

Role of FNA in the initial management of a wide range of pathological conditions: 3-years experience in a teaching hospital.

Nazar M.T. Jawhar, MD

Department of Pathology, Nineveh Medical College, University of Mosul-Iraq.

Abstract:

OBJECTIVE: The aim of this study is to determine the utility and accuracy of fine needle aspiration (FNA) cytology in the diagnosis of a wide range of pathological conditions, to increase the awareness about this test to those who are unfamiliar with it and to compare the results with that of others.

METHODS: All patients with palpable lesions and azospermia attending to the hospital during the period 2009 through to 2011 were included in this study. The patients were interrogated and a complete history and physical examination was conducted. The procedure is performed in an outpatient setting without any image guidance. The aspirated smears were stained and examined and the specimens were assigned to one of four different diagnoses: unsatisfactory/inadequate, negative for malignancy, atypical/suspicious, and positive for malignancy.

The cases were followed up and if surgical excision done, the results were compared to that of FNA and the reliability and accuracy of FNA were evaluated for all cases.

RESULTS: A total of 566 FNAs were performed 162 male and 404 female patients. There were 11 inadequate smears (1.94%) with an overall adequacy rate of 98.06%. Most of the insufficiency was seen in thyroid cases. Two hundred seventy three (273) FNAs were thyroid aspirate, 127 breast, 98 lymph node, and 24 had salivary gland enlargement. In addition there were five (5) patients had soft tissue lesions. Thirty nine (39) patients underwent testicular FNA for assessment of infertility. Only 273 (51.8%) had subsequent surgical biopsy. Comparison of FNA with subsequent biopsy results showed an accuracy rate of 95.23%. Overall false positive results were seen in only 5 cases (1.8%) most of which are thyroid cases, while false negative results were reported in only 8 cases (2.93%) and breast cases were the most common. The total sensitivity of FNA procedure was 89.47%% and specificity 97.46%, with the predictive value for positive diagnosis 93.15 % and for negative diagnosis 96%.

CONCLUSION: FNA is a reliable safe and efficient tool that can yields a definitive diagnosis in a wide range of inflammatory, benign and malignant lesions. The results of this study are similar to those found in previous regional and international studies. Its use for routine diagnosis must be encouraged particularly in underdeveloped countries.

Keywords Fine needle aspiration cytology, mass, infertility.

Introduction

The art and science of cytopathology have been implemented and recognized as early as the 18th and 19th century. However, the progress and the standardization of this branch of pathology were not funded completely until the late years of the 20th century. The first reports of fine needle aspiration (FNA) were from Scandinavia 1. It is now well recognized that FNA

cytology is a simple accurate and safe diagnostic procedure for making a specific diagnosis that dictates management decisions by treating clinicians. Definitive treatment has been performed on the basis of a positive FNA diagnosis if supported by other clinical studies. It has multiple advantages compared to open biopsy. It is quick, inexpensive, and minimally invasive, and it can often be performed on the day of the initial office visit. FNA can

generally be performed without any anesthesia, it causes minimal to no discomfort, and it is well tolerated by patients. It is possible that FNA may replace biopsy for the diagnosis of most palpable lesions. When offered a choice of open versus needle biopsy, most patients prefer the simpler needle biopsy 2,3. Indeed it has been suggested that an initial FNA is more diagnostically useful and cost effective than other forms of investigation⁴. The yield of FNA can be augmented with physical examination and radiologic guidance⁵ and also by submitting the material for flow cytometry or immunoperoxidase staining. FNA is a sensitive test with low rates of both false positive and false negative results. The frequency of such reports is related to the skill of the operator and the experience of the cytopathologist 6,7. The purpose of this study is to determine the utility and accuracy of fine needle cytology in the diagnosis of a wide range of pathological conditions and to increase the awareness about this test to those who are unfamiliar with it.

Patients and methods

All patients presenting with palpable lesions attending to Al-Salam teaching hospital during the period 2009 through to 2011 were included in this study. Also arrangement has been done with urologist to refer azospermic patients for assessment of infertility by FNA instead of biopsy. The patients were interrogated and a complete history and physical examination was conducted. Pertinent laboratory and radiologic data (such as mammogram, ultrasound and CT scan) were reviewed. The procedure was explained to the patient and a verbal consent was obtained for the procedure.

