

Comparative Study between Breast Cytology and Histology in Saudi Females

Shagufta T. Mufti, MD, MIAP and **Ali S. Sawan** MD, PhD

*Department of Pathology, Faculty of Medicine,
King Abdulaziz University, Jeddah, Saudi Arabia*

shagufta.mufti@gmail.com

Abstract. The objective of this study is to outline the pattern of breast lesions in Saudi Arabian females who are diagnosed by Fine Needle Aspiration Cytology for a clinically palpable breast mass, and to determine the level of diagnostic accuracy in cytology with subsequent histological comparison whenever possible. A retrospective clinical study targeting 312 Saudi female patients being evaluated for clinically palpable breast mass that were performed and reported at King Abdulaziz University Hospital, Jeddah from 2000 to 2009. This result indicated that while fibroadenoma is the most frequent benign tumor, infiltrating duct carcinoma is the most common malignant tumor in Saudi Arabian females on Fine Needle Aspiration Cytology and histological examination. Based on this, the overall distribution of breast diseases was as follows: inflammatory lesions were 8.65%, benign lesions were 45.83%, highly suspicious/atypical lesions were 8.33%, malignant lesions were 30.76% and unsatisfactory smears were 6.41%. Analysis of histological correlation in patients revealed a sensitivity of 91.58% and a specificity of 97.75%. False negative fraction was of 4.59% which on histology turned out to be infiltrating duct carcinomas. Causes of cytohistological discrepancy were outlined in order to increase awareness of such conditions.

Keywords: Fine Needle Aspiration Cytology, Palpable breast mass, Cytohistological comparison.

Correspondence & reprint request to:

Dr. Shagufta T. Mufta
P.O. Box 80215, Jeddah 21589, Saudi Arabia

Accepted for publication: 28 December 2010. Received: 13 February 2010.

Introduction

Clinically palpable suspicious breast mass is one of the most common surgical problems in females. Its importance becomes even more serious as it is the usual presentation of cancer breast, which also happens to be the most common cancer in women^[1].

The application of fine needle aspiration cytology (FNAC) for diagnosis of palpable breast masses was first introduced by Martin and Ellis in 1930^[2]. It has since become an increasingly popular diagnostic procedure owing to its distinctive advantages of being easy, fast, sensitive, economical and safe with excellent patient acceptability^[3]. However, a definitive diagnosis sometimes cannot be made by FNAC alone, either due to inherent limitations of any cytological examination or the inability to obtain adequate material for diagnosis^[4-7]. Moreover, it is being used as part of the “triple test” in the diagnosis of all palpable breast masses, which in addition to FNAC, include clinical breast examination and mammography^[8].

Objective

The objective of this study is to determine the level of diagnostic accuracy in cytology with subsequent histological comparison in available cases in Saudi Arabian females with a clinically palpable breast mass. Causes of cytohistological discrepancy were outlined in order to increase awareness of conditions that lead to such discrepancies.

Materials and Methods

A retrospective study was performed targeting 312 Saudi Arabian female patients. Women, who had FNAC diagnoses for palpable breast masses and underwent subsequent histopathological evaluation during January 2001 to December 2009, were accessed from the archive of the Anatomical Pathology Department of King Abdulaziz University Hospital.

Inclusion criteria included:

- Saudi females seeking FNAC for palpable breast mass
- Palpable breast lump of variable sizes

Exclusion criteria included:

- Non-Saudi patients seeking FNAC for palpable breast mass
- Frank malignant mass with skin infiltration
- Non mammary tumors involving the breast

The study group was tracked for subsequent histological correlation on tru-cut biopsies, lumpectomies and mastectomies. Histological correlation was possible in 196 patients only. However, 116 patients did not return for clinical follow up. FNAC's were performed using 22-gauge needle attached to 10 ml syringe. In most cases, one pass was made into the lesion with the needle. At each pass, the needle was directed at different angles while aspirating.

Smears from the aspirate were fixed in alcohol and stained with Papanicolaou stain. Smears were also air dried with Diff quick for immediate evaluation^[3]. The histological sections obtained from the paraffin blocks of the same patients, and retrieved from the archives of pathology department were stained with hematoxylin and eosin^[9].

Cytological and histological findings of the entire study group were reviewed, interpreted and then classified as:

- Inflammatory reactions
- Benign tumors
- Highly suspicious/ atypical
- Malignant tumors
- Unsatisfactory

An *inflammatory* diagnosis was assigned when benign ductal cells were seen in a background of acute or chronic inflammatory cells, inflammatory debris or histiocytes.

A *benign* tumor diagnosis was assigned to the smears showing benign ductal cells lacking features of cytological atypia in presence of abundant bipolar naked nuclei.

A *highly suspicious / atypical* diagnosis was given when cellular findings were not of accurate or specific diagnostic value, such as in case of: 1.) Cellular aspirate with crowded cell groups with greater variation in size and shape with some loss of polarity; 2.) Hyperchromatic nuclei with visible nucleoli; 3.) Occasional single atypical cells.

