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ENHANCING THE ACCURACY AND COMPLETENESS OF BLADDER TUMOR HISTOPATHOLOGY DOCUMENTATION WITH AN EAU-BASED STANDARDIZED TEMPLATE: A CLOSED-LOOP AUDIT AT SAFARI HOSPITAL, RAWALPINDI, PAKISTAN

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Abstract

Background: Incomplete and inconsistent histopathology documentation in bladder tumor cases can lead to diagnostic delays, suboptimal treatment planning, and compromised patient outcomes. The use of standardized and structured proforma has been proposed as a solution to improve documentation accuracy and adherence to guidelines. Aim: This audit aimed to evaluate whether implementing a structured proforma enhances the completeness and accuracy of histopathology documentation for bladder tumors. Method: A closed-loop audit was conducted at Safari Hospital, Rawalpindi, Pakistan to evaluate the completeness of histopathology documentation for bladder tumors. The initial audit reviewed 25 handwritten reports to identify documentation gaps. A standardized proforma was then introduced and a re-audit was performed on 31 cases. Compliance rates were assessed and compared using percentages and frequencies. A paired t-test was used to measure the statistical significance of improvements. Results: The implementation of a standardized proforma led to a significant improvement in histopathology documentation. Tumor number, site, and appearance, previously absent, achieved 100% compliance. Documentation of tumor clinical stage increased from 4% to 51.6%, and completion of resection improved from 12% to 80.6%. Muscle biopsy requests were documented in 51.6% of cases, compared to 20% earlier. These improvements were statistically significant ($p = 0.000$), highlighting the benefits of a standardized proforma for better diagnosis and treatment planning. Conclusion: The use of standardized histopathology templates enhances the quality and completeness of bladder tumor reports, leading to more informed clinical management. Further research should explore its long-term impact on patient outcomes and electronic health record integration.

INTRODUCTION

Bladder cancer is the 10th most common cancer worldwide and is a significant health concern. In 2025 alone, about 84,870 people were diagnosed with it, and 17,420 died from bladder cancer in the United States [1]. Accurate histopathological evaluation is essential for staging and diagnosing bladder tumors, as it directly influences treatment decisions and patient outcomes [2]. This process involves analyzing

tissue obtained through biopsy, cystectomy, or transurethral resection of bladder tumor (TURBT) to determine tumor size, stage, and grade. However, the effectiveness of this evaluation often relies on the quality and completeness of histopathology documentation.

Accurate histopathological documentation ensures clear communication between surgeons, pathologists, and multidisciplinary teams, facilitating accurate diagnoses and well-informed treatment planning[3]. For example, the use of standardized structured reporting (SSR) in oncologic pathology has been shown to improve the clarity and completeness of reports, leading to more accurate treatment decisions[4]. The European Association of Urology (EAU) guidelines emphasize that operative reports should include essential details such as tumor size, depth of resection, and administration of intravesical chemotherapy, as these elements play a critical role in risk stratification and treatment selection[5]. Despite these recommendations, studies indicate that adherence to standardized documentation remains inconsistent, particularly with handwritten notes.

Handwritten histopathology notes are often incomplete and illegible, which can lead to errors in the diagnosis and management of the condition. Studies have revealed significant gaps in documentation since most of the parameters were found to be omitted[6,7]. A retrospective study from Aga Khan University Hospital found that 54% of TURBT reports failed to indicate whether tumor resection was complete, an important element for post-surgical decision-making[8]. Similarly, a UK-based audit reported that tumor size and description were missing in 46% and 59% of cases, respectively[9]. These inconsistencies in documentation can lead to misinterpretations, delays in treatment, and suboptimal clinical decisions, ultimately compromising patient care.

Despite growing evidence supporting structured documentation, many institutions still rely on handwritten or unstandardized histopathology notes, which often results in the omission of important information. This highlights the urgent need for standardized documentation to improve diagnostic accuracy, enhance patient safety, and ensure compliance with international guidelines.

To address these issues, we conducted a closed-loop audit at Safari Hospital, Rawalpindi, Pakistan to evaluate the impact of a standardized proforma on histopathology documentation for bladder tumors. Initially, we assessed the completeness of handwritten histopathology reports. After identifying documentation gaps, we implemented a structured proforma designed to improve reporting accuracy. A re-audit was then conducted to measure compliance with essential reporting parameters and adherence to international guidelines. This study aimed to assess whether structured and standardized proforma improves the quality of histopathology documentation for bladder tumors.

Materials and Methods

This retrospective closed-loop audit was conducted at Safari Hospital, Rawalpindi, Pakistan between February 2024 to December 2024 to evaluate the quality of histopathology request forms for bladder tumors, based on standard pathology reporting guidelines.

