Original Article

Histomorphological Continuum of Urinary Bladder Lesions- A Tertiary Care Experience

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Abstract

Background: Bladder cancer is the ninth most common cancer worldwide and is responsible for significant morbidity and mortality. Treatment of bladder cancer depends on the age, extent, stage and microscopic grade of the tumour. Hence, histopathological examination plays a vital role in patient management. The aim and objective is to determine the histomorphological spectrum of urinary bladder lesions. To categorise the neoplastic lesions according to the WHO urinary bladder tumours classification, 5th edition. To estimate the frequency of bladder lesions according to age, sex and site. Study of various clinical presentations of bladder lesions. **Material and Methods:** Study type: Retrospective study. Study period: January 2022 to December 2023. Inclusion criteria: All Transurethral Resection of Bladder Tumours (TURBT) biopsies and Cystectomy specimens received in the Department of Pathology will be included in the study. Exclusion criteria: Inadequate and autolysed biopsies were excluded from the study. Sample Collection Method: The H&E slides of the patients who underwent TURBT and cystectomy from January 2022 to December 2023 will be reviewed. The patient's details, cystoscopic findings, and clinical presentation will be collected from the medical records available at the institution. All the details will be correlated with histopathological findings and analysed. Out of 52 cases, 40 were male, and 12 were female. The most common age at presentation was 70-80 years, followed by 60-70 years. Forty-seven were TURBT specimens, and 5 were radical cystectomy specimens. The majority of lesions involve the left lateral wall, followed by the vesico-ureteric junction and the posterior wall. Among the neoplastic lesions, 16 were proliferative growths, 6 were polypoidal lesions, five presented as strictures/stenoses and 1 was a multifocal growth. Out of 52 cases, Neoplastic cases were 41, Non-neoplastic cases were 11. Among the Neoplastic cases, Invasive urothelial carcinomas constitute the predominant category, with Infiltrating urothelial carcinomas accounting for 26 cases, 4 with divergent differentiation. Nineteen were high-grade tumours, and 11 were low-grade tumours. Among the 19 cases, 10 showed muscle invasion, and among the 11 low-grade cases, 3 showed muscle invasion. Hematuria was the commonest, followed by burning micturation, dysuria and loin pain. **Conclusion:** As the common age of presentation was between 60 and 80 years, elderly males presenting with hematuria need to be evaluated to rule out bladder cancer. Cystoscopic examination with histopathology helps in initiating early treatment and a better prognosis in case of urothelial carcinoma.

Keywords: Bladder cancer, histopathology, TURBT, cystoscopy, bladder lesions.

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Introduction

There is a varied spectrum of urinary bladder pathologies ranging from congenital anomalies, inflammatory lesions, metaplastic lesions and neoplasms. Among congenital anomalies, Vesicoureteral reflux is the most common and serious anomaly. Diverticula may be congenital or acquired, and rarely, carcinoma may arise. Interstitial cystitis occurs commonly an woman and is of unknown etiology.[1] Bladder cancer is the 10th most common cancer worldwide and is responsible for significant morbidity and mortality. The incidence and mortality rate are four times higher in men than women, making it the sixth most common cancer and the ninth leading cause of death in men.[2] Among the bladder tumours, urothelial neoplasms are the common, followed by squamous and glandular neoplasms.[1]

Most of the bladder tumours appear beyond the 5th decade, with 3times higher preponderance in males than females, with the common site of occurrence being the lateral wall of the bladder, followed by the posterior wall. Hematuria is the most common and earliest symptom of primary bladder cancer, which could be full-course, intermittent and painless gross hematuria.[3,4] Cystoscopy is the primary diagnostic tool for patients suspected of having bladder tumours, as it allows direct visualisation of the bladder mucosa and takes biopsies of the suspected lesions.[5] Treatment of bladder cancer depends on the age, extent, stage and microscopic grade of the tumour.[6] Non-muscle invasive urothelial carcinomas can be treated with TURBT and intravesical therapy with chemotherapy or

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immunotherapy to decrease the risk of recurrence.[7] Whereas, radical cystectomy or chemotherapy and radiation therapy are required for muscle-invasive cancer 8. Hence, histopathological examination plays a vital role in patient management.

