Cytopathology practice in Kumasi: A 2-year retrospective audit

ABSTRACT

Aim: Surgical pathology service is generally unavailable in most developing countries and comes with challenges. Cytopathology is a reliable, inexpensive adjunct to surgical histopathology. We present a retrospective review of the various cytopathology cases received at the department.

Materials and Methods: A retrospective review of 836 cytopathology cases from January 2010 to December 2011 at the Department of Pathology of our hospital was conducted. All cytopathology reports and records from the department were retrieved and analyzed using the Statistical Package for the Social Sciences version 16 for windows.

Results: A total of 836 (mean age 38.18 ± 22.18) cases were reviewed, at an average of approximately 418 cases performed a year (5.7% of the total workload). More than half (58.0%) of the cases received had no clinical diagnosis indicated on request forms. Seventy-seven percent (77%) of the cases were diagnosed as either definite or nondefinite. The breast was the most aspirated specimen site (20.2%). Benign cases formed 45.0% of all the cases and 29.0% were malignant. There were more benign than malignant cases with respect to all sites aspirated except the breast (18.3%), lymph nodes (35.0%), and soft tissues (11.7%) where the reverse occurred.

Conclusion: Patronage of cytopathology in Kumasi is increasing and serves as a quick, cheap, and effective alternate means for diagnosis. Improving and expanding on the current practice will ensure that pathologists in practice sustain and improve diagnostic cytopathology and provide material for training young pathologists.

Key words: Audit; cytopathology; FNAC; Kumasi

Introduction

Malignancies are an emerging public health problem in Africa, especially with the increasing exposure to environmental carcinogens and change in lifestyles. To implement appropriate cancer awareness programs in these settings, early diagnosis and detection need to be widely introduced. Fundamental to this, however, is a reliable, quick, inexpensive, and accurate diagnosis.[1]

Surgical histopathology remains the gold standard for diagnosis, but is generally unavailable in most developing countries and comes with challenges of equipment, expertise, and cost to facilities and patients at large. Cytopathology is a reliable but inexpensive adjunct to surgical pathology.[2] It is a branch of pathology that deals with diagnosis at the cellular level. It involves obtaining tissue diagnosis of subcutaneous and other...
tumors with the aid of a special needle that with imaging techniques may allow its use in a wider scope.\textsuperscript{[3,4]} The procedure is regarded as inexpensive, requiring simple equipment, less time consuming, and can be applied to a wide range of diseases.\textsuperscript{[3,5]} Detailed explanation of the procedure and how it can be applied throughout the body has been documented and has been adopted in clinical practices, especially for quick bedside diagnosis of various malignancies.\textsuperscript{[6]} The dangers of false positives and the inevitability of false negatives cannot be overemphasized because a negative cytology report is not definitive, especially when there is a mass.\textsuperscript{[6]} Thus, the method depends largely on expertise and reliability of diagnosis. A good cytopathology practice also requires access to surgical pathology to clarify cases for which cytopathology gives uncertain or no diagnosis and for validation and quality control purposes.

Fine needle aspiration cytology (FNAC) clinics and cytology practices have been running in the pathology department of our hospital since 2010. After brief closure of the department in 2004,\textsuperscript{[7]} much assistance in re-establishing the department to include a cytology unit came from the Breast Health Global Initiative.\textsuperscript{[8]} There was also collaboration between our hospital and a teaching hospital in Europe to train pathologists and technologists in 2005.

In this article, we present a detailed retrospect of experience in running cytopathology services in Kumasi, Ghana after its establishment. This will provide a clear picture on the performance with respect to this service as offered by the department.

Materials and Methods

Design/Site
This was a retrospective study conducted using reports on all cytology procedures performed in our department from January 2010 to December 2011. Records on the various cases received at the department were reviewed and documented. Information retrieved included age of patients, site of lesion, and diagnosis.

Ethical consent
This retrospective study was approved and supervised by the research and development unit (Ethics committee) of our institution with approval from the department. Participant informed consent was not obtained; hence, patient records/information was anonymized and de-identified prior to analysis.

