# **Original Research Article**

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# The pattern of urine cytology among patients with clinical diagnosis of bladder tumor in a tertiary hospital northwest Nigeria

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#### **ABSTRACT**

**Background:** Urine cytology is a simple, safe, non-invasive and cheap investigation that is used as adjunct to cystoscopy in the diagnosis of bladder cancer. Its low sensitivity is a major limitation against its use as a sole diagnostic test for bladder cancer. The objective of this study was to determine the pattern of urine cytology seen in patients with clinical diagnosis of bladder tumour in our practice.

**Methods:** This is a retrospective study of patients with clinical diagnosis of bladder tumour that had urine cytology in our centre. The age and gender of the patients, number of urine cytology per patient per year and cytologic diagnosis were analysed using the SPSS 20.

**Results:** During the period under review, a total of 512 urine cytology was done for patients with clinical diagnosis of bladder tumour. The age range of the patients was 6 to 90 years with modal age of 60 years. 457 (89.3%) were males while 54 (10.5%) were females and 1 (0.2%) was unspecified. Male to female ratio was 8.5:1. The highest number of urine cytology was done in 2013 with 64 (12.5%) while the least number was 1 (0.2%) recorded in 2001 and 2003. Only 68 (13.3%) specimens were reported to be malignant while 245 (47.9%) were reported as negative representing the most common cytological diagnosis in the study.

**Conclusions:** Although urine cytology is useful in the diagnostic workup of patients with bladder mass, it is unlikely it would supplant cystoscopy and biopsy in the diagnosis of bladder cancer.

Keywords: Urine cytology, Bladder tumour, Cystoscopy, Biopsy

#### **INTRODUCTION**

Bladder cancer is the second commonest malignancy of the urinary tract.<sup>1,2</sup> It is the most common male cancer in Sokoto state, Nigeria and the fourth most common cancer in the western world.<sup>3-5</sup> Early diagnosis of bladder cancer is important so that curative treatment may be achieved, thereby reducing the morbidity and mortality associated with advanced and metastatic disease. The commonest type of bladder cancer is urothelial carcinoma; however this is not so in our environment where majority of patients with bladder cancer are diagnosed with

squamous cell carcinoma due to high prevalence rate of urinary schistosomiasis. <sup>1,3,5,6</sup> In the western world, majority of patients are diagnosed with superficial, nonmuscle invasive disease and hence, have good prognosis. <sup>5</sup> This is also not so in our region where majority of patients present with locally advanced or metastatic disease and therefore, the prognosis is usually poor at presentation.

Urine cytology is used to identify exfoliated cells from neoplastic urothelium in voided urine. When larger quantity of cells are required, gentle irrigation of the

bladder using 0.9% saline solution through a catheter or cystoscope (barbotage) can be done. It is a simple, inexpensive and non-invasive diagnostic tool that is readily available. Three basic types of exfoliated urinary tract specimens are generally used for urine cytology; voided urine, catheterized urine and specimens obtained through brushing or washing. Urine cytology is used as an adjunct to cystoscopy and biopsy in the management of patients with bladder cancer.

There are various indications for urine cytology but in general terms, they fall into two categories; investigating patients with urinary symptoms, most importantly haematuria and for surveillance in patients with history of bladder cancer.<sup>8</sup> Although urine cytology can identify the presence of bladder cancer, it does not identify the anatomic location of the tumour. How accurate the result of urine cytology will be depends on several factors related either to tumour grade, sampling method or the nature of specimen as well as expertise of the cytopathologist.<sup>2,8</sup> Therefore, specimens should be processed without undue delay or refrigerated and processed as early as possible and whenever delay is anticipated, the specimen should be immediately fixed with 50% ethanol to preserve the specimen for several days.<sup>7</sup> It is also known that high grade urothelial cancers have a higher diagnostic yield compared to low grade tumours and cytohistologic correlation is as high as 98%. 1,9 Finally, voided specimens have been shown to be more specific but slightly less sensitive when compared with instrumented specimens which may partly be due to absence of reactive changes induced by instrumentation which results in cell clustering and therefore, making the cytologic findings interpretation in voided urine more straightforward.9

The objective of this study is to review the outcome of urine cytology in patients with clinical diagnosis of bladder tumour over the study period, identifying the cytological pattern of urine from these patients and to determine the uses of urine cytology in patients with bladder cancer based on a retrospective review of our records.

