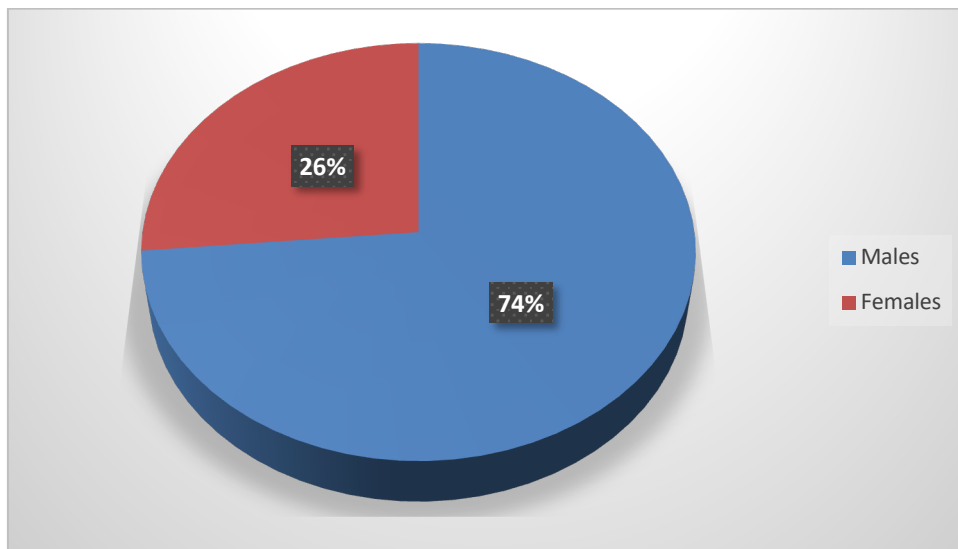


Image 3: Gender wise distribution of cases in the present study

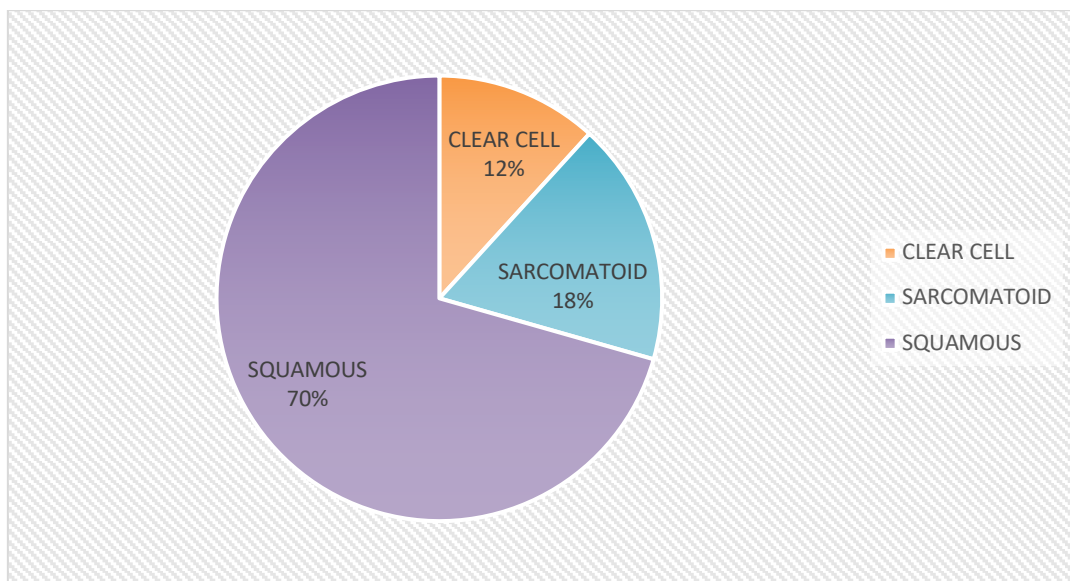


Image 4: Frequency of differentiation of various Urothelial Malignancies

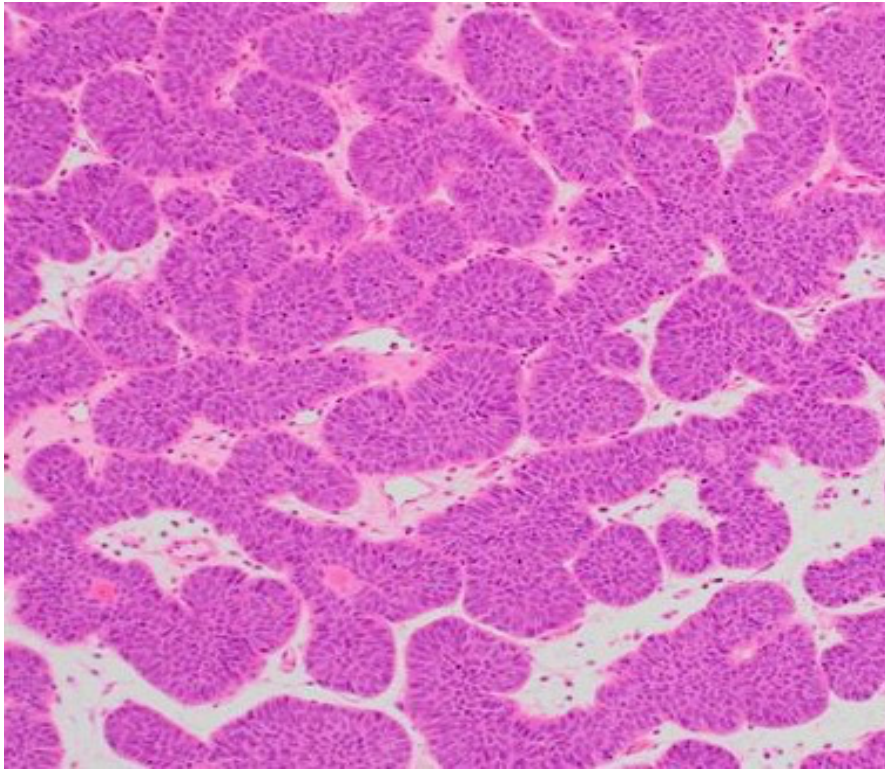