Sample collection and reporting
In routine cytology practice in our centre, pathologists performed fine-needle aspirations with the assistance of biomedical scientists. The method applies to various body sites and its interpretation was documented by a previous documented review of the methodology.\textsuperscript{[5]}

Fluid specimens (urine and pleural effusions) are centrifuged to obtain the sediment, which is then used to prepare direct smears. Wet mounted smears are stained with Papanicolaou stain, Giemsa, and sometimes hematoxylin and eosin. Ziehl–Neelsen (ZN) staining was performed on smears when tuberculosis was clinically suspected or if granulomatous inflammation was noted on the routine stains.

No gynecological smears were, however, received in the department during the period under review. This was due in part to the unavailability of cyto-screeners to assist in the anticipated workload at the time.

Data handling
Data from the reports were entered into an excel spreadsheet and analyzed using the Statistical Package for Social Scientists, version 16.0 (SPSS, IL). Summary statistics and frequency distribution tables were used to the represent data.

Results
A total of 836 cases were reviewed, an average of approximately 418 cases were performed a year. This accounted for approximately 5.7% of the total workload of the department including surgical pathology, cytopathology, and autopsy. A total of 44.7% of all cases examined were benign and 28.7% were malignant.

The mean age of patients was (38.18 ± 22.18) years. Approximately one-fifth (19.4%) of the cases reviewed, however, had no age specified.

There were more females (65.9%) than males (29.8%). More than half (58.0%) of the cases received had no clinical diagnosis indicated on the forms. Seventy-seven percent of the cases were diagnosed as either definite or nondefinite. A definite diagnosis was achieved in 73.4% of reported cases. Although a number of cases had no indicated gender, this formed only 4.3% of the total cases [Table 1].

The most aspirated sites in decreasing order was the breast (20.2%), lymph nodes (20.0%), thyroid (12.0%), soft tissue (9.6%), salivary glands (4.7%), ascitic fluid (4.1%), pleura (5.1%), CSF (0.7%), liver (0.6%), and other miscellaneous sites, which accounted for 23.0% of the total. More females had samples aspirated from the breast (27.9%) and thyroid (13.4%) than males (5.6% and 8.8%, respectively). There were more benign than malignant cases with respect to all
sites aspirated except the breast (18.3%), lymph nodes (35.0%), and soft tissues (11.7%) where the reverse occurred [Table 2].

In Table 3, the age and sex distribution of cases received relative to cytological diagnosis is shown. There was an equal distribution (40.5%) of reported benign and malignant cases among those aged 5 years and below. More than half (56.4%) of those aged 16–50 years were malignant. There was an almost equal distribution of malignant (38.0%) and benign (35.0%) cases among males. Half (50.0%) of the female cases reviewed were benign. Diagnosis was not determined in 194 (23.2%) of the cases examined. Diagnosis, however, could not be ascertained in 28 (3.3%) of the cases. Reasons for this included inadequate smear, inadequate cellular material, and no palpated lumps for aspiration.

**Discussion**

Cytopathology is a relatively inexpensive, quick, and reliable method of diagnosis in pathology settings, especially in developing countries.\[^2,9\] Cytopathology practice was started in our centre to revamp the department. In this study,

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**Table 1: Characteristics of cytological cases received at the department relative to gender**

| Parameter          | Total          | Males       | Females      | Gender Unspecified |
|--------------------|----------------|-------------|--------------|--------------------|
| Age (years)        |                |             |              |                    |
| Mean               | 38.18±22.18    | 33.98±25.48 | 39.87±20.53  | 39.72±20.29        |
| ≤15                | 131 (15.7)     | 71 (28.5)   | 59 (10.7)    | 1 (2.8)            |
| 16-50              | 335 (40.0)     | 64 (25.7)   | 268 (48.6)   | 3 (8.3)            |
| >50                | 208 (24.9)     | 58 (23.3)   | 148 (26.9)   | 2 (5.6)            |
| Unspecified        | 162 (19.4)     | 56 (22.5)   | 76 (13.8)    | 30 (83.3)          |
| Clinical diagnosis |                |             |              |                    |
| Provided           | 355 (42.0)     | 115 (46.2)  | 237 (43.0)   | 3 (8.3)            |
| Not Provided       | 481 (58.0)     | 134 (53.8)  | 314 (57.0)   | 33 (91.7)          |
| Cytological diagnosis |              |             |              |                    |
| Working diagnosis  | 642 (77.0)     | 189 (75.9)  | 438 (79.5)   | 15 (41.7)          |
| Definite diagnosis | 614 (73.0)     | 180 (72.3)  | 419 (76.0)   | 15 (41.7)          |

Data is presented as mean±SD and n (%). Working diagnosis includes definite and unsure diagnosis.

