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Original

Ocular Cytopathology: A 17 years' Experience in Northwest Nigeria

Kabiru Abdullahi[1],[2]*, Umar Mohammed[1],[2]

[1]Department of Morbid Anatomy & Forensic Medicine, Faculty of Basic Medical Sciences, College of Health Sciences, Usmanu Danfodiyo University
[2]Department of Histopathology, Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria

Abstract

Background: Cytological analysis of samples has become a widely recognized and accepted practice, serving both diagnostic and supplementary purposes. Despite this, the adoption of cytopathology in healthcare facilities within resource-limited settings tends to vary. Further investigation is needed to clarify the role of cytopathology in managing orbital and ocular tumors in resource-constrained settings.

Aims/Objective: This study examines the demographic characteristics of patients, the clinical reasons for evaluation, and the cytological diagnoses of orbital and ocular lesions observed at the Usmanu Danfodiyo University Teaching Hospital, a tertiary medical center serving portions of North-Western Nigeria.

Method: This retrospective study examined orbital and ocular tumor cases over a 17-year period, retrieving data from the histopathology records at the Usmanu Danfodiyo University Teaching Hospital between January 1, 2001, and December 31, 2017. The pertinent data was extracted, compiled in a Microsoft Excel spreadsheet, validated, and statistically analyzed using SPSS version 20.

Results: A total of 85 ocular cytology specimens were analyzed, with the most common patient age being 4 years old. Ocular cytology was predominantly performed on individuals within the 1-10 years age group, comprising 64 cases. The study population had a male-to-female ratio of 1.5:1. The primary reason for performing ocular cytology was to evaluate suspected neoplasms, which accounted for 84 cases, with 69 of these suspected to be malignant. Among the various cytological diagnoses, 62 were classified as malignant.

Conclusion: Cytological evaluation of orbital and ocular lesions is a valuable tool in patient care.

Keywords: Fine Needle Aspiration Biopsy, ocular lesions, cytology

Corresponding author:
Kabiru Abdullahi,
Department of Morbid Anatomy & Forensic Medicine,
Faculty of Basic Medical Sciences,
College of Health Sciences
Usmanu Danfodiyo University
Sokoto, Nigeria
email: ???
Phone: ???

Introduction

The orbit together with its contents which include the eyeball, and its adnexae/appendages form a delicate anatomically complex unit from which a range of lesions can arise. These can pose significant diagnostic challenges. To aid diagnosis, several techniques for investigating lesions in this region of the body are available.

Cytopathologic examination of specimens from lesions of this site has become a widely accepted procedure. Its use in evaluating mass lesions of the orbit and its content remains relatively constrained partly because of its complex anatomy, a dearth in pathologists involved in the practice of ocular cytopathology and reluctance to perform an invasive (even if minimally so) procedure in view of the possible potentially debilitating complications (1,2).

However, the practice of ocular cytopathology especially by way of fine needle aspiration biopsy (FNAB) dates back to 1868 when pioneer studies were first published (3). This procedure of FNAB has several advantages which include a high-cost benefit ratio, increased patient safety, short turn-around time, etc. These can greatly alter the course of management where resources are limited in many places in the world (2,4,5).

Clinical indications for the procedure are mainly to unravel diagnostic uncertainty. Reports show that it can be done on patients irrespective of age. The specimen may be obtained as smears from the conjunctiva, or more commonly by FNAB. The latter involves inserting a "fine bore" needle into an orbito-ocular lesion with aspiration of tissue fluid, its subsequent smearing on a glass slide followed by fixation in alcohol or air drying of the smeared glass slide. The slides are then stained with cytologic stains which range from Papanicolaou stain to one of the Romanowsky stains. The stained smears can then be viewed with a light microscope by a pathologist and reported using diagnostic criteria.

Where facilities are available, it can help to perform further investigations into the tissue fluid obtained. These further tests include cell block, immunocytochemistry, flow cytometery and cytogenetic studies. The procedure can be done under the guidance of

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palpation, ultra-sound scan or endo-illumination. Contra-indications and complications have been reported. Arun et al also noted that it has a limited role in diagnosing retinal lesions (6,7).

To the best of our knowledge, ocular cytopathology especially by way of FNAB is practiced at varying frequencies in Nigeria. However, extensive reporting of the practice from this and other parts of the world is apparently low (1). Thus, this study shall assess the extent of the practice in Sokoto, located in extreme northwest Nigeria and depict the various clinical indications and diagnostic categories for the procedure. We believe the outcome of this study shall provide baseline data for future studies. This study can further help clinicians (ophthalmologists) appreciate the cost-effectiveness especially in terms of short turn-around time, of the ocular cytopathology technique, thereby allowing it to be fully integrated into a diagnostic algorithm. Prospects will include incorporating "cell block" techniques to the cytopathology procedure to have more tissue material for diagnosis.

Materials and Methods

A retrospective study involving assessing 17 years' (1st January 2002 to 31st December 2017) records in the histopathology department of Usmanu Danfodiyo University, Sokoto. These records include requisition forms, reception registers and bench books. From all of these, using universal sampling method, all cases registered as cytology of the orbit and its contents were extracted and tabulated in Microsoft excel. These data included the laboratory number, biodata of patients, clinical indication of the cytopathology request, site of the biopsy and cytolopathologic diagnosis. The specimen had earlier been processed by fixation of smeared slides in alcohol, subsequently stained Papanicolaou stain and examined with a light microscope by pathologists. The diagnostic categories using criteria laid out by Nora, included: inflammatory, benign, suspicious (for malignancy), malignant, hemorrhage and inadequate (8,9). The results are presented as simple frequencies and tables. Exclusion criteria included cases with missing records or cases requested for but not performed. Also, cases with duplication were filtered out by entering only once in the data set, the unique "Hospital/patient registration number" and "Cytopathology number" assigned to the patients and their specimens during registration/accession in the laboratory. Some cases with missing records were traced back to the central records of the hospital to get more information.