Image 5: Biopsy specimen showing urothelial papilloma showing endophytic growth with thin anastomosing trabeculae and nests (H&E, 10x)

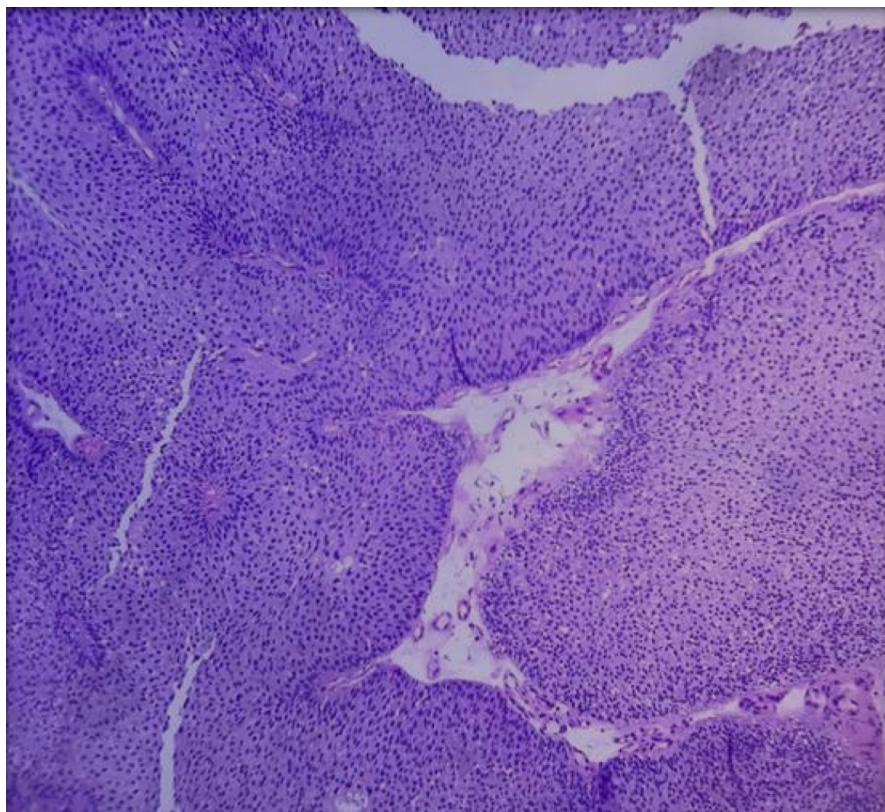


Image 6: PUNLMP showing papillary architecture with hyperplastic urothelial lining (H&E, 40x)