**Table 2: Site distribution of cases according to age, sex, and nature of diagnosis**

| Specimen Site       | Age (mean±SD) | Male | Female | Benign | Malignant | Uncertain | Not Determined |
|---------------------|---------------|------|--------|--------|-----------|-----------|----------------|
| Breast (169)        | 38.52±16.79   | 14 (5.6) | 154 (27.9) | 96 (25.7) | 44 (18.3) | 3 (10.7) | 26 (13.4)    |
| Lymph Nodes (168)   | 33.12±23.38   | 64 (25.7) | 103 (18.7) | 59 (15.8) | 84 (35.0) | 5 (17.9) | 20 (10.3)    |
| Thyroid (100)       | 47.21±19.81   | 22 (8.8)  | 74 (13.4)  | 68 (18.2) | 11 (4.6)  | 2 (7.1)  | 19 (9.8)     |
| Soft tissue (80)    | 36.38±23.40   | 38 (15.3) | 41 (7.4)   | 30 (8.0)  | 28 (11.7) | 2 (7.1)  | 20 (10.3)    |
| Salivary gland (39) | 43.54±19.52   | 17 (6.8)  | 21 (3.8)   | 21 (5.6)  | 5 (2.1)   | 2 (7.1)  | 11 (5.7)     |
| Ascitic fluid (34)  | 37.97±18.19   | 5 (2.0)   | 29 (5.3)   | 20 (5.3)  | 4 (1.7)   | 3 (10.7) | 7 (3.6)      |
| Pleura (43)         | 55.38±21.21   | 12 (4.8)  | 30 (5.4)   | 31 (8.3)  | 5 (2.1)   | 0 (0.0)  | 7 (3.6)      |
| CSF (6)             | 40.8±24.37    | 3 (1.2)   | 2 (0.4)    | 2 (0.5)   | 0 (0.0)   | 0 (0.0)  | 4 (2.1)      |
| Liver (5)           | 40.67±15.57   | 3 (1.2)   | 2 (0.4)    | 0 (0.0)   | 3 (1.3)   | 1 (3.6)  | 1 (0.5)      |
| Others (192)        | 40.27±22.64   | 71 (28.5) | 95 (17.2)  | 47 (12.6) | 56 (23.3) | 10 (35.7) | 79 (40.7)    |

Data is presented as mean±SD and n (%).

**Table 3: Age and Sex distribution of cases received stratified by cytological diagnosis**

| Parameter | Not determined n (%) | Uncertain n (%) | Benign n (%) | Malignant n (%) | Total |
|-----------|----------------------|-----------------|--------------|-----------------|-------|
| Age       |                      |                 |              |                 |       |
| ≤15       | 18 (13.7)            | 7 (5.3)         | 53 (40.5)    | 53 (40.5)       | 131   |
| 16-50     | 53 (15.8)            | 11 (3.2)        | 189 (56.4)   | 82 (24.4)       | 335   |
| >50       | 36 (17.3)            | 7 (3.3)         | 91 (43.8)    | 74 (35.6)       | 208   |
| Unspecified| 87 (53.7)            | 3 (1.9)         | 41 (25.3)    | 31 (19.1)       | 162   |
| Total     | 194 (23.2)           | 28 (3.3)        | 374 (44.8)   | 240 (28.7)      | 836   |

| Sex       |                      |                 |              |                 |       |
|-----------|----------------------|-----------------|--------------|-----------------|-------|
| Male      | 60 (24.1)            | 9 (3.6)         | 86 (34.5)    | 94 (37.8)       | 249   |
| Female    | 113 (20.5)           | 19 (3.4)        | 277 (50.3)   | 142 (25.7)      | 551   |
| Unspecified| 21 (58.3)            | 0 (0.0)         | 11 (30.6)    | 4 (11.1)        | 36    |
| Total     | 194 (23.2)           | 28 (3.3)        | 374 (44.8)   | 240 (28.7)      | 836   |
we sought to evaluate the frequency of cases, efficacy of diagnosis, its impact, and relevance to referring clinicians.

