

Biopsy Analysis of Clinico-Histological Correlation Lesions in Urinary Bladder

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Conflict of interest: Nil

Abstract:

Background: Urinary bladder diseases, encompassing both neoplastic and non-neoplastic lesions, are commonly encountered in clinical practice. With bladder cancer now recognized as the seventh most prevalent cancer globally and its incidence on the rise, the need for effective diagnosis and management is crucial. This study focuses on examining the clinicopathological features of various bladder lesions, with a particular emphasis on grading. The goal is to mitigate the morbidity and mortality associated with urinary bladder cancers through improved understanding and early intervention.

Aim: To study the histopathological spectrum of bladder lesions, highlighting their frequency and distribution across age and gender groups.

Materials and Methods: Detailed clinical history was taken from the patient. A total of 128 cases were included who has undergone transurethral resection of bladder tumour/ cystoscopic biopsies were included in the study. Biopsy specimens with autolysis or inadequate tissue for histopathological evaluation were excluded.

Results: In the study group, the majority of patients belonged to the 61–70 years age group. The most commonly reported symptoms included lower urinary tract issues, with haematuria being the most frequent, followed by increased frequency of micturition, burning micturition, dysuria, and abdominal pain. Out of 128 cases, 122 were neoplastic and 6 were non neoplastic lesions.

Conclusion: Bladder tumours are well-known for their high recurrence rates, rapid advancement to high grade, and the challenge posed by their non-specific symptoms. This makes precise diagnosis essential, with cystoscopy and histopathological analysis of biopsy material being pivotal in guiding treatment.

Keywords: Bladder lesions, Genitourinary, Cystoscopy, Malignant.

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Introduction

Urinary bladder diseases, encompassing both neoplastic and non-neoplastic lesions, are commonly encountered in clinical practice. The Non neoplastic lesions especially cystitis constitute an important source of signs and symptoms. Non neoplastic lesion include congenital anomalies, cystitis, malakoplakia, tuberculosis and metaplastic lesions. These diseases are more disabling than lethal, while neoplastic lesions are responsible for significant morbidity and mortality.[1]

As per Globocan data, urinary bladder cancer in overall 11th most common cancer world wide, with an estimated 5,73,278 new cases and 2,12,536 deaths. Bladder cancers are the second most common tumours of genitourinary tract surpassed by prostate cancer. As these neoplasm of bladder represent a heterogenous group of tumours with different subtypes and behavioural patterns they

pose biologic, clinical, diagnostic and therapeutic challenge to both urologist and pathologist.[2,3]

The risk of urothelial carcinoma is strongly linked to exposure to carcinogens such as heavy metals like arsenic and lifestyle factors like tobacco smoking. These carcinogens trigger genetic mutations that interfere with the normal growth and differentiation of urothelial cells. Furthermore, occupational and environmental exposures, including work in industries like rubber and chemicals, significantly contribute to the development of bladder tumours.[4]

Aim: To study the histopathological spectrum of bladder lesions, highlighting their frequency and distribution across age and gender groups.

Materials and Methods

A detailed clinical history was taken from the patient. Grossing of formalin fixed specimens was done, representative sections were processed, H and E staining was done and reporting was done according to WHO 2016/ISUP classification. Ethical approval was obtained from institutional ethical committee.

Inclusion Criteria: All transurethral resection of bladder tumour (TURBT) specimens, cystectomy specimen received in the Department of Pathology during period of study were included.

Exclusion Criteria: Autolyzed specimens and inadequate biopsies were excluded from the study.

Statistical Analysis: Data was entered in excel sheet and was analysed. Categorical variables were summarised as percentage.

Results

128 bladder biopsy specimens were examined. Cases aged between 31 to 80 years with maximum

cases seen in 61 to 70 years of age (Fig-1). The present study showed male predominance, 98 cases males (76.56%) and 30 cases females (23.44%) with male to female ratio of 3.27:1. Haematuria was the most common clinical manifestation in 96 cases (75%), followed by increased frequency 80 cases (62.5%), Burning micturition 67 cases (52.34%), dysuria 60 cases (46.87 %) and abdominal pain in 55 cases (42.96%) [Table - 1].

