Comparing of Fine Needle Aspiration Cytology (FNAC) and Tru-cut biopsy for the Diagnosis of Breast Pathology

Bidyut Chandra Debnath¹, Abanti Ghosh², Abul Kalam Chowdhury³, Rana Jahangir⁴, Ferdous Alam⁵, Aminul Islam Joardar⁶, Towhidul Alam⁷

¹Assistant Professor & Resident Surgeon, Department of Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh; ²Lecturer, Department of Physiology, Mugda Medical College, Dhaka, Bangladesh; ³Associate Professor, Department of Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh; ⁴Medical Officer, Department of Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh; ⁵Associate Professor, Department of Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh; ⁶Professor, Department of Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh; ⁷Chairman, Department of Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh

Abstract

Background: Diagnosis of breast pathology is very important for the management of the patients. Objective: The purpose of the present study was to compare the fine needle aspiration cytology (FNAC) and trucut biopsy for the diagnosis of breast pathology. Methodology: This analytical cross-sectional study was conducted in the Department of Surgery at Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from 1 April to 31 October 2020 for a period of six months. All the women who were attended at the OPD of the Department of Surgery with the different complaints of breast at any age were selected as study population. The different disease profiles were recorded in the data sheet. Result: A total number of 200 patients were recruited for this study. The mean age with standard deviation was 33.85±7.969 years. The male and female ratio was 1:19. Breast pathology was found in equal in left and right side which was 100(50.0%) cases in each. The central zone was the most common area which was 90(45.0%) cases. Most of the breast pathology was firm which was 170(85.0%) cases. The comparison of FNAC and tru-cut biopsy was done. Fibroadenoma was found in 50(100.0%) cases in FNAC; but in tru-cut biopsy 10(20.0%) case was fibroadenoma; invasive ductal carcinoma was in 30(60.0%) cases and the rest of 10(20.0%) case was Phyllodes tumor. In FNAC 1 case was diagnosed as gynaecomatia which was diagnosed as intradermal papilloma in tru-cut biopsy. The difference between the FNAC and tru-cut biopsy for the detection of different pathology of breast was statistically significant (p=0.000). Conclusion: In conclusion there is a significant difference between FNAC and tru-cut biopsy for the detection of breast pathology. [Journal of National Institute of Neurosciences Bangladesh, January 2021;7(1): 33-37]

Keywords: : Comparison; Fine Needle Aspiration Cytology; FNAC; Trucut biopsy; Breast Pathology

Introduction

Breast cancer still represents the leading tumor among women and the incidence of the disease is rising all over the world¹. The risk of developing breast cancer is related to a number of factors including the events of reproductive life and lifestyle factors that modify endogenous levels of sex hormones². Diet has been also found to play an important role in the etiology of breast
Breast cancer still represents the leading tumor among women, who perceive every symptom in breast as cancer, compelling them to seek medical advice. It is sometimes difficult to determine whether a suspicious lump is benign or malignant simply from clinical assessment.

Due to its increasing incidence, morbidity and mortality breast cancer is the commonest malignant tumour responsible for 18.4% of all female cancers worldwide. As it is the leading cause of death from cancer in women, the major concern of the surgeon and the responsibility of the surgical pathologist lies in the ability to differentiate a benign from a malignant lesion. Fine-needle aspiration cytology (FNAC), core needle biopsy (CNB) and vacuum assisted breast biopsy (VABB) represent the current methods of choice for pathological diagnosis, both with their specific advantages and limitations.

Self-breast examination along with triple test which includes clinical examination, mammogram and Fine Needle Aspiration Cytology (FNAC) has reduced the false negative rate to less than 1.0% cases. The diagnostic accuracy of FNAC increases to 99.0% when it is combined with clinical and radiological examination and accuracy further increases to 100.0% when it is combined with cell block preparation.

In case of detected breast nodules, FNAC is a well-established method for the diagnosis of breast lesions in many countries. It has the advantages of being highly accurate in experienced hands, cost effective, and useful for small lesions not eligible for CNB. Its limitations are represented by the lack of experienced cytologists in many institutions, the inability to reliably distinguish invasive from in situ carcinoma and the difficulty in precisely evaluating cytological and morphologic features in breast aspirates with the histological classification system used as the “gold-standard”, particularly in benign lesions.

