

Original Research Article

The pattern of urine cytology in a tertiary health care facility Northwest Nigeria

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ABSTRACT

Background: Urine cytology is an important investigation in the management of urothelial cancer. It is particularly an important test in the management of urinary tract cancers because of its non-invasive nature. Objective of study to review our practice of urine cytology as a diagnostic tool in the management of urinary tract pathology.

Methods: A seventeen years retrospective study from 1st January, 2001 to 31st December, 2017 where records of patients who had urine cytology in Usmanu Danfodio University Teaching Hospital (UDUTH), Sokoto, Nigeria were reviewed and data was extracted and analyzed using the SPSS 20.

Results: Of the 766 specimens, representing 10.1% of all cytology done in UDUTH (7,554) during the period under review, the highest number of urine cytology was done in 2013 (12%). The age range of the patients was between 2 to 90 years with modal age of 60 years. Majority of the patients were between the ages of 51 to 60 years (24.7%) and male to female ratio was 6.3:1. The commonest indication for urine cytology was bladder tumour (66.8%). However, the commonest cytological diagnosis was negative (44.6%) while 19.3% showed Non Specific Chronic Inflammation and only 77 specimens were malignant representing 10.1% of the specimen.

Conclusions: Despite its variable sensitivity, urine cytology remains a useful tool in evaluating suspected bladder malignancies and can serve as an adjunct to cystoscopy in these cases.

Keywords: Urine cytology, Urothelial cancer, Bladder tumour, Schistosomiasis

INTRODUCTION

Urine cytology is a simple, affordable and non-invasive investigation which has been used for several decades in the evaluation of patients with urothelial cancer. It involves microscopic evaluation of morphologic features of shed urothelial cells.¹ It is used in conjunction with cystoscopy and biopsy as standard for initial evaluation of patients suspected to be having bladder cancer. The diagnostic potential of urine cytology lies in its high specificity which ranges between 58% to 95%, however the sensitivity is not that impressive which is reported to

be in the range of 48% to 80%.²⁻⁵ The grade of the tumour also affects the sensitivity of urine cytology with high grade urothelial cancer having higher sensitivity as reported by several authors.⁶⁻⁸ Several factors have effect on the outcome of urine cytology which include method of specimen collection and processing, subjective interpretation, tumour type and grade as well as absence of standard method of reporting.⁹ It is recommended by the American Urology Association that voided urine cytology should be carried out in all patients with asymptomatic haematuria who belong to higher risk group and should be considered as first line option in

patients who belong to low risk group.¹ Over the years, several urothelial cancer biomarkers have been developed in order to complement or replace urinary cytology. Most of these biomarkers have had adequate sensitivity but urine cytology still has better specificity when compared with these emerging tumour markers.^{2,3} Therefore urine cytology will continue to be relevant in the evaluation of urothelial cancer.

Bladder cancer is one of the commonly seen urologic malignancies in our environment due to high prevalence of urinary schistosomiasis.^{10,11} Urine cytology is part of our diagnostic armamentarium in the evaluation of these patients.

The objective of this study is to review our practice of urine cytology over a seventeen year period, assessing the main indications for urine cytology, cytological diagnosis against clinical diagnosis and our performance in conducting this test over the years as regards the experience gained and expertise based on a retrospective review of records from Histopathology department.

METHODS

This is a retrospective review of all urine cytology requests from January 2001 to December 2017 in the Department of Histopathology of Usmanu Danfodiyo University Teaching Hospital Sokoto, Nigeria. The following Information was obtained from the database of the Department; Age and Sex of the patients; year cytology was requested, clinical indication for the cytology and Cytologic diagnosis. The data collection was done using Microsoft Excel and exported to SPSS, version 20.0 for analysis. The results are presented in simple frequency tables and percentages.

RESULTS

The results of 766 urine cytology specimen were reviewed. This represents 10.1% of all cytology specimens received during the period under review (n=7,554). There were 660 (86.2%) males, 105 (13.7%) females and 1 (0.1%) was unspecified. The male to female ratio is 6.3:1 as against 1:2 for the overall cytology.

The age range for urine cytology is 2 to 90 years with a modal age of 60 years as compared with 40 years for overall cytology. Majority of the patients, 189 (24.7%) were between the ages of 51 to 60 years while only 9 (1.2%) patients were between the ages of 1 to 10 years representing the least age group and the ages of 29 (3.8%) patients were unspecified. Other age distribution is summarized in Table 1.

The least request for urine cytology was received in 2001 which coincided with the year cytology began in the institution followed by 2003 while the highest number was requested in 2013 followed by 2012. The frequency

of urine cytology during the study year is as shown in Figure 1.

Table 1: Age distribution of the study subjects.

Age group (years)	Frequency	Percentage (%)
1-10	9	1.2
11-20	40	5.2
21-30	101	13.2
31-40	129	16.8
41-50	135	17.6
51-60	189	24.7
61-70	87	11.4
71-80	39	5.1
>80	8	1.0
Unspecified	29	3.8
Total	766	100

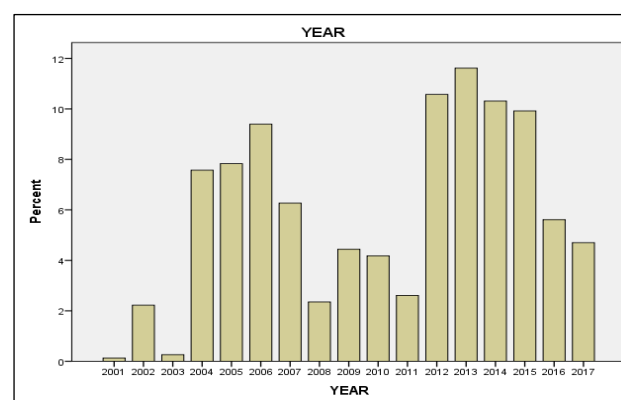


Figure 1: The frequency of cytology done per year of study.