Among 128 cases, 122 (95.31%) were neoplastic and 6 (4.68%) were non neoplastic cases. Most common non neoplastic lesion was cystitis glandularis 4 cases (3.12%) and squamous metaplasia 2 cases (1.56%) [Figure-2]. Most common Neoplastic lesion was urothelial carcinoma 110 cases (85.93%) and Squamous cell carcinoma 12 cases (9.37%). Infiltrating urothelial carcinoma is commonest 54 cases (42.18%), non invasive low grade 30 cases (23.43%), High grade 14 cases (10.93%), PUNLMP 10 cases (7.81%), urothelial dysplasia 2 cases (9.37%). [Fig-2 and Table-2]. [5]

Table 1: Distribution of clinical symptoms

Sl. No.	Symptoms	No. of cases	Percentage (%)
1	Haematuria	96	75
2	Increased frequency	80	62.5
3	Burning micturition	67	52.34
4	Dysuria	60	46.87
5	Abdominal pain	55	42.96

Table 2: Histomorphological diagnosis of bladder lesions

Sl. No	Histomorphological diagnosis	No. of cases	Percentage %
I	Non- neoplastic	6	4.68
1	Cystitis glandularis	4	3.12
2	Squamous metaplasia	2	1.56
II	Neoplastic	122	95.31
A	Urothelial carcinoma	110	85.93
1	Infiltrating	54	42.18
2	Non-invasive		
	Low grade	30	23.43
	High grade	14	10.93
	PUNLMP	10	7.81
	Urothelial dysplasia	2	1.56
B	Squamous cell carcinoma	12	9.37
	Total	128	100