## **METHODS**

This is a retrospective review of all urine cytology reports for patients with clinical diagnosis of bladder tumour during the study period (from January 2001 to December 2017) in our facility Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, Nigeria. All patients with clinical diagnosis of bladder mass on pelvic ultrasounds and with records of urine cytology test were included in the study. Patients with missing urine cytology report were excluded from the study. The following information was retrieved from the databases of the departments of surgery and histopathology after ethical approval was granted by our Research and Ethic Committee: age and gender of the patients, the year in which urine cytology was done, clinical indication for

urine cytology as requested and cytological diagnosis. The data retrieved were analysed using SPSS version 20 for Windows. The results obtained are presented in simple frequencies and percentages.

## **RESULTS**

A total of 512 urine cytology tests were done for patients with clinical diagnosis of bladder tumour. Of the 512 urine cytology done, 457 (89.3%) was for male patients and 54 (10.5%) was for female patients while the gender of 1 patient, (0.2%) was not specified. The male to female ratio was thus 8.5:1.

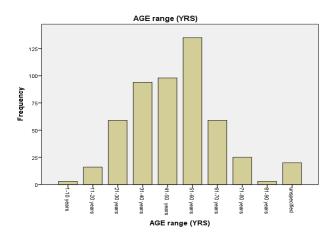


Figure 1: Age distribution.

The age range of the patients was between 6 to 90 years with a modal age of 60 years (64 patients). Majority of the patients, 135 were within the age range of 51 to 60 years representing 26.4%. The age group with the least number of patients was 1 to 10 years and 81 to 90 years, each with 3 patients (0.6% respectively). The ages of 20 (3.9%) patients were not recorded. Other age distributions are summarized in Figure 1.

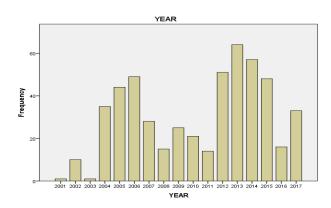


Figure 2: Year distribution.

The years that recorded the least number of urine cytology reports for bladder tumour were 2001 and 2003 where only single (0.2%) urine cytology was done in each of these years. The highest number of urine cytology

reports for bladder tumour was recorded in 2013, where 64 (12.5%) urine cytology were reported. This is closely followed by reports from 2014 which shows that 57 (11.1%) urine cytology tests were carried out. The frequency of urine cytology according to year is shown in Figure 2.

Table 1: Cytological diagnosis in the study.

Cytologic diagnosis	Frequency	%
Acellular	12	2.3
Benign	1	0.2
Degenerate	19	3,7
Dysplasia	1	0.2
Haemorrhagic	7	1.4
Inadequate	2	0.4
Inflammatory	96	18.8
Malignant	68	13.3
Negative	245	47.9
Reactive	10	2
Schistosomiasis	6	1.2
Suppurative inflammation	5	1
Suspicious	40	7.8
Total	512	100

The most reported cytological diagnosis in the study was negative for malignancy occurring in 47.9% (n=245) of reports. This is followed by inflammatory which was reported in 96 (18.8%) specimens. The number of specimens that were reported as malignant were 68 (13.35%) making it the third most common cytologic diagnosis while 40 (7.8%) specimens were reported as suspicious and was the fourth most common cytologic diagnosis. Of the 68 urine cytology tests that were reported as malignant, 53% are from patients aged between 31 to 50 years while the highest recorded number of suspicious cytology, 14 (35%) was in patients aged 41 to 50 years. Only 6 (11.1%) females were reported to have malignant cytology as against 62 (13.6%) in males. The least frequent cytologic diagnosis was dysplasia and benign which were reported in 1 (0.2%) specimen each. Other cytologic diagnosis and their frequencies are shown in Table 1.