Table 2: Clinical indications of urine cytology in the study.

Clinical indication	Frequency	Percentage (%)
Urinary tract infection	62	8.1
Schistosomiasis	1	0.1
Haematuria	78	10.2
Obstructive uropathy	63	8.2
Renal disease	8	1.0
Bladder tumour	512	66.8
Metastatic tumour	37	4.8
Small round blue cell tumour	5	0.7
Total	766	100

Cytologic examination of urine was requested due to suspicion of bladder tumour in 512 (66.8%) patients representing the highest request, history of haematuria in 78 (10.2%) patients and schistosomiasis in 1 (0.1%) patient. Other indications for the request of urine cytology in the study are as shown in Table 2.

Of the 766 urine cytology specimens, 342 (44.6%) which constitute the majority were negative. Non specific chronic inflammation was reported in 148 (19.3%) specimens which was the next commonest cytologic diagnosis while only 77 (10.1%) specimens were reported to be malignant and 50 (6.5%) specimens were suspicious of malignancy. Among the patients with positive urine cytology for malignancy, 57(72%) patients were between 31 to 50 years of age. The least frequent cytologic diagnosis was suppurative inflammation with 8 (1%) specimens. Other diagnosis and their frequency are shown in the Table 3.

Table 3: Showing cytological diagnosis as seen in the study.

Cytologic diagnosis	Frequency	Percentage (%)
Acellular	57	7.4
Haemorrhagic	18	2.3
Inadequate/degenerate	35	4.6
Negative	342	44.6
Non-specific chronic inflammation	148	19.3
Reactive	18	2.3
Schistosomiasis	13	1.7
Suppurative inflammation	8	1.0
Suspicious	50	6.5
Malignant	77	10.1
Total	766	100

DISCUSSION

Urine cytology is a non invasive investigation that has been used for the diagnosis and follow up of patients with urothelial cancer for over 50 decades.⁹ It is used as a complement but not replacement for cystoscopy and biopsy. Therefore positive urine cytology requires confirmation with cystoscopy and biopsy before instituting any form of definitive therapy and a negative cytology does not always exclude malignant disease. Urine cytology has been faced with numerous challenges one of which is lack of agreed diagnostic criteria and terminology when compared to other cytology such as for breast and thyroid.⁹

In our study, we found that male-to-female ratio for urine cytology was 6.3:1.0 which reflects the pattern of bladder cancer in our environment being commoner in males and hence the more frequent request for urine cytology in male gender.^{10,11} Nabi et al, also reported more urine cytology to be carried out in Men 78% as against women 22%.⁹ Likewise Obiora et al reported the ratio to be 1.5:1 in favour of men in their study carried out in southern Nigeria.¹²

Cytological examination of the urine specimens revealed 77 specimens (10.1%) to be positive for malignancy as

against 512 specimens (66.8%) with clinical diagnosis of bladder cancer. This is slightly higher than 9.8% reported by Obiora et al and 5.9% reported by Nabi et al but lower than 25% reported to be malignant by Manna et al.^{9,12,13}

The reason for the lower positive result for malignancy in our study may be because of the method of obtaining urine specimen in our center, which is mostly voided urine and usually single specimen. Majority of positive cytology, 45 (58.4%) were in patients aged <51 years. This also reflects the pattern of bladder cancer in our environment because most of the schistosoma infestations occur during early childhood and patients start developing features of squamous cell carcinoma from their 30th decade of life. However, Nabi et al reported 87% of their positive urine cytology to be in men aged >50 years.⁹ There were 50 (6.5%) specimens reported to be suspicious of malignancy which is higher than 4% reported by Manna et al but lower than 11.35% reported by Nabi et al and 27.5% reported by Obiora et al.^{9,12,13} We reported 148 specimens (19.3%) to be non specific chronic inflammation which is also higher than the 17% reported by Manna et al.¹³ Interestingly, only 1 (0.1%) request for urine cytology was due to clinical suspicion of urinary schistosomiasis. However urine cytology was able to detect schistosomiasis in 13 specimens (1.7%). Therefore urine cytology may play an important role in the diagnosis of urinary schistosomiasis. Specimens that were either acellular or negative were 399 (52%), this is lower than what was reported by Manna et al (54%) and Nabi et al (79.64%).⁹

Requesting for urinary cytology in the proper clinical context will help in reducing negative cytology and financial burden on patients who may not necessary require the test. It will also reduce burden on the already busy histopathological services.

CONCLUSION

Urine cytology, despite its variable sensitivity remains a useful tool in evaluating suspected urothelial malignancies and can serve as an adjunct to cystoscopy in these cases. However there is need to discover more sensitive and specific tumour markers for urothelial malignancies.

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Ethical approval: The study was approved by the Institutional Ethics Committee of Usmanu Danfodiyo University Teaching Hospital, Sokoto

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