### Methodology

This analytical cross-sectional study was conducted in the Department of Surgery at Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from 1 April to 31 October 2020 for a period of six months. All the women who were attended at the OPD of the department of Surgery with the different complaints of breast at any age were selected as study population. The women with different morbidities were seeking medication in the only medical university in Bangladesh. This was representing the whole country patients’ burden. The age, pattern of disease were recorded in a predesigned data sheet. Fine needle aspirations were done by pathologists in the Department of Pathology at Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh by using between 10 ml to 20 ml syringe with 23 G needle. Smears were stained with Haematoxylin and Eosin (H &E), Papanicolaou and Giemsa stains. Tru-Cut biopsy (TCB) was performed using a Tru-Cut gun with an 18-gauge needle. After manual localization and immobilization of the lesion under complete aseptic technique, a 2% lignocaine-infiltrating anesthetic was administered and a skin incision was performed. A biopsy specimen was obtained by means of 4 successive insertions with different angulations of the needle into the lesion’s core. After immediate immersion of the specimen in a fixative, its quantity and quality were judged and it was sent to the histopathology department. All breast masses were clinically palpable. The research protocol was approved by the Local Ethics Committee. Statistical analysis was performed by Windows based software named as Statistical Package for Social Science (SPSS), versions 22.0 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Continuous data that were normally distributed were summarized in terms of the mean, standard deviation. Categorical or discrete data were summarized in terms of frequency counts and percentages. For end points analysis, Chi-square test was performed which was corrected by Fisher’s exact test was used for categorical variables. A two-sided P value of less than 0.05 was considered to indicate statistical significance.

### Results

A total number of 20 patients were recruited for this study after fulfilling the inclusion and exclusion criteria. Majority of the patients were in the age group of less than 40 years which was 16(80.0%) cases and the rest were in the age group of more than 40 years of age. The mean age with standard deviation was 33.85±7.969 years with the range of 18 to 45 years (Table 1).

| Age Group          | Frequency | Percent |
|--------------------|-----------|---------|
| Less Than 40 Years | 160       | 80.0    |
| More Than 40 Years | 40        | 20.0    |
| Total              | 200       | 100.0   |

Table 1: Age Distribution among the Study Population (n=200)

In this study most of the study population were female which 190(95.0%) cases was and the rest 10(5.0%) case
Breast pathology was found in equal in left and right side which was 100 (50.0%) cases in each. The central zone was the most common area which was 90 (45.0%) cases followed by upper outer quadrant which was 70 (35.0%) cases. Most of the breast pathology was firm which was 170 (85.0%) cases followed by tender soft which was 20 (10.0%) cases (Table 2).

The comparison of FNAC and tru-cut biopsy was done. Breast abscess was found in 5 (100.0%) cases in both tru-cut biopsy and FNAC. Fibroadenoma was found in 5 (100.0%) cases in FNAC; but in tru-cut biopsy 1 (20.0%) case was fibroadenoma; invasive ductal carcinoma was in 3 (60.0%) cases and the rest of 1 (20.0%) case was Phyllodes tumor. In FNAC 1 case was diagnosed as gynaecomata which was diagnosed as intradermal papilloma in tru-cut biopsy. Invasive ductal carcinoma was found in 3 (100.0%) cases which was found similar in tru-cut biopsy. Traumatic Fat Necrosis was found in similar in FNAC and tru-cut biopsy. The difference between the FNAC and tru-cut biopsy for the detection of different pathology of breast was statistically significant (p=0.000) (Table 3).

Discussion

To ensure an accurate diagnosis, the combination of a good clinical eye, high-quality imaging, and appropriate pathological techniques is important\(^7\). For several years, fine needle aspiration cytology (FNAC) was the most practiced method for the pathological diagnosis of breast masses. FNAC became popular because of its accuracy, cost effectiveness, and ease of use\(^8,9\). A total number of 200 patients were recruited for this study after fulfilling the inclusion and exclusion criteria. Majority of the patients were in the age group of less than 40 years which was 160 (80.0%) cases and the rest were in the age group of more than 40 years of age. The mean age with standard deviation was 33.85±7.969 years with the range of 18 to 45 years
Breast pathology was found in equal in left and right side which was 100(50.0%) cases in each. The central zone was the most common area which was 9(45.0%) cases followed by upper outer quadrant which was 7(35.0%) cases. Most of the breast pathology was firm which was 170(85.0%) cases followed by tender soft which was 20(10.0%) cases. The advent of core needle or Tru-Cut biopsy (TCB) in the new millennium has resulted in many surgeons switching to TCB since it provides a sufficient amount of tissue for pathologists to make an accurate histological diagnosis. It is now the initial investigation method of choice for pre-operative diagnosis of breast lesions. Some studies have suggested that TCB is superior to FNAC to some extent. The sensitivity of FNAC increases when TCB biopsy is also performed\(^5\). TCB can provide all the necessary details to guide both the surgeon and the oncologist in designing an appropriate therapeutic strategy for the management of patients with breast masses\(^4\).