#### **DISCUSSION**

Urine cytology is used to compliment cystoscopy in identifying new and recurrent bladder cancer. <sup>10</sup> The local recurrence of bladder cancer can be as high as 40-80% while 10-30% of recurrent disease progress to invasive cancer. <sup>5,11</sup> Therefore, there is need for lifelong surveillance. Cystoscopy and biopsy is the gold standard investigative tool in the diagnosis of bladder cancer, however it is invasive and causes significant discomfort to the patient. <sup>12</sup> Several bladder cancer tumour markers have been studied and some are still under intense research. Although, many of such markers have shown better sensitivity than urine cytology in the diagnosis of bladder cancer, their specificity hasn't surpassed that of

cytology.<sup>4</sup> Therefore, urine cytology may continue to play an important role in the management of bladder cancer until a urinary marker that is highly sensitive and equally specific as urine cytology in the detection of bladder cancer is discovered.

Majority of our patients were males (89.3%) against 10.5% females with male to female ratio of 8.5:1. This reflects the predominance of bladder cancer in males in our region.<sup>6</sup> In a similar study conducted by Chawla et al, males were 75.2% against 24.7% that were females.<sup>2</sup> Obiora et al also reported a male-to-female ratio of 1.5:1, though significantly lower than ours all the studies however reflect male preponderance in bladder cancer.<sup>13</sup>

We found the most common cytological diagnosis to be negative, 47.9%. This is higher than 37% reported by Curling et al. 14 Chawla et al however reported 53.9% of their urine cytology as benign.<sup>2</sup> The overall sensitivity of urine cytology in our study is 13.3% which is lower than 28% reported by Kehinde et al, Planz et al, reported in two different studies an overall sensitivity of 68% and 38% respectively which are also higher than what we observed in this study. 11,12,15 The method of specimen collection, the number of specimens collected, the experience of the pathologist carrying out the cytology and the tumour grade can all affect the diagnostic yield of urine cytology and hence the sensitivity. Perhaps the histological type of tumour may also play a role in the very low sensitivity we are seeing as majority of bladder cancers in our practice are squamous cell carcinoma rather than transitional cell carcinoma predominating in the cited studies.<sup>3,16</sup> We reported 68 (13.3%) urine cytology as malignant which is lower than 47.47% and 52% reported by Chawla et al and Curling et al respectively.<sup>2,14</sup> This observation may also be related to the tumour type predominant in our practice area. Bladder cancer is more common in 5<sup>th</sup> to 7<sup>th</sup> decades of life with an average age at diagnosis of 65 years. 1,2 This is in agreement with Chawla et al report of 96.46% of their patients aged above 60 years.<sup>2</sup> This is however in contrast with our finding which showed most of the malignant cytology, 36 (53%) are in individuals between 31 to 50 years. It is important to note that we are in schistosoma endemic region with most of the infestation occurring in early childhood when the children wades in infested water bodies where the infective form of schistosoma haematobium abound. Majority of the patients commonly develop bladder cancer before the age of 50 years in our setting. Generally bladder cancer is commoner in males; this is in agreement with our finding in this study. 1-3 Of the 68 cytology that was reported as malignant, 62 (91.2%) were males while 6 (8.8%) were females.