Most of the FNACs performed were aspirates from the breast (20.2%), followed by that from the lymph nodes (20.0%). This may be due to increased breast cancer awareness among the Ghanaian population. Our findings show that the use of cytopathology for the diagnosis of the abovementioned conditions is very important, in the triage of such patients and the provision of a quick diagnosis for prompt attention by referring clinicians. In contrast to our findings, a study conducted in Cameroon showed that lymphadenopathy was the most common indication for FNAC followed by breast.\(^\text{[2]}\)

In most of the cases under review, cytopathology was very useful in distinguishing benign and malignant cases. Benign cases were, however, more than malignant cases, a reassurance that with the right treatment patients are likely to have a very good prognosis. This is contrary to a finding by Spillane et al.,\(^\text{[10]}\) who found a high percentage of malignant lesions being diagnosed by fine-needle aspiration biopsy (FNAB). However, this was of benefit by reducing the number of corresponding open biopsy rates.

The percentage of the total workload accounted for by cytopathology was relatively small. Because pathology practice in Ghana is still in its infancy with high rate of autopsy practice, cytopathology is usually not considered by clinicians, especially those in peripheral hospitals.\(^\text{[8]}\) It may also be an indication that most referring clinicians prefer surgical pathology.

Laboratory request forms, which provide detailed information about the patient and clinical history, were not properly filled or completed by referring clinicians. Approximately one-fifth of all the forms received did not specify sex, and more than half (58.0%) of the cases did not have any clinical diagnosis indicated by referring clinicians. This could lead to a possible delay in diagnosis as well as reliability of the diagnosis. A similar finding was also reported in a study conducted in Ghana on the evaluation of request forms received in a hematology laboratory, and seems to be the trend in most hospitals in Ghana.\(^\text{[11]}\)

Seventy-seven percent of the time, a working diagnosis was achieved with a definite diagnosis in 73.4% of cases. However, there is a limitation in determining the specificity and sensitivity of diagnosis. This may be due in part to lack of integration between cytopathology and histopathology.

Poor requests from referring clinicians, varied sampling techniques by pathologists and biomedical scientists may account for the high rate of nondiagnostic cases. Going forward, histology and cytopathology correlation may be necessary to reduce the high rate of non-diagnostic cases and to ascertain unclear cases. Unifying training for pathology staff may also improve practice.

It has been suggested that having a pathologist on site for FNAC improves sampling and enables assessment of clinical signs and symptoms to enhance diagnostic accuracy.\(^\text{[12,13]}\) This was a major advantage in this setting, as seen in the percentage of diagnosis obtained. More work, however, needs to be done to improve efficiency and diagnosis rate.

### Conclusion

Cytopathology practice in our centre has improved and is promising. Improving and expanding on the current practice will ensure that pathologists in practice sustain and improve diagnostic cytopathology, as well as provide materials for training young pathologists. As the number of pathologists on site increases, sub-specialization in cytopathology may be necessary to enhance the diagnostic capability of the department.

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### Conflicts of interest

There are no conflicts of interest.

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Announcement of New Award Instituted by Indian Academy of Cytologists in 2017 for Best Published Article in Journal of Cytology

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2. The award comprises of a gold plated silver medal and a certificate.
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4. The following criteria shall be followed in selection of the awardee:-
   (a) Publication should be in Journal of Cytology.
   (b) Publication should be during the past one year and shall comprise of papers from Issues 3 and 4 of previous year and Issues 1 and 2 of current year.
   (c) Ahead of print articles shall not be considered for the award.
   (d) Publication should be an original article.
   (e) The awardee shall be the first author of the published paper.