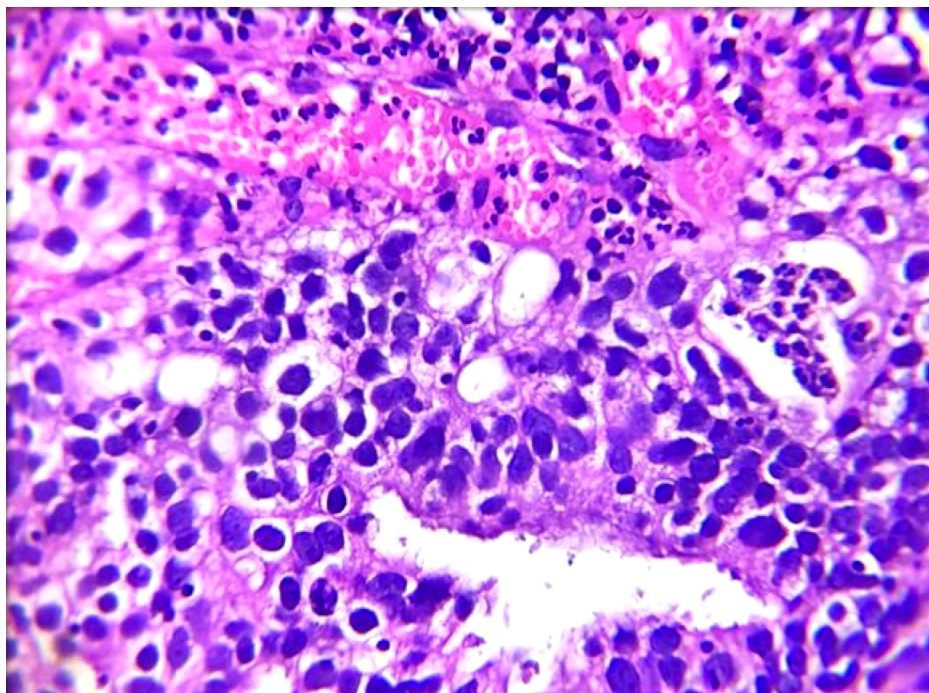


Image 7: High grade papillary urothelial carcinoma showing nuclear pleomorphism, nuclear hyperchromasia and tumour cell dyscohesion. (H&E 40x)

Discussion

Urinary bladder lesions are common occurrences in routine OPD. Bladder tumor is the ninth most common tumor worldwide. Urothelial carcinoma is the commonest type accounting for 90% of all primary tumors of the bladder. In bladder cancer histomorphology is the most powerful tool to predict the risk of recurrence, progression and therapeutic response [9]. Diagnosis by histopathological examination of the lesion is fairly easy in most of the cases, however it can pose a diagnostic challenge in few cases. Therefore, pathologist play an important role in not just labelling the diagnosis but also to give additional information that can have an impact on the treatment [9].

In the present study a total of 106 specimens of urinary bladder lesions were included which included the majority of TURBT specimens. In our study hematuria was the most common clinical symptoms (87%), while pain was present in 51% of cases, burning was present in 36% of cases and strangury was present in 23% of cases which was similar to the study of Ray et al (2013) [10] who found that 91% of urinary bladder patients were presented with painless hematuria.

In our study we found male predominance, the male to female ratio was 2.78:1 which was concordant with Hasan et al [11] (2.58:1) and Cheng et al [12] (3.3:1.0). The gender ratio varies from different studies. The male to female ratio of our study was slightly lower than the study of Lim et al [13] and Vaidya et al [14] and they found male

to female ratio in their study was 5:1 and 4.5:1 respectively.

In our study the most common age group was 61-70 years with 37.36% cases which was correlated with Vaidya et al [14] of 33.73% cases of 61-70 years while Mean age of presentation was 46.14 ± 8.78 years which was nearly correlated with Matalka et al [15] studied in which mean age of the patients was 60.6 years (range 19-91) and median age of presentation was 61.00 years (range 35-85).

In the present study, the non-neoplastic lesions constituted 17.92% cases which included, chronic nonspecific cystitis was the most common type of lesion constituting 13 (68.42%) of all cases. Second most common lesion encountered was acute on chronic cystitis with 3 (5.26%) cases. Others were granulomatous cystitis (2 (10.53%) cases) and cystitis cystica et glandularis with 1 (5.26%) case. We observed comparatively lesser non-neoplastic lesions when compared to study done by Shruti et al. [16]. The reason may be that ours is a tertiary care regional cancer centre and patients with malignancies visit our centre from a wide geographical area.

In our study, malignant urothelial carcinoma without any differentiation was the predominant type with 68 cases (78.16%) which was similar to studies done by Shruti HP et al [16] having 86.67% and Goyal VK et al [17] having 92.13%. Apart from this, IUC with squamous differentiation and IUC having clear cell and Sarcomatoid variant were also included in the present study. In our study, total noninvasive malignant lesions constituted 51

(58.62%) of total malignant lesions. The noninvasive high grade papillary urothelial carcinoma were 4 (4.60%) whereas 6 (6.90%) were Papillary urothelial neoplasm of low malignant potential and 35 (40.23%) were Low-grade papillary urothelial carcinoma.

Thirty-six (41.38%) cases demonstrated invasion in our study, 16 cases were superficially invasive bladder cancer (invasion up to lamina propria) and 20 cases of muscle invasive bladder cancer (invasion into muscularis propria). Laishram et al [18] showed 53.85% of non-invasive papillary carcinoma, 15.38% of superficially invasive bladder carcinoma and 30.77% of muscle invasive bladder carcinoma in their study, which is comparable to our study.

Conclusion

Urothelial carcinoma is prevalent and represents a substantial proportion of malignancies in developing nations. Among all carcinoma cases, high-grade urothelial carcinoma with lamina propria and muscle invasion was the most frequently observed. Pathological grade and the extent of muscle invasion stand out as crucial prognostic indicators for survival. There is a critical need for public awareness regarding hematuria, as neglecting its symptoms often leads to the presentation of advanced-stage bladder cancer at the time of diagnosis.

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