A *malignant* tumor diagnosis was assigned when the following three criteria were met: 1.) Abundant cellularity with loose cohesion. 2.)

Variable size of cells, nuclear molding with pleomorphism. 3) Individual tumor cells exhibiting increased nuclear/cytoplasmic ratio, hyperchromatic and coarsely granular chromatin and prominent nucleoli with thick nuclear membrane.

An *unsatisfactory* smear was defined as one which composed predominantly of blood elements, with rare or insufficient cellular elements. These unsatisfactory specimens warranted a repeat FNAC if clinically indicated.

Patients, who were rendered a benign cytological diagnosis with a confirmatory follow up biopsy, were subjected to lumpectomy if clinically indicated. However, patients with a highly suspicious/atypical cytological diagnosis were either subjected to tru-cut biopsy or frozen section for subsequent management.

Results for various diagnostic outcomes were calculated on the basis of following criterion according to Hatada *et al.*^[10] and Ciba^[9]:

1. Positive cytological findings and those highly suspicious/atypical were considered as true positive (TP) when subsequent histological examination revealed a carcinoma.

2. Negative cytological findings were considered true negative (TN) when subsequent histological examination revealed a benign lesion.

3. The results of benign lesions reported as highly suspicious/atypical on FNAC were considered as false suspicious (FS).

4. The results of malignant lesions reported as negative on FNAC were considered as false negative (FN).

Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated.

The following parameters were used to determine the utility and diagnostic accuracy of FNAC.

- Sensitivity = $TP/TP+FN$
- Specificity = $TN/TN+FS$,
- PPV = $TP/TP+FS$, NPV = $TN/TN+FN$
- Global Efficiency = $TP+TN/TP+TN+FS+FN$

Results

A total of 312 FNAC's performed from 2000 to 2009 on Saudi Arabian women were evaluated for clinically palpable breast mass and

were chosen for this study. The youngest patient was 16 years and the oldest was 80 years; mean age was 37.26 years.

The age related incidence in each category along with sub categorization on FNAC is presented in the following Tables 1-6. The analysis of these FNAC results indicated that benign breast lesions were more common than the malignant. Overall distribution of inflammatory lesions was 8.65% (mean age 32.75 years), benign lesions was 45.83% (mean age 32.8 years), highly suspicious/atypical lesions 8.33% (mean age 41 years), malignant lesions 30.76% (mean age 42.50 years) and unsatisfactory smears were 6.41%. The most common benign lesion in descending order of frequency on FNAC were; benign epithelial cells 21.15%, followed by fibroadenomas 14.42%, fibrocystic changes 8.3%, acute mastitis 3.8%, granulomatous mastitis 3.5%, papillary breast lesions and lactational changes 0.96%. Finally, periductal mastitis and fat necrosis 0.64% each. The lower incidence of fibroadenomas in our study could be explained by the fact that on reviewing the cytology of the cases reported as “benign epithelial cells” without specific categorization (20 out of 66 cases) showed scant to nil epithelial and stromal components to be assessed against the background of bare nuclei. Forty-six of the remaining cases did not return for clinical follow up. Among the malignant lesions, mammary carcinoma of ductal type was the most common accounting for 16.34%. A diagnosis of “positive for malignancy” (not specified) was given in 12.82%. 6.4% cases in this study group had unsatisfactory cytology specimens with no follow up available.

These results were compared to seven other studies in literature (Table 7)^[11-17], highlighting the pattern of palpable breast disease in different regions of the Kingdom.

Results indicated from our study depend on cytology, while other studies mentioned here depend on histology.

Table 1. Inflammatory lesions on FNAC.

Inflammatory	N	%	Mean age
Acute mastitis	12	3.8	28
Periductal mastitis	2	0.64	30
Fat necrosis	2	0.64	38
Granulomatous mastitis	11	3.5	35
Total	N = 27	8.65%	32.75

Table 2. Benign lesions on FNAC.

Benign Lesions	N	%	Mean Age
Benign non proliferative	29	9.26	
Fibrocystic change	26	8.33	30
Lactational change	3	0.96	33
Benign proliferative	69	22.11	
Benign epithelial cells	66	21.15	34
Papillary breast lesion	3	0.96	32
Benign tumors	45	14.42	
Fibroadenomas	45	14.42	35
Total	N = 143	45.83	32.8

Table 3. Highly suspicious/atypical lesions on FNAC.

Highly Suspicious / Atypical Lesions	N	%	Mean Age
Highly suspicious / Atypical	N = 26	8.33	41

Table 4. Malignant lesions on FNAC.

Malignant Lesions	N	%	Mean age
Positive for malignancy	N = 96	30.76	42.5

Table 5. Malignant lesions (with sub-categorization of mammary carcinomas).