A total of 56 patient reports were randomly selected, including cases from biopsy, transurethral resection of bladder tumor (TURBT), and cystectomy. The audit was performed in two phases. In the first phase, 25 handwritten histopathology forms were reviewed using an audit tool (checklist) designed according to established EAU guidelines[5] (Appendix I). This checklist included 11 essential parameters, along with the patient's age and gender. The parameters assessed were: type of surgical procedure, proper labeling of tissue specimens, tumor clinical stage, documentation of cystoscopy findings, number and appearance of tumors, tumor site, completeness of resection, submission of separate muscle biopsy, inclusion of a bladder diagram, and documentation of previous treatments (resection, chemotherapy, or radiotherapy). Each parameter was evaluated as either "yes" (documented) or "no" (missing), and compliance rates were calculated based on the percentage and frequency of documented parameters.

After identifying deficiencies in the handwritten reports, a structured proforma was developed in line with European Association of Urology (EAU) guidelines (Appendix II). The purpose of the proforma was to standardize the documentation process and ensure that all important elements were

consistently and accurately noted. It included predefined options for most parameters, allowing standardized selection and reducing documentation variability. Additionally, text-free fields were included for details such as procedure type, specimen information, and clinical stage to make sure these essential parameters were not overlooked.

Following the development of the proforma, surgeons were trained on its proper use and instructed to implement it for all subsequent procedures. A re-audit was conducted two months later, between July 2024 to December 2024. During this phase, 31 forms were assessed using the same audit tool (checklist). Percentages and frequencies of documented parameters were calculated, and the results from both audits were compared. To evaluate the significance of the observed improvements, a paired sample t-test was performed, with a p-value of <0.05 considered statistically significant. All statistical analyses were done using SPSS version 2.0.

Results

We analyzed a total of 56 histopathology forms and calculated compliance rates based on frequencies and percentages using a standardized checklist. The first audit reviewed handwritten histopathology reports for 25 patients undergoing transurethral bladder resection (TURBT). This included 8 females (32%) and 17 males (68%), with a mean age of 57.76 years.

The results revealed significant variation in compliance with documentation standards. Although the surgical procedure was documented in all reports (100%), several essential parameters were missing. The tissue specimen was properly labeled in 23 cases (92%), while 2 cases (8%) lacked proper labeling. Tumor-related details were frequently missing, with the tumor clinical stage recorded in only 1 case (4%) and absent in 24 cases (96%). Similarly, the number of tumors was mentioned in only 1 case (4%), while 24 cases (96%) did not include this information.

Cystoscopy findings were not documented in any of the reports. Tumor appearance and site were also absent in all cases. The completion of tumor resection was mentioned in 3 cases (12%), whereas 22 cases (88%) did not specify this information. The request for a muscle biopsy to be sent separately was documented in 5 cases (20%) and omitted in 20 cases (80%). None of the reports included a bladder diagram. Additionally, the previous history of any resection, chemotherapy, or radiotherapy was not documented in any case.

After the introduction of the standardized proforma, 31 notes were reviewed in the re-audit. Among these patients, 10 (32.3%) were female and 21 (67.7%) were male, with a mean age of 60.9 years. The results of the re-audit showed substantial improvement in documentation quality. The surgical procedure continued to be documented in all reports (100%), and tissue specimen labeling improved to 100%. Tumor clinical stage, which was previously recorded in only 4% of cases, was now documented in 16 reports (51.6%). Furthermore, the number, appearance, and site of tumors, which had been entirely absent in the first audit, were now included in all cases (100%).

Other improvements were also evident. The documentation of resection completion increased from 12% to 80.6% (25 forms). Similarly, muscle biopsy requests improved from 20% to 51.6% (16 forms). Moreover, the bladder diagram and prior treatment history, which were completely missing in handwritten forms, were included in 29 (93.5%) and 23 forms (74.2%) respectively.

Table 1. Comparison of documentation completeness across both audits (percentages and frequencies).

Documentation Parameter	1st Audit	2nd Audit
Was surgical procedure mentioned?		
Yes	25 (100%)	31 (100%)
No	0	0
Tissue specimen properly labeled?		
Yes	23 (92%)	31 (100%)
No	2 (8%)	0
Tumor clinical stage mentioned?		

Yes	1 (4%)	16 (51.6%)
No	24 (96%)	15 (48.4%)
Are cystoscopy findings documented?		
Yes	0	31 (100%)
No	25 (100%)	0
Number of tumors mentioned?		
Yes	1 (4%)	31 (100%)
No	24 (96%)	0
Tumor appearance mentioned?		
Yes	0	31 (100%)
No	25 (100%)	0
Tumor site mentioned?		
Yes	0	31 (100%)
No	25 (100%)	0
Completion of resection mentioned?		
Yes	3 (12%)	25 (80.6%)
No	22 (88%)	6 (19.4%)
Muscle biopsy request documented?		
Yes	5 (20%)	16 (51.6%)
No	20 (80%)	15 (48.4%)
Bladder diagram drawn?		
Yes	0	29 (93.5%)
No	25 (100%)	2 (6.5%)
Was previous history of resection/chemotherapy/radiotherapy documented?		
Yes	0	23 (74.2%)
No	25 (100%)	8 (25.8%)

The table above indicates the improvements observed across all parameters, with significant increases in compliance rates. The most notable improvements were seen in the documentation of tumor characteristics, cystoscopy findings, and prior treatment history.