Although open surgical biopsy is the ‘gold standard’ for diagnosis of palpable breast lesions, in recent years two types of minimally invasive breast biopsy techniques, core needle biopsy (CNB) and fine needle aspiration cytology (FNAC), have become established for the diagnostic evaluation of palpable breast lesions\(^3\). A triple test consisting of clinical examination, mammography and FNAC is considered the gold standard in making a definitive assessment of breast lumps\(^3\). The comparison of FNAC and tru-cut biopsy was done. Breast abscess was found in 50(100.0%) cases in both tru-cut biopsy and FNAC. Fibroadenoma was found in 50(100.0%) cases in FNAC; but in tru-cut biopsy 10(20.0%) case was fibroadenoma; invasive ductal carcinoma was in 30(60.0%) cases and the rest of 1(20.0%) case was Phyllodes Tumor. In FNAC 1 case was diagnosed as gynaecomatia which was diagnosed as intradermal papilloma in tru-cut biopsy. Invasive ductal carcinoma was found in 3(100.0%) cases which was found similar in tru-cut- biopsy. Traumatic Fat Necrosis was found in similar in FNAC and tru-cut biopsy. The difference between the FNAC and tru-cut biopsy for the detection of different pathology of breast was statistically significant (p=0.000). In resource poor settings like ours, FNAC comes readily useful for its obvious advantages. It is a cheap, fast, and reliable diagnostic method. It also reduces the frequency of open biopsies\(^8\). Some of the setback of FNAC include pain and haematoma formation. It has also been found to have the potential to mask radiological assessment when done prior to mamography\(^3\). It is also possible that the smears may be acellular (no cells are harvested) making cytological analysis impossible. These are described as inadequate aspirates and rates vary markedly, being particularly operator dependent and cases have to be converted to CNB which is able to solve the problem\(^\text{15}\).

**Conclusion**

In conclusion there is a significant difference between FNAC and tru-cut biopsy for the detection of breast pathology. The diagnosis of benign changes or a normal breast by tru-cut biopsy would reassure the patient about the absence of malignancy and these cases can be followed-up in outpatient clinics. Patients in the current study who have benign breast lesions diagnosed accurately by tru-cut has saved a lot of expenses and did not undergo unnecessary surgical procedures that would have been an additional burden on the healthcare system. The use of tru-cut also lessens the propensity of complicated surgical procedures and minimizes patient stress. In patients with malignant lesions, in addition to having diagnostic significance, TCB also provides adequate tissue for the evaluation of molecular markers which have extreme therapeutic value.

**References**

1. Ibikunle DE, Omotayo JA, Ariyibi OO. Fine needle aspiration cytology of breast lumps with histopathologic correlation in Owo, Ondo State, Nigeria: a five-year review. Ghana Medical Journal. 2017;51(1):1-5
2. Yong WS, Chia KH, Poh WT, Wong CY. A comparison of trucut biopsy with fine needle aspiration cytology in the diagnosis of breast cancer. Singapore Med J. 1999;40(9):587–589
3. Rahman MZ, Islam S. Fine needle aspiration cytology of palpable breast lump: A study of 1778 cases. Surgery S. 2013;12:2161-1076.
4. Obaseki DE, Olu-Edo AN, Ogunbiyi JO. Diagnostic accuracy of fine needle aspiration cytology of palpable breast masses in Benin City, Nigeria. West Afr J Med. 2010;29(4):259–262
5. Kaufman Z, Shpitz B, Shapiro M, Ronan R, Lew S, Dinbar A. Triple approach in the diagnosis of dominant breast masses: combined physical examination, mammography, and fine-needle aspiration. Journal of surgical oncology. 1994 Aug;56(4):254-7
6. Ukah CO, Oluwasola OA. The clinical effectiveness of fine needle aspiration biopsy in patients with palpable breast lesions seen at the University College Hospital, Ibadan, Nigeria: A 10-year retrospective study. Journal of Cytology/Indian Academy of Cytologists. 2011 Jul;28(3):111
7. Daramola AO, Odubanjo MO, Obiajuju FJ, Ikere NZ, Banjo AA. Comparison between fine-needle aspiration cytology and histology for palpable breast masses in a Nigerian tertiary health institution. International journal of breast cancer. 2015 Jan 1:2015.
8. Rikabi A, Hussain S. Diagnostic usefulness of tru-cut biopsy in the diagnosis of breast lesions. Oman medical journal. 2013;28(2):125
The risk of developing breast cancer is related to endogenous levels of sex hormones. Diet has been also to a number of factors including the events of anxiety and stress among women, who perceive every uncovered breast as a threat to their health.

