



Mammography and cytology as assessment tools in Iraqi patients with nipple discharge

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Abstract

Background: Nipple discharge is a symptomatic problem that causes women suffering and anxiety. Mammography is a supplement diagnostic and screening device in the exploration of the etiology of nipple discharge after the age of forty, the aim of the study is to evaluate the role of mammography in the diagnosis of diseases related to ducts in symptomatic patients with nipple discharge.

Methods: A retrospective study included 100 patients who complained of nipple discharge attending the Early Detection clinic of Breast Tumors in the Oncology Teaching Hospital in Baghdad during the period from January 2019 to August 2020. Their age ranged from 40 to 75 years. Their mammographic findings were reviewed and correlated with the corresponding cytology results.

Results: By assessing the nipple discharge cytology, inflammatory cells were observed in the majority of cases (70% of patients); 12% were cases that show duct ectasia, and 6% were diagnosed as fibrocystic changes. Neoplasia was detected in 8% of cases; the last 4% show acellular smear. When correlating the mammographic findings with cytology, the results reveal normal mammography in 71%. In all patients with a cytological diagnosis of intraductal papilloma, mammography showed changes consistent with retro areolar masses, focal asymmetry is seen in 5%, ductal calcification typical for duct ectasia seen in 8%, while 9% shows dense breast, the validity test shows that the mammography has 29% sensitivity and 50% specificity with an overall accuracy of 30% in detection the cause behind the nipple discharge.

Conclusion: mammography is a required adjuvant tool, but not as a routine diagnostic method of investigation in defining the causes behind nipple discharge. Its value was so limited in comparison to ultrasound, the latter is more informative in localizing the ductal problems especially retro areolar region, as well as assessing the wall thickness and content of the lesion and in defining intraductal abnormalities, especially papillomatous types.

Keywords: mammography, nipple discharge, cytology

Introduction

Nipple discharge is a symptomatic problem that causes both distress and anxiety to a lot of women specifically when bloody, wonderful advances have been made in the management of breast problems, mainly through advances in diagnostic breast imaging [1]. The causes of nipple discharge are not well unstated. However, nipple discharge is usually associated with endocrine changes and/or drugs, these are mainly due to duct ectasia or fibrocystic changes [2]. Changes are often bilateral, the most common cause of the significant discharge is intraductal hyperplasia, micropapillary ductal proliferation, solitary papilloma, and/or less likely intraductal or lobular carcinoma (mainly in situ), most of the intraductal changes that lead to nipple discharge are located behind the nipple in the retro areolar region [3]. Mammography plays an important role in the diagnosis of breast diseases [4], it has low (20-25%) sensitivity in cases of nipple discharge [5], because the associated lesions are usually retro areolar, small, intraductal, and noncalcified, therefore, negative mammography results do not exclude the possibility of underlying disease [6]. Ultrasound (US) is a crucial diagnostic tool in the investigation of breast abnormalities [7]. In the US, normal ducts are not visible; if seen, they appear as thin cylindrical anechoic or hypoechoic tramline structures [8], a normal duct should peripherally be tapered and should not have focal areas of dilatation along its course [9]. The current study was carried out

to demonstrate the role of mammography when used alone as a diagnostic radiological tool and in correlation with Cytopathology in diagnosing patients with nipple discharge referred to the main center for early detection of breast cancer in Baghdad, Iraq.

Patients and Methods

This is a retrospective study that comprised 100 patients complaining of nipple discharge and referred to the Main Training Center for Early Detection of Breast Tumours in the Oncology Teaching Hospital / medical city complex in Baghdad during the period from January 2019 to August 2020. Their age ranged from 40 to 75 years. All patients were subjected to clinical examination by the specialized surgeon and then referred to the mammography department where the examination was performed by SIEMENS MAMMOMAT 3000 nova (Germany). Patients were examined in an erect position with breast and axilla fully exposed, two views were taken for each breast, mediolateral oblique and craniocaudal. The presence or absence of dilated ducts was assessed including their position, breast density, calcification, and mass were recorded. Then the patients were referred to the cytology lab, where the nipple was squeezed carefully to obtain the discharge which was evaluated according to its color and density. The discharge was smeared directly onto

glass slides which were immediately dipped in 99% ethanol for fixation. After 20 minutes, the fixed smears were stained with Papanicolaou stain and examined under the microscope for any abnormal findings. The mammographic findings were correlated with the corresponding cytological results.