Aims and Objectives

1. To determine the histomorphological spectrum of urinary bladder lesions
2. To categorise the neoplastic lesions according to the WHO urinary bladder tumours classification, 5th edition.
3. To estimate the frequency of bladder lesions according to age, sex and site.
4. Study of various clinical presentations of bladder lesions.

Materials and Methods

Study type: Retrospective study

Study period: January 2022 to June 2024

Inclusion criteria: All Transurethral Resection of Bladder Tumours (TURBT) biopsies and Cystectomy specimens received in the Department of Pathology were included in the study

Exclusion criteria: Inadequate and autolysed biopsies were excluded from the study.

The H&E slides of the patients who underwent TURBT and cystectomy from January 2022 to June 2024 were reviewed. The patient details and clinical presentations were collected from the medical records available in the institution and analysed.

Results

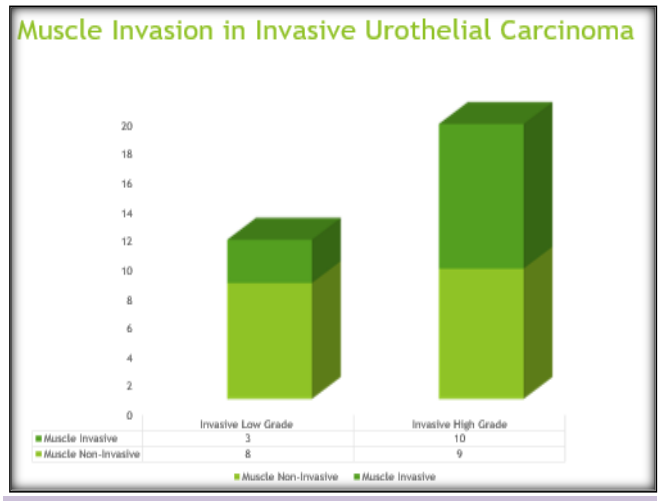

Figure 1: bar graph depicting muscle invasion

Clinical Presentation

Among the various presenting symptoms Hematuria was the commonest followed by burning micturation, dysuria and loin pain.

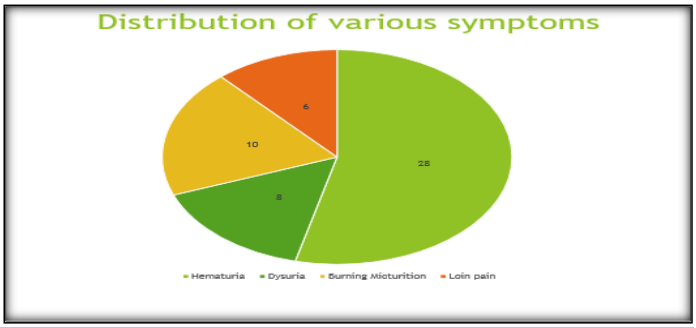

Figure 2: pie chart depicting various symptoms

Figure 3: Gross cystectomy specimen showing the ulceroproliferative growth involving the almost entire bladder with wall infiltration more than half the wall thickness

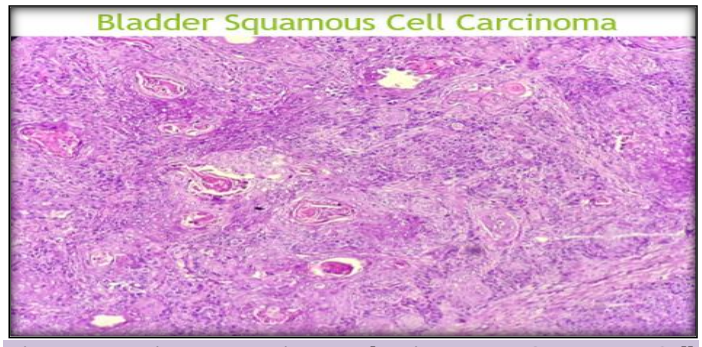

Figure 4: Microscopy picture showing pure Squamous Cell Carcinoma depicting tumor cells arranged in sheets and nests with keratin pearls formation