Introduction

Breast cancer still represents the leading tumor among women. Due to its increasing incidence, morbidity and mortality it is considered to be one of the most important threats to the health of women worldwide. Breast cancer is responsible for 18.4% of all female cancers worldwide.

The diagnostic accuracy of fine needle aspiration cytology (FNAC) and core needle biopsy (CNB) and vacuum assisted breast biopsy (VABB) represent the current methods of choice for the initial investigation method of choice for pre-operative biopsy for the detection of different pathology of breast lesions. Some studies have indicated that these are reliable methods, particularly in benign lesions. In most institutions, the inability to reliably distinguish a benign from a malignant lesion and the diagnostic usefulness of FNAC is combined with clinical and radiological examination to have the potential to mask radiological assessment.

In this study most of the study population were female (60.0%) cases followed by upper outer quadrant which was 9(45.0%) cases. The central zone was the most common area which was 9(45.0%) cases followed by upper outer quadrant which was 100(50.0%) cases in each. The central side which was 100(50.0%) cases in each.

After immediate immersion of the specimen in a lignocaine-infiltrating anesthetic was administered and an 18 gauge needle was inserted into the lesion. Smears were stained with Giemsa’s stain. Aspirations were done by pathologists in the Department of Surgery at Banghabandhu Sheikh Mujibur Rahman Medical University, Dhaka, Bangladesh by using between 10 ml or 20 ml syringe with 23 G needle. Smears were stained with Giemsa’s stain.

In this study most of the study population were female (60.0%) cases followed by upper outer quadrant which was 9(45.0%) cases. The central zone was the most common area which was 9(45.0%) cases followed by upper outer quadrant which was 100(50.0%) cases in each. The central side which was 100(50.0%) cases in each.

Breast pathology was found in equal in left and right breasts. Benign breast pathology was detected in 151(75.5%) cases followed by malignant which was 48(24.5%) cases. 80(40.0%) cases were diagnosed as cysts followed by fibroadenoma which was diagnosed in 30(15.0%) cases. The rest of the cases were in 8(4.0%) cases. Breast carcinoma was in 30(60.0%) cases and the rest of the cases in 20(40.0%) cases were gynaecomatia.

The difference between the FNAC and tru-cut biopsy was diagnosed as gynaecomatia which was diagnosed in 3(60.0%) cases and the rest of the cases in 20(10.0%) cases. The advent of core needle biopsy (CNB) and fine needle aspiration cytology (FNAC) was diagnosed as gynaecomatia which was diagnosed in 3(60.0%) cases and the rest of the cases in 20(10.0%) cases. The advent of core needle biopsy (CNB) and fine needle aspiration cytology (FNAC) was diagnosed as gynaecomatia which was diagnosed in 3(60.0%) cases and the rest of the cases in 20(10.0%) cases. The advent of core needle biopsy (CNB) and fine needle aspiration cytology (FNAC) was diagnosed as gynaecomatia which was diagnosed in 3(60.0%) cases and the rest of the cases in 20(10.0%) cases. The advent of core needle biopsy (CNB) and fine needle aspiration cytology (FNAC) was diagnosed as gynaecomatia which was diagnosed in 3(60.0%) cases and the rest of the cases in 20(10.0%) cases. The advent of core needle biopsy (CNB) and fine needle aspiration cytology (FNAC) was diagnosed as gynaecomatia which was diagnosed in 3(60.0%) cases and the rest of the cases in 20(10.0%) cases.