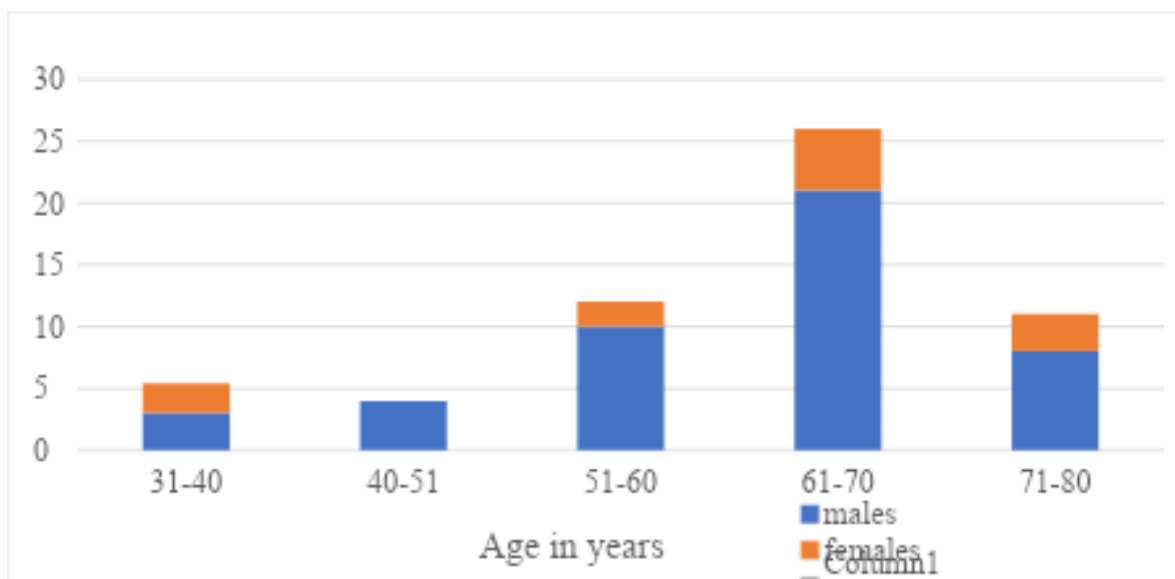


Figure 1: Age and gender wise distribution

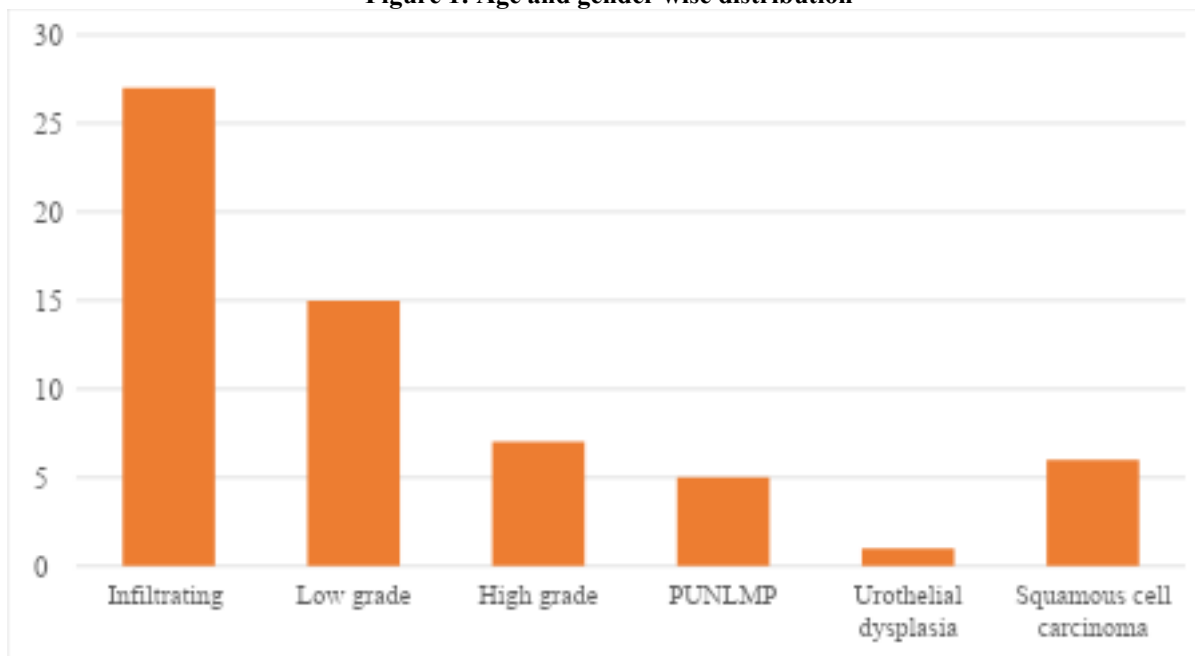


Figure 2: Distribution of bladder lesions

Discussion:

The spectrum of bladder cancer is diverse, encompassing a wide range of histopathological features that vary significantly in terms of tumor type, grade, and invasiveness. Urinary bladder lesions contribute significantly to both morbidity and mortality, as these conditions often present with nonspecific symptoms that may lead to delayed diagnosis. The present study, is undertaken mainly to highlight the importance of histopathological examination in the diagnosis of bladder lesions.[6]

Early detection with combination of cystoscopy, histopathological examination and urine cytology is crucial for improving patient outcomes. As bladder tumors often recur and progress, understanding their

histomorphological spectrum aids in formulating appropriate treatment strategies. [5,7]

The present study showed male predominance (76.56%) and similar results were seen in study done by Poudel et al [8] and SK Pandey et al [9]. This may be due to occupational exposure and habitual facts. Most common age group in the present study was 61 to 70 years which was same as Shah A et al [10]. Hematuria was the most common clinical manifestation observed in our study which is similar to S Preethamol, PS Prasanth [11].