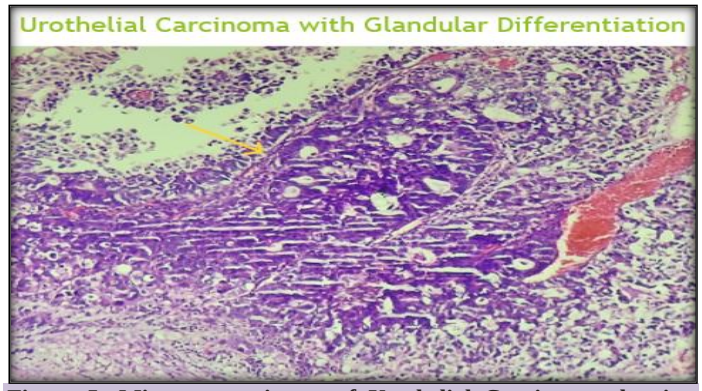

Figure 5: Microscopy picture of Urothelial Carcinoma showing tumor cells arranged in Glandular pattern

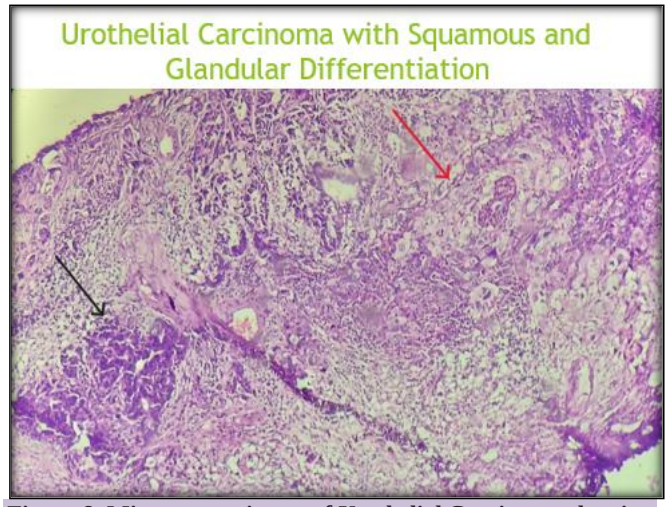

Figure 6: Microscopy picture of Urothelial Carcinoma showing Squamous differentiation (red arrow) and Glandular differentiation (black arrow)

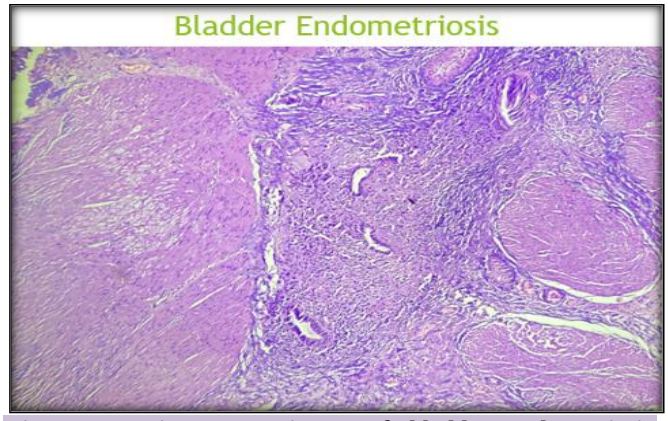

Figure 7: Microscopy picture of bladder endometriosis depicting endometrial glands amidst the muscle bundles

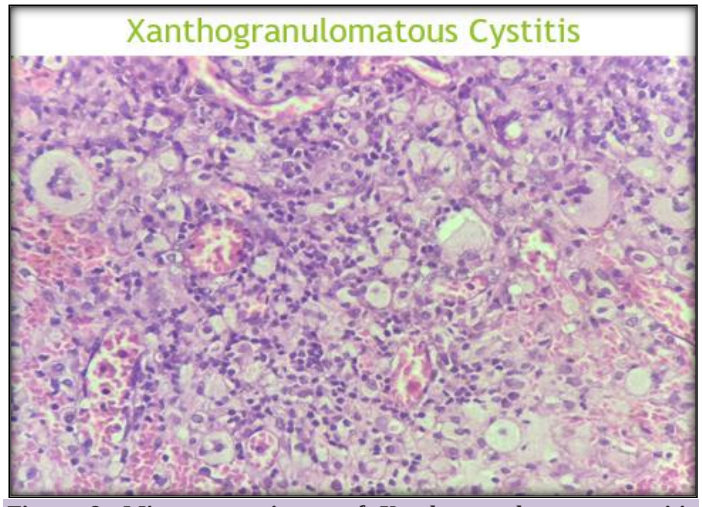

Figure 8: Microscopy picture of Xanthogranulomatous cystitis depicting aggregate of foamy macrophages and giant cell