It is important to know that false positive results can be seen especially in patients with active infection, previous instrumentation, calculus and intravesical therapy which is mostly secondary to reactive changes.<sup>2</sup> Therefore, it is important to have detailed clinical information while

reporting urine cytology and this should be followed by histopathological evaluation for bladder tumour.<sup>2</sup>

#### **CONCLUSION**

The value of routine use of urine cytology may be limited in the initial evaluation and work-up of patients with bladder cancer due to its variable sensitivity. There is the need to identify tumour markers with excellent sensitivity but also having specificity as attractive as that of urine cytology in bladder cancer detection both in diagnosis and in surveillance after treatment.

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#### **REFERENCES**

- Konety BR, Carroll PR. Urothelial carcinoma: cancers of the bladder, ureter and renal pelvis. In: McAninch JW, Lue TF, eds. Smith and Tanagho's General Urology. 18th ed. New York: McGraw-Hill Medical; 2013: 310-329.
- 2. Chawla N, Mehta R, Tewari K. Role of urine cytology in bladder neoplasm-cytopathological correlation and review of literature. J Mar Med Soc. 2018;20:27-30.
- 3. Mungadi IA, Malami SA. Urinary bladder cancer and schistosomiasis in North-Western Nigeria. West Afr J Med. 2007;26:226-9.
- 4. Van Rhijn BWG, Van der Poel HG, Van der Kwast TH. Cytology and Urinary Markers for the Diagnosis of Bladder Cancer. Eur Urol. 2009;8:536-41.
- 5. Caraway NP, Katz RL. A review on the current state of urine cytology emphasizing the role of fluorescence in situ hybridization as an adjunct to diagnosis. Cancer Cytopathol. 2010;118:175-83.
- 6. Sahabi SM, Abdullahi K. Abstract 1212: urinary bladder cancer in Sokoto, Northwestern Nigeria: a 10-year histopathological review. Cancer Res. 2018;78:1212.

- 7. Mansoor I. Analysis of urine cytology at a community hospital. J Ayub Med Coll Abbottabad. 2003;15:20-3.
- 8. Case B, Brimo F, Auger M, Aprikian A, Kassouf W, Vollmer RT. Accuracy of urine cytology and the significance of an atypical category. Am J Clin Pathol. 2009;132:785-93.
- 9. Brimo F, Vollmer RT, Case B, Aprikian A, Kassouf W, Auger M. Accuracy of urine cytology and the significance of an atypical category. Am J Clin Pathol. 2009;132:785-93.
- Wild PJ, Fuchs T, Stoehr R, Zimmermann D, Frigerio S, Padberg B, et al. Detection of urothelial bladder cancer cells in voided urine can be improved by a combination of cytology and standardized microsatellite analysis. Cancer Epidemiol Biomarkers Prev. 2009;18(6):1798-806.
- 11. Planz B, Synek C, Deix T, Bocking A, Marberger M. Diagnosis of bladder cancer with urinary cytology, immunocytology and DNA-image-cytometry. J Urol. 1998;159:384-8.
- 12. Planz B, Jochims E, Deix T, Caspers HP, Jakse G, Boeckin A. The role of urinary cytology for detection of bladder cancer. Eur J Surg Oncol. 2005;31:304-8.
- 13. Obiorah CC, Ofuru VO. Urine cytology outcome in a tertiary health institution in Nigeria. Eur J Pharm Med Res. 2017;4:87-92.
- 14. Curling M, Broome G, Hendry WF. How accurate is urine cytology?. J R Soc Med. 1986;79:336-8.
- 15. Kehinde EO, Al-Mulla F, Kapila K, Anim JT. Comparison of the sensitivity and specificity of urine cytology, urinary nuclear matrix protein-22 and multitarget fluorescence in situ hybridization assay in the detection of bladder cancer. Scand J Urol Nephrol. 2011;45:113-21.
- 16. Malami SA, Bindiga UH, Abimiku BA, Mungadi IA, Abdullahi AD, Dauda A, et al. A descriptive retrospective study of the pattern of bladder cancer of the pattern of malignant diseases in Sokoto, North Western Nigeria (1999-2004). J Med Sci. 2007;7:1033-8.

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