In our study, non-invasive urothelial neoplasm of low grade was the most common type, constituting 23.43%, followed by high-grade urothelial neoplasm at 10.93%. In comparison, the study by S. Preethamol and P.S. Prasanth reported higher rates

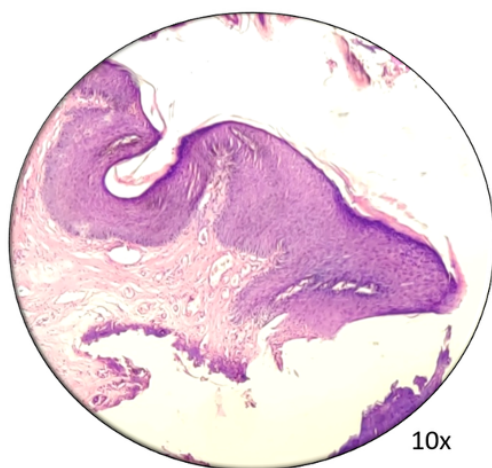
of low-grade neoplasms at 48.25% and high-grade neoplasms at 24.12%.[11]

Present study showed increased prevalence of invasive urothelial carcinoma than non invasive urothelial carcinoma, which was correlated with Shah A et al. The rising prevalence of urothelial carcinoma can be attributed, in part, to a lack of awareness regarding the use of occupational protective equipment and the challenges associated with low socio-economic status.[10,12]

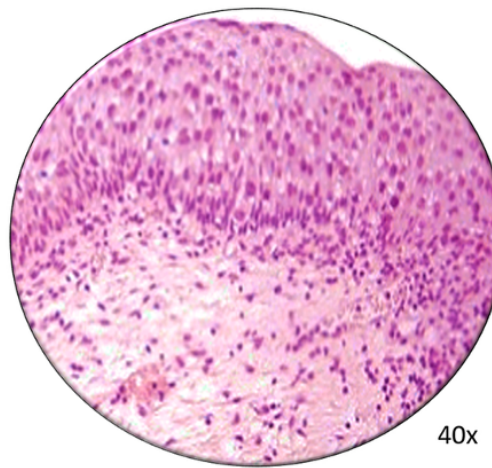
Papillary urothelial neoplasm of low malignant potential (PUNLMP) accounted for 7.81% in the current study, compared to 5.55% reported in the study by Shah A et al. PUNLMP is a urothelial lesion with a biologically low risk of progression. However, a significant proportion of these patients

(60%) experienced tumor recurrence, often with higher-grade lesions upon recurrence. Therefore, recognizing and accurately diagnosing these tumors is crucial for effective management. [10,13]

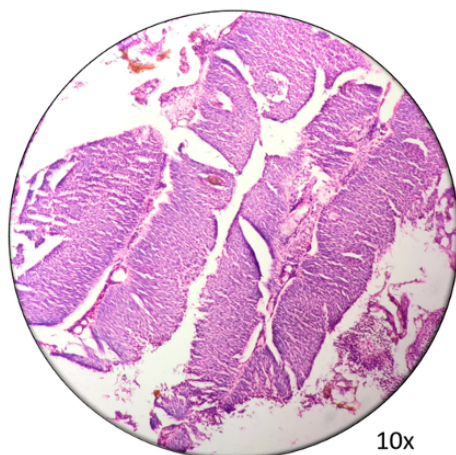
The prognosis of bladder tumors is significantly influenced by several factors, including histological grade, degree of differentiation, and the depth of invasion. Higher-grade tumors with poor differentiation tend to exhibit a more aggressive behaviour, while superficial lesions with well-differentiated features generally have a better prognosis. Furthermore, the depth of invasion plays a critical role in determining the stage of the tumor and guiding therapeutic decisions. [13,14]