Sub-categorization of Malignant Lesions	N	%	Mean Age
Positive for malignancy (not specified)	40	12.82	40
Mammary carcinoma favouring ductal	51	16.34	42
Mammary carcinoma favouring lobular	4	1.28	48
Mammary carcinoma favouring mucinous	1	0.32	40
Total	N = 96	30.76	42.5

Table 6. Unsatisfactory FNAC's.

Malignant Lesions	N	%	Mean age
Unsatisfactory	N = 20	6.41	33

Table 7. Analytical comparison of mean age for malignant disease, percentage of fibroadenoma, fibrocystic and inflammatory cases in 7 other studies from different parts of the Kingdom^[11-17].

Author/s	Hospital	Region	No. of Years Studied	No. of Cases	Mean Age for Ca.	% Cases of Fibro-adenoma	% Cases of Fibro-cystic Disease	% Cases of Inflamma-tory Lesion	% of Cases Ca.
Ibrahim ^[11]	KFUH	Eastern	10	292	42	_*	_*	_*	_*
Al-Idrissi ^[12]	KFUH	Eastern	6	69	40.50	_*	_*	39	19
Amr <i>et al.</i> ^[13]	DHC	Dhahran	26	915	47.10	31	21	22	15
Ezzat <i>et al.</i> ^[14]	KFSH & RC	Riyadh	10	315	46	_*	_*	_*	_*
Awatif <i>et al.</i> ^[15]	ACH	Abha	8	312	43.70	22	_*	39	19
Merdad <i>et al.</i> ^[16]	KAAUH	Jeddah	8	211	45	_*	_*	_*	_*
Awatif ^[17]	KAAUH	Jeddah	15	1084	44.18	25	12	11	32.5
Average			11.85	444	44.06	26	16.5	27.75	21.37
Present study	KAAUH	Jeddah	8	312	42.50	14.42	8.3	8.65	30.76

KFUH = King Fahad University Hospital; DHC = Dhahran Central Hospital; KFSH = King Faisal Specialist Hospital; ACH = Asir Central Hospital; KAAUH = King Abdulaziz University Hospital, No = Number; Ca = Carcinoma

Subsequent histological follow up was available in 196 cases, including 22 cases with inflammatory diagnosis on FNAC, 74 cases with a benign diagnosis on FNAC, 15 cases with a ‘highly suspicious/atypical’ diagnosis on FNAC and 85 cases with a ‘malignant tumor’ diagnosis on FNAC. In Tables 8, 9 and 10, a comparative analysis was presented. Table 8 shows the detailed relevant histological correlation under each category of FNAC performed. Analysis of histopathological correlation in patients revealed a sensitivity of 91.58% and a specificity of 97.75%. There was no false positive fraction. However 2 cases diagnosed as highly suspicious/atypical on cytology turned out to be false suspicious/atypical on histological correlation. PPV (positive predictive value) was 98%, NPV (negative predictive value) 90.62 %, FSR (false suspicious rate) 1.02%, and FNR (false negative rate) was 4.59% with a TP (true positive) of 50% and TN (true negative) of 44.38%. The most common benign lesion on histological examination was fibroadenoma accounting for 22.44% (44 out of 196 cases on histology). The rest of the benign lesions in the descending order of frequency were acute mastitis and fibrocystic change 6.12% (12 cases each), granulomatous mastitis 3.57% (7 cases), lactational change and intra duct papilloma 1.53% (3 cases each); epithelial hyperplasia and lactating adenoma 1.02% (2 cases

each), tubular adenoma, blunt duct adenosis and sclerosing adenosis 0.51% (1 case each). The most common malignant lesion was infiltrating duct carcinoma 50.5% (99 cases), followed by lobular carcinoma 2.04% (4 cases), mucinous carcinoma 0.5% (1 case), poorly differentiated carcinoma 0.5% (1 case) and metaplastic carcinoma 0.5% (1-case). Histological correlation was excellent in cases diagnosed as clearly benign and malignant on FNAC.

Table 8. FNAC diagnosis and histopathological correlation in each.

FNAC & Corresponding Histological Diagnosis	No. of Patients	No. of Patients Lost for Follow-up Histology
INFLAMMATORY FNAC	27	5
Subsequent histology	22	
Acute mastitis	12	
Fat necrosis	1	
Granulomatous mastitis	7	
Fibrocystic change	1	
Fibroadenoma	1	
BENIGN FNAC	143	69
Subsequent histology	74	
Unremarkable breast	1	
Fibrocystic change	11	
Lactational change	3	
Epithelial hyperplasia	1	
Blunt duct adenosis	1	
Intraductal papilloma	3	
Lactating adenoma	2	
Tubular adenoma	1	
Fibroadenoma	42	
Infiltrating duct carcinoma	9	
HIGHLY SUSPICIOUS/ATYPICAL FNAC	26	11
Subsequent histology	15	
Sclerosing adenosis with atypia	1	
Fibroadenoma with degenerative atypia	1	
Infiltrating duct carcinoma	11	
Metaplastic carcinoma	1	
Lobular carcinoma	1	
MALIGNANT FNAC	96	11
Subsequent histology	85	
Infiltrating duct carcinoma	79	
Lobular carcinoma	4	
Mucinous carcinoma	1	
Poorly differentiated carcinoma	1	
UNSATISFACTORY FNAC	20	20
TOTAL	196	116

However, 13 of 15 lesions called “highly suspicious/atypical” on FNAC turned out to be frankly malignant on histology. The remaining 2 cases turned out to be sclerosing adenosis and fibroadenoma, each with degenerative changes and atypia respectively.