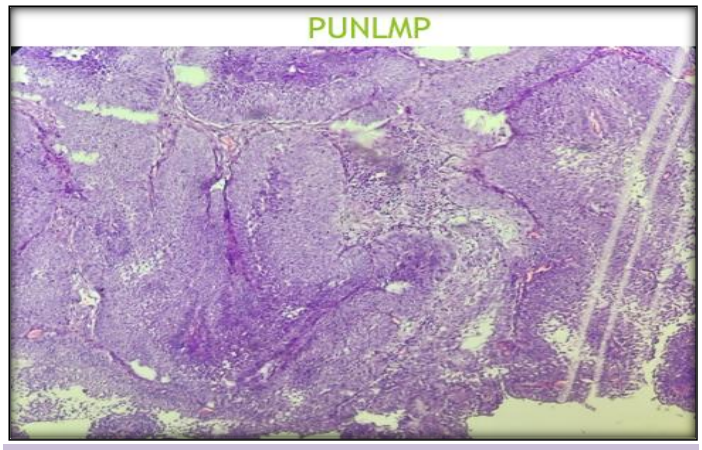

Figure 9: Microscopy of PUNLMP depicting endophytic growth with fibrovascular core and thickened epithelium.

Table 1: Age and sex distribution of urothelial tumors

Age (yrs)	Male	Female	Total	Percentage (%)
<40	03	02	05	9.61
40-50	01	01	02	3.84
50-60	05	02	07	13.46
60-70	12	00	12	23.07
70-80	14	05	19	36.54
>80	05	02	07	13.46
TOTAL	40	12	52	100

Out of 52 cases 40 were male and 12 females. The most common age of presentation was between 70-80 years followed by 60-70 years.

Table 2: Types of specimen and their distribution

Type of Specimen	Number of Cases	Percentage (%)
TURBT	47	90.38
Radical Cystectomy	05	09.62
TOTAL	52	

We had received 52 specimens of bladder, out of which 47 were TURBT and 05 were of Radical cystectomy specimens.

Table 3: site-wise distribution of bladder lesions

Site	Number of cases	Percentage (%)
Left Lateral Wall	14	38.88
Right Lateral Wall	2	5.55
Posterior Wall	6	16.66
Anterior Wall	2	5.55

Vesico Ureteric Junction(VUJ)	7	19.44
Bladder Neck	2	5.55
Trigone	2	5.55
Dome of Bladder	1	2.77
TOTAL	36	

Among the 52 cases, only in 36 cases details regarding the site of lesion was available and majority of the lesions shows involvement of left lateral wall, followed by vesico-ureteric junction and posterior wall.

Table 4: growth pattern of urothelial neoplastic lesions

Growth pattern	Number of cases	Percentage (%)
Proliferative growth	19	61.29
Polypoidal growth	6	19.35
Stricture/stenosis	5	16.12
Multifocal growth	1	3.22
Total	31	

Out of 41 Neoplastic lesions 31 cases details regarding growth patterns were available. Majority were Proliferative growth followed by Polypoidal growth and Stricture/Stenosis. Only one case of multifocal pattern was observed.

Table 5: spectrum of bladder lesions

Histopathological spectrum of bladder lesions (WHO 5TH edition)		
Diagnosis	**No.of cases**	**Percentage(%)**
Invasive urothelial carcinomas		
Infiltrating urothelial carcinoma	26	50
Infiltrating urothelial carcinoma with divergent differentiation	04	7.69
Non- Invasive Urothelial Neoplasm		
Papillary urothelial neoplasm of low malignant potential(PUNLMP)	02	3.84
Non-invasive papillary urothelial carcinoma- low grade	04	7.69
Non-invasive papillary urothelial carcinoma-high grade	04	7.69
Squamous cell carcinoma	01	1.92
Non – neoplastic urothelial lesions		
Granulomatous Cystitis	01	1.92
Xanthogranulomatous cystitis	01	1.92
Endometriosis with Cystitis Cystica et glandularis	01	1.92
Chronic non-specific cystitis	03	5.76
Interstitial Cystitis	05	9.61
Total	52	

Out of 52 cases Neoplastic were 41, Non-neoplastic were 11 cases. Among the Neoplastic cases, Invasive urothelial carcinomas constitutes the predominant category in which Infiltrating urothelial carcinomas were of 26 cases, 4 cases of Infiltrating urothelial carcinoma with squamous and glandular differentiation were seen a case of Squamous cell carcinoma was noted.