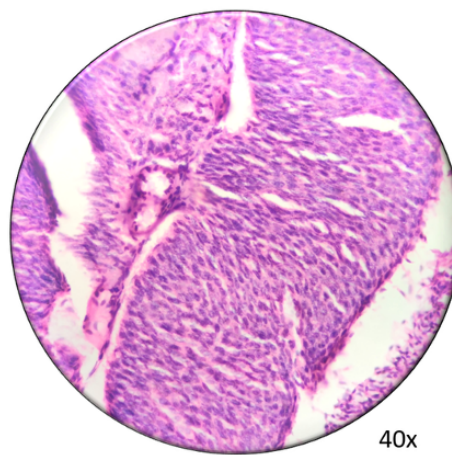
- **Keratinizing squamous metaplasia** – hyperkeratotic squamous epithelium.

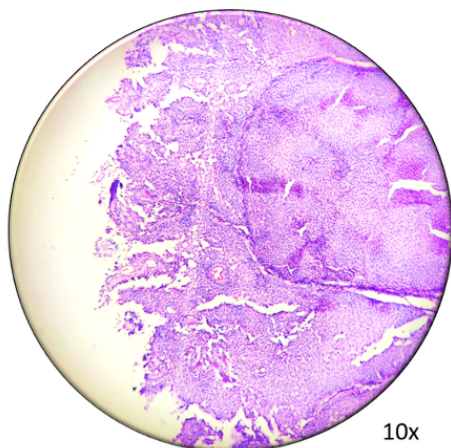


- **Urothelial dysplasia**: loss of perpendicular arrangement of the urothelial cells, minimal degree of nuclear enlargement.

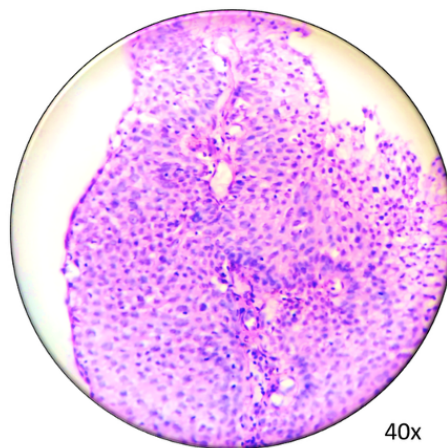


- **PUNLMP (Papillary urothelial neoplasm of low malignant potential)** – a neoplasm with overly thickened urothelium lining papillary fronds with no loss of polarity. Uniform bland cytology, lacking mitotic figures.



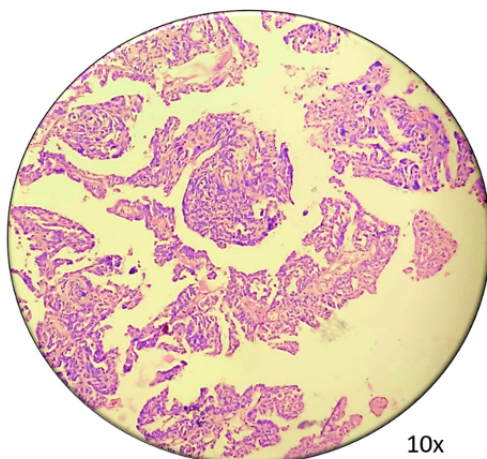


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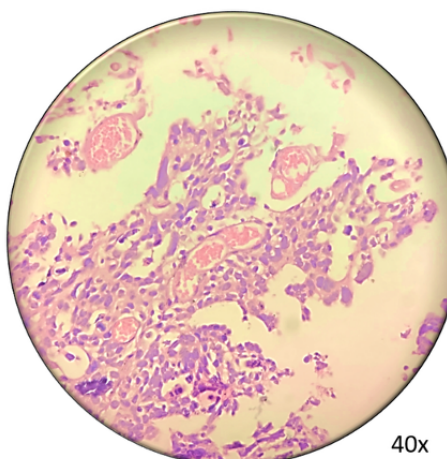


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- **Non-invasive papillary urothelial carcinoma – low grade:** Delicate papillae lined by urothelium with minimal cytological and architectural disorder.