Table 9. Statistical analysis of FNAC aspiration diagnosis.

Diagnosis	n	%
TP	98	50
TN	87	44.38
FS	2	1.02
FN	9	4.59
Total	196	

Table 10. Predictive value of FNAC.

Values	%
Sensitivity	91.58
Specificity	97.75
Positive predictive value (PPV)	98
Negative predictive value (NPV)	90.62
False suspicious rate (FSR)	1.02
False negative rate (FNR)	4.59
Global efficiency	94.38

Table 11^[1,3-7,18,19] presents the analytic comparison of FNAC sensitivity, specificity, positive predictive value, negative predictive value, false positive fraction, false negative fraction and unsatisfactory rates in 8 studies from literature. It was found that our results concordant with these studies.

Table 11. Analytical comparison of sensitivity, specificity, positive predictive value, negative predictive value, false positive and false negative with 8 other studies in literature^[1,3-7,18,19].

Author/s	n	Sensitivity	Specificity	PPV	NPV	FPF	FNF	Unsatisfactory
Homesh <i>et al.</i> ^[1]	296	66.66	81.8	100	90	*	*	*
Ariga <i>et al.</i> ^[3]	1158	99	98	99	86	*	*	*
Atamdede and Isaac ^[4]	100	97	95.4	94.2	97.6	5.8	2.4	2.2
Vetrani <i>et al.</i> ^[5]	265	96.5	93.9	95.1	95.5	4.9	4.5	5.2

CollaAco <i>et al.</i> ^[6]	276	92.1	98.6	99.4	82.1	0.6	17.9	6.2
Dominguez <i>et al.</i> ^[7]	450	93.5	95.7	93.5	95.7	*	*	*
Jamal and Mansoor ^[18]	72	98.4	60	93.9	85.7	6	14.2	4
O'Neil <i>et al.</i> ^[19]	697	97	78	92	92	*	*	*
Average	-	92.52	87.67	95.88	90.57	4.32	9.75	4.4
Present study	196	90.65	96.84	97	90.19	1.48	4.95	6.4 (over 312)

*These results were not mentioned in these studies

Discussion

These results indicate that while fibroadenoma is the most frequent benign tumor, infiltrating duct carcinoma is the most common malignant tumor in Saudi Arabian females, These findings are compatible with other studies reported in literature^[1,11-18,20]. All the inflammatory and benign lesions occurred in early 30 years of age and similar values were found in other studies^[1,11-18,20]. Malignant lesions, however, showed a mean age of 42.50 years that is comparable to other studies in literature^[12,15,21].

The high sensitivity and specificity obtained in this study indicate that FNAC is a reliable diagnostic method when correctly performed and interpreted by an experienced cytopathologist^[22]. Nine (4.59%) of 196 cases that were diagnosed as false negative on FNAC were diagnosed as infiltrating duct carcinomas on histology. These smears were reviewed and their histology slides found reasons to explain this cytohistological discrepancy. The traditional technical factors were found, such as air drying artifact; a major contributor in 1 case.

Traumatic aspirates were found contributory in 2 cases. Hypocellularity of aspirates was a contributory factor in 3 cases. Presence of mixed benign and malignant disease in the same breast was found to be contributory in 2 cases. One case showed presence of dissociated cells with intact cytoplasm against a background of benign clusters of epithelial cells with scattered bare nuclei of bland morphology. Nuclear overlapping was a major short coming for assessing nuclear morphology in this case. Ariga *et al.*^[3] in their study of 1,158 patients for FNAC breast with subsequent histological correlation reported similar reasons for cytohistological discrepancy in the false negative category, and our experience is in concordance with their results along with other studies mentioned in literature^[8,9,19,23]. False negative

diagnosis may be due to technical failure, misdiagnosis or the presence of mixed benign and malignant features^[24]. Examples of technical failure include acellular or insufficient cellular material, heavily blood stained smears, partial air drying and smearing artifacts resulting in cell disruption^[3]. These discrepancies are rarely if ever due to an interpretative error on part of an experienced cytopathologist^[3].

There was no false positive case in our study. Two FS cases (false suspicious/atypical) diagnosed as highly suspicious/atypical on FNAC turned out to be fibroadenoma with degenerative changes and sclerosing adenosis with atypia on histology of tru-cut biopsy and lumpectomy, respectively. Review of these smears and their respective histology slides revealed that nuclear overcrowding, monomorphism, mild irregularity of nuclear membrane, inconspicuous nuclei and sclerotic stroma were the causes leading to the cytohistological discrepancy.