Among the Non-invasive urothelial neoplasm, 2 were diagnosed as PUNLMP, 4 as Non-invasive papillary urothelial carcinoma-low grade, 4 as Non-invasive papillary urothelial carcinoma -high grade.

Out of 11 Non-neoplastic lesions, 5 were Interstitial cystitis, 3 were Chronic non-specific cystitis, each case of Endometriosis with Cystitis Cystica et glandularis, Xanthogranulomatous cystitis and Granulomatous cystitis was noted.

Invasive urothelial carcinoma

Table 6: muscle invasion

Category	No. Of cases	Percentage (%)	Muscle invasion	Percentage (%)
High grade	19	63.33	10	52.63
Low grade	11	36.66	3	27.27

Out of 30 cases 19 were High grade tumors and 11 were low grade tumors. Among the 19 cases 10 showed muscle invasion and out of 11 low grade cases 3 showed muscle invasion.

Discussion

Urinary bladder lesions cause significant morbidity and mortality. The diagnosis and monitoring of bladder lesions are made through cystoscopy and histopathology.[10] The sensitivity and specificity of cystoscopy are 81% and 73% respectively, suggesting a risk of missing or underdiagnosing bladder tumours. Thus emphasising the need for additional diagnostic methods.[11]

Radiation exposure for the treatment of prostate cancer and uterine cervix cancer increases the risk of bladder cancer. Infections like Schistosoma haematobium, patients with neurogenic bladder, smokers, and occupational exposure to benzidine-based dyes increase the risk of bladder cancer.[2]

In the present study, we analysed 52 bladder biopsies, of which the majority (36.53%) belonged to the age group of 70-80 years, followed by 60-70 years (23.07%). Similar results were found in a study by Poudel et al.: 25.5% among 70-80-year-olds, followed by 21.8% among 60- 70-year-olds.[12]

Of the 52 cases, 40 were Male (76.9%) and 12 Female (23.07%), showing a Male preponderance in Bladder Lesions, similar to the

study done by Poudel et al with 76.4 % of cases were male, and Sighal P et al., showing 75% cases and 91.5% cases were male in non-neoplastic and neoplastic category respectively.[13] The presumptive diagnosis of UTI leads to a delay in the diagnosis of bladder cancer in women.[2]

Radiation exposure for the treatment of prostate cancer and uterine cervix cancer increases the risk of bladder cancer. Infections like Schistosoma haematobium, patients with neurogenic bladder, smokers, and occupational exposure to benzidine-based dyes increase the risk of bladder cancer.[2]

Hematuria was the commonest presenting symptom in our study, which is similar to the studies by Pandey S K et al (92%),[14] and Preeti N Jhaveri et al.[15] The various presenting symptoms included microscopic and macroscopic haematuria, urinary urgency, urinary frequency, nocturia, and dysuria. Those presenting with Gross hematuria were found to have an association with higher stage of the disease at diagnosis compared to microscopic hematuria.[16]

In our study, the majority of bladder lesions were neoplastic (78.84%), and non-neoplastic lesions accounted for 21.15%. A study done by Poudel et al. also showed similar findings with neoplastic 83.64% and non-neoplastic 16.36%.[12] Out of 52 cases studied, 31 cases were Invasive Urothelial carcinoma, 10 cases were Non-invasive Urothelial neoplasms, and 11 were Non-neoplastic lesions. The spectrum of cases studied included 26 cases of infiltrating urothelial carcinoma, 4 cases with squamous and glandular differentiation, and 1 case of squamous cell carcinoma. Non-invasive urothelial neoplasms include 2 cases of PUNLMP, 4 cases of non-invasive papillary urothelial carcinoma, low grade and high grade each. Cystitis was the most common non-neoplastic lesion encountered, with a single case of Endometriosis.

Among the invasive urothelial carcinomas, only 3 of 11 low-grade cases showed muscle invasion, whereas 10 of 19 high-grade cases were muscle invasive, indicating the aggressive behaviour and worse outcome of high-grade tumours.