Statistical analysis

All patients' data entered using computerized statistical software; Statistical Package for Social Sciences (SPSS) version 20 was used. Descriptive statistics presented as (mean ± standard deviation) and frequencies as percentages. Multiple contingency tables conducted and appropriate statistical tests were performed, Chi-square was used for categorical variables and Fisher's exact

test was used when more than 20% of the expected variable was less than 5.

Results

One hundred patients presenting with nipple discharge were included in this study. Their ages ranged from 40 to 75 years (mean 57 years). The age of the patients and the color of discharge are shown in figures 1 and 2 respectively. The mammography is normal in the majority of patients with nipple discharge and those represent 71% of the patients, dense breasts and duct ectasia are seen in 9% and 8% respectively, further details about the mammography finding are illustrated in table 1

Table 1: Categorization of mammographic Findings.

Mammographic findings	No.	%
Normal	71	71%
Dense breasts	9	9%
Ductal calcification (ectasia)	8	8%
Focal or diffuse asymmetry	5	5%
Poorly demarcated focal lesion	4	4%
Well defined mass(es)	3	3%
Egg shell	1	
Calcified fibroadenomas	2	
Total	100	100%

Inflammatory cell infiltration was observed in the majority of cases (70%) of symptomatic patients; 12% were cases of duct ectasia and 6% were diagnosed as fibrocystic changes. neoplastic lesions were detected in 8% of cases; all of which were presenting

with bloody nipple discharge 6% given a diagnosis of intraductal papilloma and 2 malignant cases were detected (2%), while acellular smears were seen in 4%, details of pathological results of nipple discharge were illustrated in table 2.

Table 2: Pathological Results of Nipple Discharge Cytology.

Cytological finding of nipple smear	No.	%	
Acellular	4	4%	
Fibrocystic	6	6%	
Duct ectasia	12	12%	
Inflammatory	70	70%	
Neoplastic	Benign	6	6%
	Malignant	2	2%
Total	100	100%	

When correlating the mammographic findings with cytology it was concluded that when mammography showed normal findings, the corresponding cytology revealed inflammatory cell infiltration in 65%, duct ectasia seen in 6% while cytology

reveals 12 cases, 3 of well-defined masses are benign while two poorly defined lesions are malignant, the correlation of mammographic findings and cytology results are demonstrated in table 3.

Table 3: Correlation between mammographic Findings versus Cytopathology Results.

Mammographic findings	Cytopathology Results						Total
	Acellular	Duct ectasia	Inflammatory	Fibrocystic	Neoplastic		
					Benign	Malignant	
Normal	2	3	65	1	0	0	71
Dense breast	1	3	0	4	1	0	9
Ductal calcification	1	6	0	1	0	0	8
asymmetry	0	0	5	0	0	0	5
Poorly defined mass	0	0	0	0	2	2	4
Well defined mass	0	0	0	0	3	0	3
Total	4	12	70	6	6	2	100