A good percentage of patients were diagnosed as 'positive for malignancy' (not specified mammary or metastatic) in our institution. Twenty-eight of 40 cases reported positive for malignancy on FNAC turned out to be infiltrating duct carcinomas and 1 as poorly differentiated carcinoma breast on histology. Review of these smears and their respective histology slides led us to speculate that the use of this term 'positive for malignancy' was perhaps only of medico legal value the so-called "pathologists fence!" Primary breast carcinomas are more common than secondary and also, that there was absolute lack of any clinical evidence to suggest another primary in all these cases. Moreover, diagnostic terminology used internationally in the classification of FNAC's of the breast, fall into five categories benign, atypical, indeterminate/suspicious, malignant and unsatisfactory^[25]. A pathologist should, however, avoid the use of terminology that convey confusing diagnosis or is not mentioned in the internationally accepted or recommended diagnostic categories. While exploring reasons for 20 unsatisfactory FNAC smears in this study, it was found that hypocellularity is to be the main factor. Unfortunately, no histological follow up of these cases was available, which further limited our search for explanations. Follow up that was lost in many patients in different categories could be explained partly by the fear of facing surgical outcomes, lack of moral support from families, or the tendency of changing health plans or physicians.

FNAC of the breast has some unavoidable limitations, mainly due to poor sampling; poor cellular yield of mammary tumors with fibrotic stroma; poor preservation and difficulty in cytological differentiation of atypical benign lesions; and well differentiated malignant neoplasms^[4-7].

Cytohistological discrepancies frequently encountered are inherent to FNAC of breast masses^[3]. There is some inconclusive evidence in literature indicating that such discrepancies could be due to histological stage and type of carcinoma^[26]. In contrast to other studies in literature, false negative results were more common with infiltrating duct carcinoma in our study, than lobular^[26,27]. These discrepancies can be overcome and sensitivity of FNAC further enhanced by using techniques, such as ultra-sound guided FNA biopsy^[8,10,22]. This would ensure that the aspirator hits the target area^[8,10,22]. All clinically or cytologically highly suspicious lesions need to be resolved ultimately with excisional biopsy or frozen section^[3].

Since the sensitivity and specificity rates of FNAC are not always 100%, the technique should be used with its limitations in mind^[4-7]. These unavoidable limitations of FNAC can be further reduced by wider use of 'triple test' which in addition to FNAC includes physical examination and mammography as other components. There are many studies that have shown that the triple test was 100% accurate in the diagnosis of palpable breast lesions when all three elements were concordant^[22,28]. Salmi *et al.*^[28] and Lau *et al.*^[29] suggest the use of triple test with negative predictive value reaching 100%. Vetto *et al.*^[30] suggested that 'modified triple test' (physical examination, ultrasonography instead of mammography and FNAC) is more accurate and cost effective in the diagnosis of palpable breast lesions in younger women.

The pattern of palpable breast disease in Saudi Arabian females presented in this study is concordant to other studies from different regions of the Kingdom indicating that similar etiological factors are probably playing a role^[8,11-15,17,18,20,21]. Indeed, a population based study is required to define the exact pattern of breast disease and state their accurate figures in Saudi Arabian females. Malignant lesions, however, showed a younger mean age of 42.5 years. It is comparable to other studies in literature^[12,15,21,31] and has raised concern regarding the prevalence of breast cancer in premenopausal women in Saudi Arabia as

indicated in the results from the first national public breast cancer screening programme^[32]. This could in part be attributed to the increasing public awareness or incidence of breast cancer in Saudi women. Moreover, to the fact that our hospital is a tertiary care hospital receiving more number of cases with the availability of more surgeons possessing higher expertise regarding this disease treatment and management. However, epidemiological factors that could explain this variation and define more accurate causes, warrant further population based research.

The false negative rate varies from 2.5-17.9 %^[1,3-7,19,33-35] with an average rate of 9.75% in literature (Table 11). False negative FNAC of the breast is most often due to errors in sampling, interpretation, or both^[9]. False negative FNAC diagnosis may also be due to technical failure or the presence of mixed benign and malignant features^[24]. Some authors report low nuclear grade carcinoma or scirrhous tumors as causes of false negative^[22,26]. False positive rate varies from 0.6-6%^[1,3-7,19,33-35] with an average rate of 4.42% in literature (Table 11). The potential for false positive diagnosis exists in aspirates with epithelial proliferations exhibiting hypercellularity and variable degrees of atypia (including atypia due to degenerative changes). Fibroadenoma, sclerosing adenosis, sclerosing papillary lesions, fibrocystic change and granulomatous mastitis are well documented causes leading to false positive^[24,36,37] or suspicious interpretation on FNAC of the breast^[37]. Evaluation of specimen adequacy is useful to eliminate equivocal diagnosis caused by technical factors^[38]. However, if the smears show scant cellularity, it's recommended the use of 'non-diagnostic FNAC' due to limited cellularity. In addition, the report should include a disclaimer that breast FNAC has an inherent false negative and a false positive rate. The consequences of which can be minimized by applying the triple test strategy. In case of known triple test discordance, it should be stated in the report and biopsy recommended. This can be promptly achieved by the ethical and patient centered cooperation between the surgeon, radiologist and the cytopathologist^[22]. The surgeon should be acquainted with additional techniques, such as core needle biopsy or excisional biopsy in cases with a high index for suspicion for malignancy^[22]. The error caused by technical factors could further be reduced if FNAC's were strictly performed under the close supervision of an experienced breast surgeon. Considering the fact that our institution is a post graduate