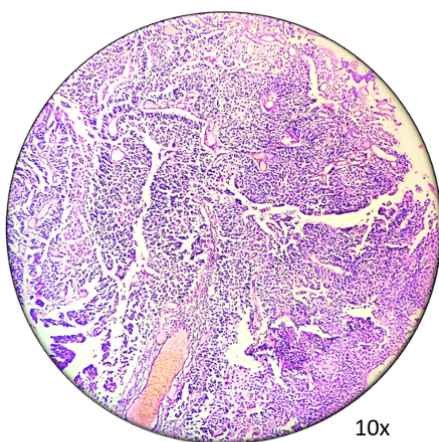


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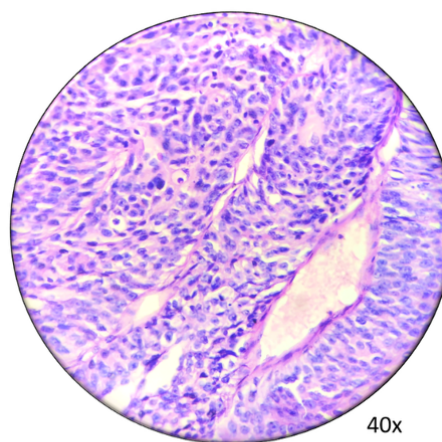


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- **Non-invasive papillary urothelial carcinoma – high grade:** papillae lined by variable number of urothelial cells with marked cytological atypia

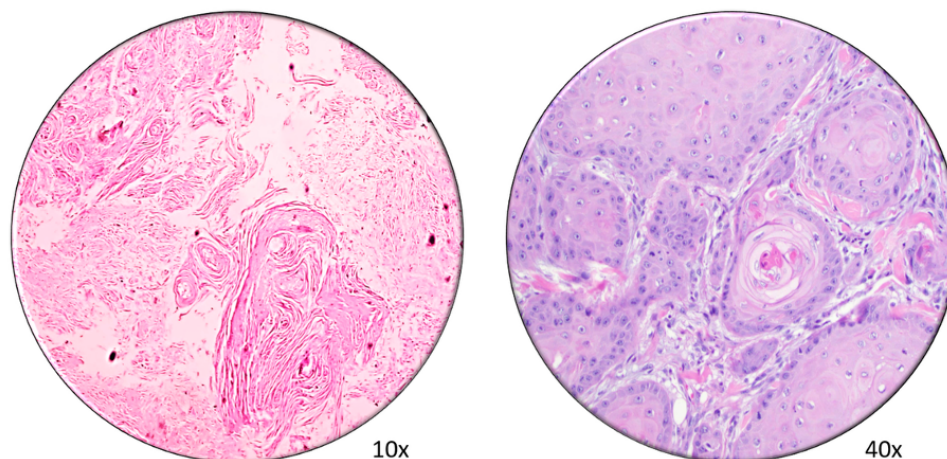


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- **Infiltrating urothelial carcinoma:** markedly pleomorphic tumor cells scattered throughout.



- **Squamous cell carcinoma - well differentiated** : nests of squamous cells with keratinization with minimal nuclear pleomorphism

Conclusion

Our study highlighted that neoplastic bladder lesions were more commonly observed in males, with a predominance in the elderly population. These observations underscore the essential role of histopathological examination in the evaluation and accurate diagnosis of bladder pathologies. Additionally, the analysis of bladder biopsies remains crucial for guiding targeted patient management, especially given the higher prevalence of neoplastic lesions in older individuals.

Bladder tumors are well-known for their high recurrence rates, rapid advancement to high grade, and the challenge posed by their non-specific symptoms. This makes precise diagnosis essential, with cystoscopy and histopathological analysis of biopsy material being pivotal in guiding treatment.[15]

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