Table 2. Significance of improvement using paired sample t-test

Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Initial audit - Re-audit	-65.4091	37.9952	11.4560	-90.9346	-39.8836	-5.710	10	.000

A paired sample t-test confirmed that these changes were statistically significant (p = 0.000). This suggested that the introduction of the standardized proforma substantially improved the completeness and accuracy of histopathology forms.

Discussion

We conducted a closed-loop audit to assess the impact of implementing a structured and standardized pro forma on the completeness and accuracy of histopathology reporting for bladder tumors. The study comprised two phases: an initial assessment of 25 handwritten histopathology reports, followed by a second phase evaluating 31 cases after introducing a standardized template.

The initial audit revealed significant documentation deficiencies. While certain parameters, such as the surgical procedure, were consistently recorded (100% compliance), critical details were frequently omitted. Specifically, tumor clinical stage was documented in only 4% of cases, tumor number in 4%, and completion of resection in 12%. Additionally, essential information like cystoscopy findings, tumor appearance, and site were entirely absent in all cases. These findings align with existing research highlighting the limitations of unstructured reporting in histopathology documentation, where missing clinical details can lead to diagnostic delays and suboptimal patient management [2].

Following the introduction of a structured operative note template, documentation quality showed substantial improvement. Tumor number, appearance, and site achieved 100% compliance, while completion of resection documentation improved from 12% to 80.6%. The inclusion of tumor clinical stage increased from 4% to 51.6%, and muscle biopsy requests were documented in 51.6% of cases compared to 20% before intervention. These improvements are consistent with previous studies demonstrating the benefits of use of standardized and structured templates. For instance, Guerrero et al. (2022) reported significant improvements in TURBT documentation after implementing structured templates, with tumor size reporting increasing from 46% to 89% and tumor description from 59% to 89% [9]. The study showed that implementing a structured TURBT operative note enhanced risk stratification, which facilitates more tailored patient management. Similarly, a study by Dave et al. (2023) demonstrated that using a TURBT checklist improved resection quality and oncologic outcomes[10]. Kikuchi et al. also found that implementing a surgical checklist during TURBT procedures can lead to improved quality of resections and reduced recurrence rates in patients with non-muscle-invasive bladder cancer[11]. A systematic review by Botros et al. (2024) also highlighted that surgical checklists in TURBT procedures improved intraoperative documentation and were associated with better postoperative surveillance and treatment adherence[12].

Despite the improvements observed in our study, the extent to which structured reporting directly influences patient outcomes remains uncertain. While enhanced documentation is expected to support better clinical decision-making, further research is required to assess its impact on tumor staging accuracy, adherence to treatment guidelines, and recurrence rates. Moreover, as a single-center audit with a relatively small sample size, the findings in this study may not be generalizable to broader healthcare settings. Future studies should focus on multi-center evaluations, long-term follow-up studies, and assessing standardized proforma integration with electronic medical records to ensure sustainability and widespread adoption.

Conclusion

In conclusion, our audit demonstrates that handwritten histopathology request forms for bladder tumors often lack critical information, potentially compromising patient care. Implementing a standardized proforma significantly improved documentation completeness, aligning with international guidelines. Given the strong evidence supporting structured documentation, institutions should consider the widespread adoption of standardized templates. Further integration with EMRs and digital platforms may enhance compliance and ensure consistent, high-quality documentation across healthcare settings.

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Appendix I

HISTOPATHOLOGY FORM
(BLADDER TUMOR)
Audit Tool

MR #

Age/ Gender

Standard #1: Name of the surgical procedure mentioned? Yes / No

Standard #2 Was the tissue specimen properly labelled? Yes / No

Standard #3 Was the tumor clinical stage mentioned? Yes / No

Standard #4 Was the cystoscopy findings properly documented? Yes / No

CYSTOSCOPY FINDINGS

Standard #5 number of tumors mentioned? Yes / No

Standard #6 appearance of the tumor mentioned? Yes / No

Standard #7 site of the tumor mentioned? Yes / No

Standard #8 was the completion of the resection mentioned? Yes / No

Standard #9 mentioning of the muscle biopsy to be sent separately was Requested? Yes / No

Standard #9 Was the bladder diagram drawn? Yes / No

Standard #10 Was the previous history of any resection/chemotherapy/radiotherapy Documented? Yes / No

Appendix I

HISTOPATHOLOGY FORM
(BLADDER TUMOR)

Name:_____ **Father Name:**

Age: _____ **Date:** ____/____/

Consultant: **Surgical Procedure**:

Tissue specimen : **Tumor Clinical Stage :**

Cystoscopy Findings :

Number of Tumour:

Appearance: Papillary Solid Mixed Sissle Nodular Flat

Site(s):

1. Trigone 2. Right ureteral orifice 3: Left ureteral orifice

4: Right wall 5: Left wall 6: Anterior wall

7: Posterior wall 8 : Dome 9 : Neck

10 : Posterior urethra

Resection:

Visualization of muscle at the resection base : Yes / No / Not sure

Previous History: Any Resection / Chemo / Radio / Systemic therapy