teaching institution one could not probably jeopardize the learning opportunity of the “surgeons in the making”.

Therefore, it is recommended that FNAC's be performed under experienced supervision to further overcome technical errors. Especially, the geographic miss of the needle, which is common with the inexperienced and a potential cause of hypocellularity further complicating the scenario of false positive or false negative interpretations. Other authors have also suggested the proper training of the physicians who perform the aspirates as a measure to reduce these rates^[23,39].

The present situation is still far from ideal and indicates that much needs to be done in order to make early detection and management of breast lesions possible in an easy, accessible and cost effective way. Persistent public awareness and motivation to undergo breast screening and regular clinical follow up, if indicated needs to be further emphasized. In our experience, the specificity of FNAC is very reliable for aspirates which are interpreted as “definitely malignant” which is concordant to other studies^[22-25,33,34]. The major benefit of FNAC in these patients is that it enables the surgeon to plan which patients would have one stage inpatient procedure with frozen section and which would have a lumpectomy.

In conclusion, the high sensitivity and specificity obtained in this study indicate that FNAC is a reliable diagnostic method when correctly performed and interpreted by an experienced cytopathologist^[22]. The cytohistological discrepancies could be clinically significant as they may lead to an unnecessary surgical mutilation or medical treatment. Since it's known that these errors can and do occur, it emphasizes the fact that FNAC is only a preliminary interpretation, and critical surgical treatment should not be instituted based on this diagnosis alone. Besides, sources of cytohistological discrepancies, mentioned in the discussion are well documented and should be kept in mind. FNAC should not be used as the sole modality and results must be interpreted in correlation with all the clinical and imaging findings (the triple test) to reduce errors and allow proper management for each patient^[28-30]. However, the ultimate decision regarding the appropriateness of any treatment must be made by physicians and surgeons in the light of all circumstances prevailing in the

individual setting, in accordance with medical ethics, the rules and regulations in which the care is rendered.

An effective communication between the surgeons and pathologists could not only facilitate more accurate and precise reporting, but enormously improve patient care which is our ultimate goal.

References

- [1] **Homesh NA, Issa MA, EL-Sofiani HA.** The diagnostic accuracy of fine needle aspiration cytology versus core needle biopsy for palpable breast lump(s). *Saudi Med J* 2005; **26**(1): 42-46.
- [2] **Martin HE, Ellis EB.** Biopsy by needle puncture and aspiration. *Ann Surg* 1930; **92**(2): 169-181.
- [3] **Ariga R, Bloom K, Reddy VB, Kluskens L, Francescatti D, Dowlat, K, Siziopikou P, Gattuso P.** Fine needle aspiration of clinically suspicious palpable breast masses with histopathologic correlation. *Am J Surg* 2002; **184**(5): 410-413.
- [4] **Atamdede FI, Isaacs JH.** The role of fine needle aspiration in the diagnosis of breast lesions. *Gynecol Oncol* 1993; **50**(2): 159-163.
- [5] **Vetrani A, Fulciniti F, Di Benedetto G, Zeppa P, Troncone G, Bascanio A, Rosa GD and Palombini L.** Fine-needle aspiration biopsy of breast masses: An additional experience with 1553 cases (1985-1988) and meta- analysis. *Cancer* 1992; **69**(3): 736-740.
- [6] **Collaço LM, de Lima RS, Werner B, Torres LF.** Value of fine needle aspiration in the diagnosis of breast lesions. *Acta Cytol* 1999; **43**(4): 587-592.
- [7] **Dominguez F, Riera J R, Tojo Sand Junco P.** Fine needle aspiration of breast masses: An analysis of 1398 patients in a community hospital. *Acta Cytol* 1997; **41**(2): 341-347.
- [8] **Al-Mulhim A S, Sultan M, Al -Mulhim FM, Al-Wehedy A, Ali A M, Al-Suwaigh A, Al-Dahfiri S, Baymen O.** Accuracy of "the triple test" in the diagnosis of palpable breast masses in Saudi females. *Ann Saudi Med* 2003; **23**(3-4): 158- 161.
- [9] **Cibas ES, Ducatman BS.** Breast. In: *Cytology: Diagnostic Principles and Clinical Correlates*, 3rd ed. Chp 8, 3rd ed., Philadelphia, PA: Saunders/Elsevier, 2009. 221-250.
- [10] **Hatada T, Ishii H, Ishii S, Okada K, Fujiwara Y, Yamamura T.** Diagnostic value of ultra sound guided fine needle aspiration biopsy, core - needle biopsy and evaluation of combined use in the diagnosis of Breast lesions. *J Am Coll Surg* 2000; **190**(3): 299-303.
- [11] **Ibrahim EM.** Pattern and prognosis of breast cancer: Data from the eastern province of Saudi Arabia. *Saudi Med J* 1991; **12**(3): 227-231.
- [12] **Al-Idrissi HY.** Pattern of breast cancer in Saudi females. *Indian J Med Sci* 1991; **45**(4): 85-87.
- [13] **Amr SS, Sadi AR, Ilahi F, Sheikh SS.** The spectrum of breast diseases in Saudi Arab females. A 26 years pathological survey at Dhahran health center. *Ann Saudi Med* 1995; **15**(2): 125-132.
- [14] **Ezzat AA, Raja M, Rostom A, Zwaan F, Akhtar M, Bazarbashi S, Ingemansson S, Al Abdulkareem A.** An overview of breast cancer. *Ann Saudi Med* 1997; **17**(1): 10-15.
- [15] **Awatif J, Nader M, Tarek M, Suleiman J, Jamal H, Mohammad S, Ajao, Mirdad S.** Profile of breast pathology at Asir Central Hospital: a review of 312 biopsies. *Saudi Med J* 1997; **18**(4): 363-366.