FNA technique: The procedure is performed in an outpatient setting; the targeted area is exposed, disinfected with povidone iodine. No local anesthetic is used. Then a 23-gauge needle on a 5ml syringe (without a "pistol-grip" device) is introduced through a single puncture site in the skin into the mass. The syringe

plunger is fully withdrawn to create vacated air space within the syringe. After that, the needle is advanced and withdrawn within the mass rapidly and sequentially in different directions while aspirating in order to provide a representative sample from multiple areas within the mass so that to decrease sampling error. Aspiration is kept as minimally traumatic as possible. Upon completion, the negative pressure is released, the needle is withdrawn from the patient and a local pressure is applied to the site of aspiration for 2-4 minutes to prevent bleeding and minimize the likelihood of swelling. The aspirated material is expressed onto glass slides and the material is then smeared with a second slide. When cyst fluid is aspirated the volume and color is recorded and if there is a residual mass after aspiration it will be reaspirated. The patients were discharged in the same day with a small bandage over the aspiration site with instructions to apply ice should discomfort occur later. As for testicular FNA, the scrotal skin is cleaned and bilateral spermatic cord block is achieved by 5 to 7 ml of two percent lidocaine. To quicken the distribution of anesthetic, spermatic cord is gently massaged after injection. Each testis is aspirated at three different sites, upper, middle and lower part, using 23 G needle with 5 ml syringe attached to it. The patient is allowed to rest for at least thirty minutes after the procedure.

All slides are fixed immediately in 95% ethanol for 30 minutes to avoid drying artifact and to preserve nuclear details. Then the slides stained with hematoxyline and eosin stain. The stained specimen is immediately examined by the cytopathologist on site to assess the adequacy of specimen for cytologic diagnosis. When the specimen is diagnostic, no further passes are made.

Interpretation: The adequacy criteria used in this study were those of Goellner et al, Abele J. et al, Sneige N., Sneige N. et al, Salami N. et al. 8,9,10.

In order to obtain a meaningful outcomes, a standardized reporting of FNAs was used, using four diagnostic categories: 1) unsatisfactory/inadequate, 2) negative for

malignancy, 3) atypical/suspicious, and 4) positive for malignancy^{5,11}.

In testicular FNA, in order to produce clinically and therapeutically useful groups,

the cases were classified, after cytomorphological assessment, into 4 categories; active spermatogenesis, hypospermatogenesis, maturation arrest, and Sertoli cell only syndrome¹².

The cases were followed up and if surgical excision done, the results were compared to that of FNA and the reliability and accuracy of FNA were evaluated for all cases.

Results

A total of 566 FNAs were performed on patients presenting with pathological conditions associated with palpable mass at different sites of their body (and with infertility). There were 162 male and 404 female patients. Details of patient's age and gender are illustrated in table 1. All FNA were performed by the pathologist. No radiological (ultrasound and CT-scan) guidance was used. In 11 (1.94%) patients the aspiration contained inadequate material and were labeled inadequate while the remaining 555 were adequate with an overall adequacy rate of 98.06% (table 1). Most of the insufficiency was seen in thyroid cases. Two hundred seventy three (273) FNAs were performed on patients presenting with thyroid enlargements, one hundred twenty seven (127) on patients presenting with breast lesions, ninety eight (98) patients had lymph node enlargement, and twenty four (24) had salivary gland enlargement. Five (5) patients had soft tissue lesions. Thirty nine (39) patients underwent testicular FNA for assessment of infertility.

The result of thyroid FNA showed that 204 patients (74.7%) had benign lesions (hyperplastic, cystic, and inflammatory). Forty five patients (16.4%) had features suggestive of follicular neoplasm, 21 (7.6%) cases were labeled suspicious, and 17 (6.2%) were positive for malignancy. Of the latter 12 cases were papillary carcinoma, 2 anaplastic carcinoma and one case of Non-Hodgkin's lymphoma). I

had two cases of metastatic carcinoma; mammary and squamous cell carcinoma. Nodular hyperplasia was the most common benign lesion (52.3%) while papillary carcinoma was the most common malignant neoplasm (4.02%), table 2.

As for breast FNA, 93 (73.2%) were benign lesions, 4 (3.1%) had suspicious lesions and 30 (23.6%) showed malignant neoplasms. Fibroadenomas were the most common lesion (25.1%), table 3.

Regarding lymph node FNA, 29 (29.5%) showed non-specific hyperplastic changes, 14 (14.2%) acute suppurative inflammation, 24 (24.4%) had granulomatous inflammation, 5 (5.1%) were suspicious for lymphoid neoplasm, and 20 (20.4%) were positive for malignancy. Of the later, 11 (11.2%) were Non-Hodgkin's lymphoma and 9 (9.1%) were metastatic carcinoma (primary site was nasopharyngeal, laryngeal and thyroid). There were also 2 cases of Langerhan's granulomatosis. Three cases were referred to us as submandibular lymph nodes but upon aspiration they turn to be non-lymphoid lesions and included hemangioma, carotid body tumor and branchial cyst respectively. Only 24 cases of salivary gland lesions were seen, 16 females and 8 males. Inflammatory conditions were the most common 12 (50%), followed by benign tumors 9 (37.5%) and 2 cases (8.3%) were positive for malignancy (mucoepidermoid carcinoma and acinic cell tumor). Most of the benign tumors were pleomorphic adenomas (eight) and one case was consistent with oncocytoma. Soft tissue lesions were the least common (five cases only) four were lipomas, one had sacrococcygeal germ cell tumor consistent with yolk sac tumor.