Results

Demographic Findings: Demographic Findings

A total of 85 ocular cytology specimens were examined in the 17-year period (1st January 2002 to 31st December 2017). These constituted 1.1% of all cytology specimens during that time. All but one of these were obtained through Fine Needle Aspiration Biopsy, performed under visual inspection and palpation guidance. While the lowest age of the patients was one year, the oldest was seventy (70) years, with a modal age of 4 years. Ocular cytology was most performed in 75.3% of the 1-10 years' age group. The female-to-male ratio was 1:1.5.

Clinical Indications

The study showed that 68.2% of the specimens were from ocular lesions, while 4.7% were from lesions involving both the orbit and ocular tissues contiguously. Additionally, the only specimen obtained as a smear was from a conjunctival lesion. The primary clinical indication for the procedure was 98.2% of suspected neoplasms, with 81.1% of these being suspected to be malignancies (Table 1).

Table 1: Distribution of ocular cytology by sex, site and clinical diagnosis

Sex	Frequency	Percentage (%)
Female	34	40.0
Male	51	60.0
Grand Total	85	100.0
Site		
Conjunctiva	1.0	1.2
Ocular	58.0	68.2
Eyelid	4.0	4.7
Oculo -Orbital	4	4.7
Orbit	18	21.2
Grand Total	85	100.0
Clinical Diagnosis		
Conjunctivitis	1	1.2
Mesenchymal Benign	6	7.1
Metastatic Tumour	1	1.2
Orbital Tumour	9	10.6
Retinoblastoma	1	1.2
Sarcoma	10	11.8
SRBCT * Not Specified	57	67.1
Grand Total	**85**	**100.0**

*SRBCT: Small Round Blue Cell Childhood Tumour

Cytologic Diagnoses

Among the various cytologic diagnostic categories, 72.9% were classified as malignancies, a figure lower than the number of clinically suspected malignant cases (Table 2).

Discussion

Our recorded sample size of 85 reflects the rather low use of this procedure in our center. Although it should

be noted that similar studies from other parts of the world also show a relatively low sample size, with some being as low as 25 (2). However, Anna et al reported a large series of 225 cases in Stockholm (10). Roozitalab et al observed in Asia an age range that closely compares to what we have in this study (2). However, Lubna et al noted slightly lower age range. This probably reflects the overall similar frequency of orbito-ocular disease (1).

While our observed sex distribution is similar to Lekha et al's findings (11), it is in contrast to Lubna et al's finding of a slightly more female preponderance in India (1). This may reflect the overall health seeking behavior of patients in our environment especially being a conservative one that relatively restricts the movement of women from their homes.

Our observed preponderance of lesions located in the eye, with few in the other orbital contents contrasts with wide site distribution reported in many studies (2,11). The reasons for these discrepancies may include late presentation and the tendency to seek home treatment or self- medication before presenting to the hospitals. Also, the data collection methods in developed centers and other parts of the world may explain the frequency discrepancies.

Clinical indications in our study reflected the need to confirm diagnosis of a malignant neoplasm especially in children. This reflects its use as an ancillary as well as a diagnostic test. The latter becomes more apt when one considers that malignancy was detected in some cases which the clinician was unsuspecting. This is in keeping with the numerous reports of how useful a tool FNAB can be when it comes to clinical decision making. There seems to be a concordance in clinical judgment and the cytolopathologic diagnosis in case of malignancies, further underscoring the usefulness of this test.

A further study emphasizing cytologic and histologic correlation is encouraged from our observations, especially in view of the ability of FNAB to detect malignancies in unsuspected cases. These can further influence patient management considering the cost-effectiveness of cytopathology generally, its rather short turn-around time and the fact that the procedure can easily be incorporated into general evaluation of suspected mass lesions.

Conclusion

It can be deduced that even in a health center situated in a resource limited region of the world, ocular cytology especially as FNAB is a practical means of achieving diagnosis. In view of the numerous advantages of the FNAB including its role in influencing clinical judgment and management of patients, capacity building by way training of manpower, providing resources to allow sub-specialization in this field.

Further prospects include incorporation of cell block in the technique to allow for approximation to tissue histology and even immunohistochemoistry. Clinical-(cyto-)pathologic correlations can be explored. Additional cytologic-histopathologic correlation studies need to be done (considering that histopathology is the "gold standard") to further strength the diagnostic acumen.

There is need for manpower development by way of specialist training ocular pathology can have far reaching impact in management of ocular lesions in this environment.

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Table 2: Distribution of ocular cytology by age group and cytologic diagnosis

	Age group						
	1.0 - 10.0	**11.0 - 20.0**	**21.0 - 30.0**	**31.0 - 40.0**	**41.0 - 50.0**	**>51.0**	**Total**
Benign	1	0	3	2	0	1	7
Hemorrhage	3	0	0	0	0	0	3
Inflammatory	4	0	0	0	1	0	5
Malignant	50	7	1	1	1	2	62
Reactive	1	0	0	0	0	0	1
Suppurative Inflammation	3	0	0	0	0	0	3
Suspicious	2	1	0	1	0	0	4
Grand Total	**64**	**8**	**4**	**4**	**2**	**3**	**85**

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