- [16] **Merdad A, Al Ghaithy Z, Al Thubaity F, Bakhsh T.** Breast Cancer "a lot to be done". *JKAU Med Sc* 1999; **7**(2): 37-43.
- [17] **Jamal AA.** Pattern of breast diseases in Jeddah, Saudi Arabia. *Saudi Med J* 2001; **22**(2): 110-113.
- [18] **Jamal AA, Mansoor I.** Analysis of false positive and false negative cytological diagnosis of breast lesions. *Saudi Med J* 2001; **22**(1): 67-71.
- [19] **O'Neil S, Castelli M, Gattuso P, Madsen K, Aranha G.** Fine needle aspiration of 697 palpable breast lesions with histopathologic correlation. *Surgery* 1997; **122**(4): 824-828.
- [20] **Ibrahim M, Jamal AA.** Role of fine needle aspiration in diagnosing breast lesions. *Saudi Med J* 2002; **23**(8): 915-920.
- [21] **Lawrence CC, Imad AH, Sharanamma MK.** Breast diseases in the Northern region of Saudi Arabia. *Saudi Med J* 2003; **24**(6): 623-627.
- [22] **Nguansangiam S, Jesdapatarakul S, Tangjitgamol S.** Accuracy of Fine Needle Aspiration Cytology from Breast Masses in Thailand. *Asian Pacific J Cancer Prev* 2009; **10**(4): 623-626.
- [23] **Akçil M, Karaagaoglu E, Demirhan B.** Diagnostic accuracy of fine-needle aspiration cytology of palpable breast masses: An SROC curve with fixed and random effects linear meta-regression models. *Diagn Cytopathol* 2008; **36**(5): 303-310.
- [24] **Yeoh GP, Chan KW.** Fine needle aspiration of breast masses: an analysis of 1533 cases in private practice. *Hong Kong Med J* 1998; **4**(3): 283-288.
- [25] **Sneige N.** Fine-needle aspiration of breast: a review of 1995 cases with emphasis on diagnostic pitfalls. *Diagn Cytopathol* 1993; **9**(1): 106-112.
- [26] **Layfield LJ, Dodd LG.** Cytologically low grade malignancies: an important interpretative pitfall responsible for false negative diagnosis in fine-needle aspiration of the breast. *Diagn Cytopathol* 1996; **15**(3): 250-259.
- [27] **Boerner S, Sneige N.** Specimen adequacy and false-negative diagnosis in fine-needle aspirates of palpable breast masses. *Cancer* 1998; **84**(6): 344-348.
- [28] **Salami N, Hirschowitz SL, Nieberg RK, Apple SK.** Triple test approach to inadequate fine needle aspiration biopsies of palpable breast lesions. *Acta Cytol* 1999; **43**(3): 339-343.
- [29] **Lau SK, McKee GT, Weir MM, Tambourt RH, Eichhorn JH, Pitman MB.** The negative predictive value of breast fine needle aspiration biopsy: The Massachusetts General Hospital experience. *Breast J* 2004; **10**(6): 487-491.
- [30] **Vetto JT, Pommier RF, Schmidt WA, Heidi E, Priscilla WA.** Diagnosis of palpable breast lesions in younger women by the modified triple test is accurate and cost-effective. *Arch Surg* 1996; **131**(9): 967-974.
- [31] **Anim JT, Sohaibani MO, Grant CS, Tamimi D.** Breast cancer as seen in King Fahad Hospital, Al-Khobar 1983-1986. *J R Coll Surg Edinb* 1989; **34**(4): 201-204.
- [32] **Abulkhair OA, Al Tahan FM, Young SE, Musaad SM, Jazieh AM.** The first national public breast cancer screening program in Saudi Arabia. *Ann Saudi Med* 2010; **30**(5): 350-357.
- [33] **Chaiwun B, Thorner P.** Fine needle aspiration for evaluation of breast masses. *Curr Opin Obstet Gynecol* 2007; **19**(1): 48-55.
- [34] **Nggada HA, Tahir MB, Musa AB, Gali BM, Mayun AA, Pindiga UH, Yawe KD, Khalil MI.** Correlation between histopathologic and fine needle aspiration cytology diagnosis of palpable breast lesions: a five-year review. *Afr J Med Med Sci* 2007; **36**(4): 295-298.