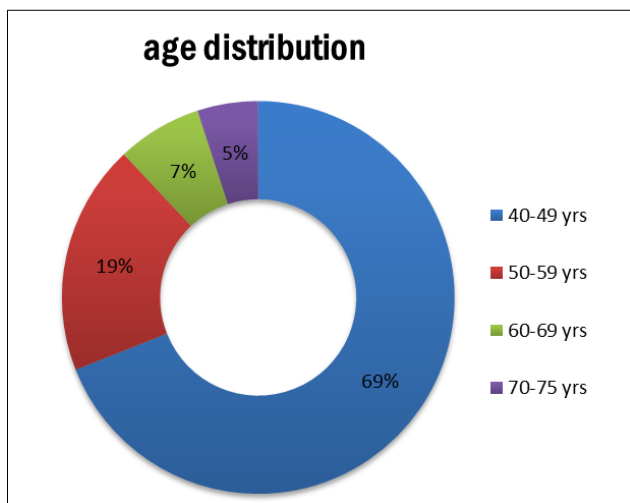


Fig 1: Age Distribution of the Study Population

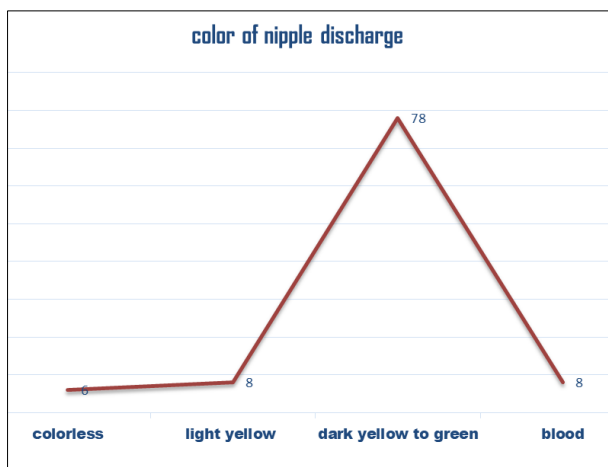


Fig 2: Color of the Nipple discharge in the studied population

The Majority of nipple discharges were yellow to green in color which revealed inflammation by cytology. Most bloody nipple discharges showed benign cytological changes. While malignancy was detected in two cases, histopathology later detects ductal carcinoma in situ in both.

The detection ability of mammography for the underlying cause of nipple discharge was poor as mammography considered 71 exams as normal while cytology reveals inflammatory cells in 65% that made mammography sensitivity of 29% and specificity of 50% while overall accuracy ~30%, further details were shown below in table 4

Table 4: accuracy of mammography in the detection of the cause of nipple discharge.

Mammography	Cytology	
	Positive	Negative
Positive	28	2
Negative	68	2
Sensitivity	29.00%	
Specificity	50.00%	
Positive Predictive Value	93.33%	
Negative Predictive Value	2.8%	
Accuracy	30%	

Discussion

Nipple discharge is the third most common complaint of patients looking for medical attention for breast disease, consists of about 5% of overall breast symptoms [10].

Spontaneous nipple discharge is a relatively common presentation of breast disease, bilateral nipple discharge involving multiple ducts is usually non-pathological, it's either spontaneously or when you squeeze your nipples or breasts. Nipple discharge may look milky, clear, yellow, green, brown, or bloody [11]. The value of nipple discharge cytology has long been a subject of discussion, it is usually practiced if patients are having active discharge at the time of examination [12].

The commonest cause of bloody nipple discharge is intraductal papilloma or an underlying malignancy, usually ductal carcinoma in-situ, the likelihood of malignancy is higher in the postmenopausal group or those presenting synchronously with a palpable lesion [13, 14].

It has been reported that a benign nipple discharge cytological diagnosis does not exclude malignancy, and the false-positive rate requires validation of a malignant nipple discharge earlier to definitive patient intervention [15].

In our study we find that in the majority the cause of nipple discharge is benign, ranging from inflammatory to fibrocystic finding and duct ectasia while the neoplastic is a rare cause of nipple discharge especially when its bloody, and this is in agreement with a study performed by Vargas et al [16].

Wonderful advances have been made in the management of breast problems, mainly through advances in diagnostic breast imaging, namely ultrasound and mammography, the latter has a major role as a screening tool for breast cancer especially after the age of forty [17], however, its role in managing patients with nipple discharge is weak with reported sensitivity between 20-25% according to a study performed by Ashfaq et al and this in line with our results, the explanation for that is the majority of causes of nipple discharge related to ducts and as most of these lesions are retro areolar, small and difficult to see by mammography [5, 18].

The specificity and overall accuracy of mammography in the detection of the cause of nipple discharge in our study was 50% and this nearly equal to a study performed by Mona M. Zaky et al [19].

It was shown that new version, high-resolution ultrasound machines, and high-frequency linear transducers are becoming more sensitive for the visualization of intraductal changes [20], the ultrasound is lack ionizing radiation, highly operator dependent and shows a lesion in real-time, and had high detection ability for ductal dilation, ductal content and intraductal lesion [21].

The current study revealed that inflammatory cells were the major cause of nipple discharge in the majority of patients and this is in agreement with the study done by Shahverdi [22]. Benign neoplasm namely papilloma is a major leading cause of bloody nipple discharge, however ductal carcinoma in situ is the main malignant tumor behind bloody nipple discharge, and this in agreement with a study done by Richards T. and Khaleel et al [16, 21] and by Zervoudis et al [23] respectively.

Recent studies rely on using MRI in cases of suspicious nipple Discharge especially when mammography and ultrasound examination were normal [24]. Magnetic resonance imaging (MRI) is also useful in the evaluation of the location and extent

of the abnormality, being of greater value than mammography and ultrasound [25]

Conclusions

Mammography has low sensitivity, specificity, and overall accuracy in detecting the cause behind that is the size and location of the causative lesion, however, mammography is useful to detect pleomorphic malignant calcification.

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