DIAGNOSTIC ACCURACY OF FEMALE BREAST FINE NEEDLE ASPIRATION CYTOLOGY RESULTS

A Retrospective Statistical Study

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Abstract

FNA is widely used for evaluating palpable breast masses, breast cysts, and even non-palpable mammographic abnormalities. The use of FNA significantly decreases health care costs.

This is a retrospective statistical study of F.N.A.C. of breast done in both cytology and histopathology units in pathology department of Kasr Al-Aini hospital, Faculty of Medicine, Cairo University between January 2006 and December 2010. FNAC findings were correlated with data from histopathology records to determine the reliability of FNAC.

The aim of this work is to detect sensitivity, specificity and accuracy of cytopathology in diagnosis of breast malignancy.

The total number of patients was 463, all were females ranging in age from 13 to 84 years with mean age of (44.27±12.928) years. About half of the cases (52.3%) were included in the age category (>40-60) and most of the cases (93.3 %) were aspirated in our department.

Key Words:

The breast anatomy, The breast histology, Historical background, Fine needle aspiration cytology, Breast fine-needle aspiration, Cytomorphologic findings in different breast lesions

List of abbreviations:

ADH	Atypical ductal hyperplasia
DCIS	Ductal carcinoma in-situ
DLBL	diffuse large B-cell lymphomas
EA	Eosin Azure
EMA	Epithelial membrane antigen
FA	Fibroadenoma
FCC	Fibrocystic changes
FDA	Food and Drug Administration
FISH	fluorescence in situ hybridization
FN	False negative
FN	Fat necrosis
FNAB	Fine needle aspiration biopsy
FNAC	Fine needle aspiration cytology
FP	False positive
IDC	Invasive ductal carcinoma
ILC	Invasive lobular carcinoma
IPs	Intraductal papillomas
LA	Lactating adenoma
LCA	Leukocyte common antigen
LCIS	Lobular carcinoma in-situ
MALT	mucosa-associated lymphoid tissue
MC	Medullary carcinoma
N/C	Nucleo/cytoplasmic
OG-6	Orange G-6(6 denotes the used concentration of phosphotungstic acid)
Pap	Papanicolaou
PC	Papillary carcinoma
PTs	Phyllodes tumors
Rpm	Round per minute
TC	Tubular carcinoma
TN	True negative
TP	True positive

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Fine-needle aspiration cytology (FNAC) was first described and performed in 1930. Thirty years later, it gained acceptance first in Europe and about a decade later in North America. The method is generally considered as a rapid, reliable, safe diagnostic tool to distinguish non-neoplastic from neoplastic breast lesions **(Zagorianakou et al; 2005).**

The advantages of FNAC are that it is sensitive and specific for the diagnosis of malignancy, require little equipment, cause minimal discomfort to patient, is an outpatient procedure, reduce bed occupancy, allow preoperative diagnosis, minimize the use of frozen sections, reduce incidence of exploratory procedures, allow a definitive diagnosis on inoperable patients, does not result in fibrosis which may interfere with further investigations, does not require wound healing and is readily repeatable and cost effective**.** The disadvantages of FNAC are that the aspiration technique requires practice and skill, a certain percentage of aspirates are unsatisfactory, interpretation requires experience and diagnostic material is unsatisfactory **(Young; 1993).**

- Revision of all available archival slides of FNAC of breast in the last five years (2006-2010), collected from the Pathology Department, cytology unit, Faculty of Medicine, Cairo University, Kasr Al Aini Hospital.
- Statistical evaluation and correlation between clinical and patient data available in the request sheet and pathological findings.
- Correlation of FNAC results with the histopathological results diagnosed in pathology department in Kasr Al Aini, in cases that undergone further diagnostic pathological procedures.