Similar findings were reported in the study by Pokar R et al., with 33.34% of low-grade tumours and 74.18% of high-grade tumours showing muscle invasion.[17]

Squamous Cell Carcinoma of the bladder is a rare and aggressive cancer. Predisposing factors are Schistosoma infections, smoking and nephrolithiasis.

Among the non-neoplastic lesions we have encountered, Xanthogranulomatous Cystitis is an unusual, benign entity.

Endometriosis with Cystitis Cystica et glandularis mimicked carcinoma cystoscopically with a multiple polypoidal appearance.

Conclusion

The incidence of bladder carcinomas is increasing because of occupational exposure and habitual factors.

Histopathology plays an important role, as some benign conditions mimic neoplasms, and tumour grading and muscle invasion status initiate appropriate treatment.

Increasing awareness and early diagnosis, with histopathological confirmation, helps in the proper management of patients and improves prognostic outcomes.

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Conflicts of interest

There are no conflicts of interest.

References

1. Kumar V, Abbas AK, Fausto N. The Lower urinary tract and male genital system. Robbins and Cotran's Pathologic Basis of Disease. 10th ed.South Asia edition; 2021, p. 957
2. WHO classification of tumours of the urinary system and male genital organs.International Agency for Research on Cancer, Lyon,2022;5th edition
3. Mohan H. Text of Pathology. Jaypee Brothers Medical Publishers, 7th edition, 2015, p. 687
4. Zhu CZ, Ting HN, Kwan NH et al. A review on the accuracy of bladder cancer detection methods, Journal of Cancer 2019; volume 10 (17): 4038-4044.
5. Grignon DJ. Urologic Surgical Pathology. St Loius: Mosby. Neoplasm of the urinary bladder, 1997; 215-305.
6. Rosai J., J.Rosai and Ackerman's surgical pathology 10 10th ed., St. Louis: Mosby; 2015, p. 1264
7. Chang S.S,Boorjian S.A,Chou R et al.Diagnosis and Treatment of Non-Muscle Invasive Bladder Cancer: AUA/SUO Guideline.J.Urol.2016;196:1021-1029
8. Softness K, Kauls, Fleishman A et al.Radical cystectomy versus trimodality therapy for muscle-invasive urothelial carcinoma of the bladder.
9. Srikousthubha, Sukesh, Raghuveer CV, Hingle S. Profile of lesions in cystoscopic bladder biopsies: A histopathological study. J Clin Diagn Res. 2013;7(8):1609-128.
10. Sathya Mylsamy, Devaki Kanakasabapathi. Histopathological Study: TURBT Biopsies of Urinary Bladder Cancer. Trends in Medical Research. 2017; 12:51-54.
11. Guldhammer C S, Kristensen V M, Norus T et al. Cystoscopy accuracy in detecting bladder tumours: A Prospective Video-Confirmed Study.Cancers.2024 Jan;16(1):160
12. Poudel S, Ranabhat S, Shahi S et al.Spectrum of lesions in the urinary bladder: A histopathological study in a tertiary-level hospital.Journal of College of Medical Sciences-Nepal,vol-19, No 3, Jul-Sep 2023
13. Singhal P, Singhal M, Gupta M et al.Histopathological spectrum of neoplastic and non-neoplastic lesions of urinary bladder- A retrospective study. National journal of laboratory medicine.2021 0ct,vol-10(4):PO20-24
14. Pandey S K Mishra R T, Solanki F S et al. A clinico-histopathological study of urinary bladder lesions. International Journal of Academic Medicine and Pharmacy.2023;5(4);95-102
15. Preeti N Jhaveri, Seva V Makwana et al, A Histopathological study of urinary bladder neoplasms, Indian Journal of Pathology and Oncology, 2021;8(1):59-63
16. Ramirez D, Gupta A, Canter D, Harrow B, et al. Microscopic Hematuria at the time of diagnosis is associated with a lower disease stage in patients with newly diagnosed bladder cancer.BJU Int.2016,117,783-786.
17. Pokar R et al.Spectrum of histopathological variants in urinary bladder carcinomas-Experience in a tertiary care hospital.IP Archives of cytology and histopathology research.2022;7(4):237-240.