- [35] **Kocjan G.** Needle aspiration cytology of the breast: current perspective on the role in diagnosis and management. *Acta Med Croatica* 2008; **62**(4): 391-401.
- [36] **Sneige N.** Fine needle aspiration of breast lesions: diagnostic categories and clues to accurate diagnosis. *Breast J* 1997; **3**(4): 149-168.
- [37] **Saad RS, Kanbour SA, Syed A, Kanbour A.** Sclerosing papillary lesion of the breast: a diagnostic pitfall for malignancy in fine needle aspiration biopsy. *Diagn Cytopathol* 2006; **34**(2): 114-118.
- [38] **Chaiwun B, Sukhamwang N, Lekawanvijit S, Sukapan K, Rangaeng S, Muttarak M, Thorner PS.** Atypical and suspicious categories in fine needle aspiration cytology of the breast: histological and mammographical correlation and clinical significance. *Singapore Med J* 2005; **46**(12): 706-709.
- [39] **Day C, Moatamed N, Fimbres AM, Salami N, Lim S, Apple SK.** A retrospective study of the diagnostic accuracy of fine-needle aspiration for breast lesions and implications for future use. *Diagn Cytopathol* 2008; **36**(12): 855-860.

مقارنة بين تقنية الخزع بالإبرة، والفحص النسيجي في الثدي للمرأة السعودية

شفتتا طاهر مفتي و علي صادق صوان

قسم علم الأمراض، كلية الطب، جامعة الملك عبدالعزيز

جدة - المملكة العربية السعودية

المستخلص. الهدف من هذه الدراسة هو تحديد الأنماط المختلفة للأمراض الثدي لدى الإناث في المملكة العربية السعودية، والتي تم تشخيصها باستخدام تقنية الخزع بالإبرة الدقيقة في التشخيص الإكلينيكي لسرطان الثدي، وذلك لتحديد مستوى الدقة في التشخيص، بالمقارنة مع تشخيص الخلايا النسيجية. هذه الدراسة استهدفت ٣١٢ سيدة سعودية تم تشخيصهن إكلينيكيًا بوجود كتلة محسوسة في الثدي، وتم تشخيص هذه الحالات بمستشفى جامعة عبد العزيز بجدة ما بين عام ٢٠٠٠-٢٠٠٩م. كانت نتائجنا تشير إلى أنه في حين أن الورم الليفي الغدي هو الورم الحميد الأكثر شيوعاً، كان سرطان الثدي من النوع المخترق للقنوات، هو السرطان الخبيث الأكثر شيوعاً. كان التوزيع العام للحالات التي تم تشخيصها باستخدام الخزع بالإبرة الدقيقة كالتالي: أمراض التهابات الثدي ٨,٦٥٪، الأورام الحميدة تمثل ٤٥,٨٣٪، والحالات التي بها خلايا غير طبيعية، أو هناك درجة عالية من الشك في كونها خلايا خبيثة تمثل ٨,٣٣٪، والأورام الخبيثة تمثل ٣٠,٧٦٪، في حين أن المسحات غير المرضية كانت تمثل ٦,٤١٪. قمنا بعد ذلك بعمل تحليل ترابطي بين نتائج تقنية الخزع بالإبرة الدقيقة، والتشخيص النسيجي، كشف عن وجود

٩١,٥٨٪ حساسية إحصائية، و٩٧,٧٥٪ تميز أخصائي. أما الحالات السلبية الخاطئة كانت بنسبة ٤,٥٩٪، وذلك في التشخيص النسيجي، حيث تبين أنها سرطان الثدي من النوع المخترق. هذا وقد تم إظهار التعارض في تشخيص تلك الحالات بين استخدام تقنية الخزع بالإبرة، والتشخيص النسيجي، من أجل زيادة الوعي في مثل هذه الظروف.