The breast anatomy:

The breast lies in the superficial fascia of the pectoral region, and has a base and an axillary tail: The base of the breast extends from the 2nd rib above to the 6th rib below, and from the side of the sternum medially to the mid-axillary line laterally. The axillary tail is an upward extension from the superolateral part of the gland. It runs along the lower border of the pectoralis major and pierces the deep fascia of the axilla **(Macéa and Fregnani., 2006).**

Lymphatic drainage of the breast:

Lymph vessels drain the breast 4 quadrants in lymph nodes groups including axillary and parasternal lymph nodes, also there is a communication between the axillary lymph nodes and the lower deep cervical nodes. Axillary lymph nodes arranged into 5 groups: lateral, anterior (pectoral), posterior (subscapular), central and apical. Breast lymphatics drain in the anterior and apical groups **(Drake et al., 2005).**

The breast histology:

The breast contains 15 to 25 lactiferous ducts, which begin at the nipple, then branch into smaller ducts, and end in the

terminal duct lobular unit (or lobule). The lobule is composed of a terminal duct and many small ductules (or acini). An inner layer of cuboidal or columnar epithelial cells and an outer layer of myoepithelial cells line all ducts and ductules. The connective tissue within the lobule is a hormonally responsive mixture of fibroblasts, occasional lymphocytes, and histiocytes, in a background of collagen and acid mucins. The interlobular stroma is hypocellular and contains fibroadipose tissue **(Pitelka and Hamamoto., 1983)**

Historical background of FNAC:

With growing awareness in the general population, especially about breast pathologies, a lady with a breast lump is one of the commonest presentations in outpatient departments. Clinical examination would be followed in most patients with a confirmatory diagnosis under the microscope. Previously, this involved invasive methods, such as an excision biopsy followed by the definitive operative treatment a few days later in case the biopsy report demanded it. The final specimen so obtained would then be sent for histopathology again, for determination of other parameters. This entailed repeated admission to hospital in most

cases, and more than one surgery. The delay in having the histopathology report was also added to the fears of the patient (**Khemka et al., 2009).**

The FNA procedure is an attractive alternative to diagnostic open biopsy especially in pregnancy, poor surgical patient, multiple masses, mass following trauma, in the differential of axillary tail mass versus lymph node and in the setting of accidently discovered mass during routine check up or mammographically detected micro-calcification, to alleviate the anxiety, and when both the patient & the treating physician reject surgical intervention and adopt follow up policy **(Boerner and Sneige., 1998).** Sir James Paget is credited for aspirating malignant cells from a breast cancer patient in 1853. Much of the early experience of aspiration biopsy was not with “fine” needles but with larger bore cutting needles **(Kocjan., 2006).** The incidence of breast cancer has risen, and early detection of breast cancer plays a pivotal role in prognosis and survival. Palpable lesions can be effectively biopsied using a thin needle (23 gauge or smaller) without radiologic guidance. However, with the current trend of detecting smaller, non-palpable lesions, radiologic guidance (mostly ultrasound) is needed to adequately sample smaller lesions **(Boerner and Sneige., 1998).**

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The pioneering work at the Karolinska institute in Stockholm by Torsten Lowhagen and his colleagues, in the sixties and seventies helped to popularize a new minimally invasive technique of diagnosis known as Fine-Needle Aspiration Cytology (FNAC). It is a study of cellular material obtained by a small-gauge needle obtained by an airtight syringe. It is a study commonly used in breast, thyroid, and lymph nodes in neoplastic and non-neoplastic diseases. With help of a radiologist the effectiveness of the study can be maximized. This is a quick-to-perform, easy, out-patient and virtually painless procedure which became a standard tool for diagnosis in breast lumps. With a high percentage of true positives, nearly no false positives and virtually no complications, and no requirement of anesthesia, it has established itself as an important patient-friendly out-patient procedure **(Khemka et al., 2009).**

FNA is widely used for evaluating palpable breast masses, breast cysts, and even non-palpable mammographic abnormalities. The use of FNA or core biopsies significantly