Testicular FNA was performed on 39 male patients referred for assessment of infertility. Twenty (51.2%) patients had active spermatogenesis on both sides, 12 (30.7%) had hypospermatogenesis and 7 (17.9%) showed germ cell aplasia with Sertoli cell only. In all patients the findings were identical on both sides except one patient had hypospermatogenesis on one side and absence germ cells on the other.

The patients were followed for subsequent excisional biopsy. Only 273 (51.8%) had surgical biopsy. Comparison of FNA with subsequent biopsy results showed that concordant results were obtained in 260 (an accuracy rate of 95.23%). Overall false positive results were seen in only 5 cases (1.8%) most of which are thyroid cases, while false negative results were reported in only 8 cases (2.93%) and breast cases were the most common. Details are presented in table 4. The overall sensitivity of FNA procedure was 89.47% and specificity 97.46%, with the predictive value for positive diagnosis 93.15 % and for negative diagnosis 96%.

For thyroid FNA, the sensitivity was 94.73% and specificity 97.27%, positive predictive value 85.71% and the negative predictive value 99.07%. For breast, the sensitivity was 90.32% and specificity 97.29%, positive predictive value 96.55% and the negative predictive value 92.30%. Regarding lymph node cases, the sensitivity of FNA was 82.6% and specificity 97.36%, with the predictive value for positive diagnosis 90.24 % and for negative diagnosis 91.80%.

No subsequent biopsy was performed for the testicular FNA. No complication has been reported in any case.

Discussion

It is now known that FNA is a rapid reliable diagnostic procedure⁵ and that one of its major advantage that it is a cost effective test¹³. Its low cost has been reported in both developing^{14,15} and developed countries^{16,17}. Therefore in underdeveloped countries in which the cost of medical care is on the rise, such simple quick and safe test like FNA is very much indicated. But, unfortunately, in some underdeveloped countries, FNA is less popular in addition to the paucity of well trained personnel in this field. This was a major motivation to write this article in order to increase the awareness about this test and to focus more light on its simplicity, validity and accuracy, and to compare our results with that of others. As stated earlier, the test was conducted as an outpatient procedure at the FNA clinic.

Performing the procedure at the FNA clinic yields better results since aspiration, smearing, staining and interpretation will be done by the pathologist or other well-trained personnel and thus ensuring good quality and constancy^{18,19}. Furthermore, the smeared slides can be quickly stained and examined by the pathologist to determine adequacy so that insufficient samples can be reaspirated while the patient is still at the clinic. An added benefit is that the pathologist will be able to see the patient, take history and perform quick physical examination. This will allow the pathologist to have a feeling and understanding of the clinical condition of the patient and formulate a clinically based differential diagnosis.

FNA procedure is usually performed in an outpatient setting; however, for non-palpable and deep seated lesions (such as intraabdominal and intrathoracic lesions) FNA can be done under image guidance such as ultrasound and CT-scan. This study dealt with cases having palpable lesions that can be aspirated directly without the need for any image guidance in order to emphasize the simplicity and feasibility of this procedure particularly to those physicians who are not yet so convinced with it.

One of the major concerns in reporting cytology smears is the issue of adequacy, since a cytologic diagnosis cannot be reached if there is poor specimen handling and preparation or if insufficient cellular material was obtained at the time of FNA²⁰. The principal reasons for insufficient material for diagnosis may be *inexperience on the part of the person performing the procedure*, insufficient number of aspirations done during the procedure, the size of the mass, or the presence of a cystic lesion²⁰. Also densely fibrotic lesions can yield hypocellular smears as in the case of scirrhous carcinoma of the breast²¹.

For determination of smears adequacy in this study we applied the established criteria published in the literatures^{8,9,10} which are based largely upon cellularity standards; number, size, and composition of cell clusters. However, these are quantitative parameters and may be alone

insufficient measures for determining specimen adequacy. Rather, adequacy should also be based upon other factors such as confidence of needle placement, cell preservation, and correlation with clinical and radiologic findings²², this is one of the reasons why it is preferable that FNA is done by the pathologist. The overall success rate of acquiring adequate tissue for cytological diagnosis was 98.06% which is comparable with that of others¹. The majority of the cases were adequate from the first aspirate without the need for re-aspiration. Despite reaspiration, eleven cases were labeled inadequate due to very low cellularity; most of them (seven) were thyroid. In this study, all the cytological and histological evaluations were done by the same pathologist. This approach was also adopted by others and played an important role in having a low unsatisfactory rate²³. Other important issue in FNA cytology is the accuracy because false positive and false negative diagnosis, although infrequent, may lead to either unnecessary surgery such as (mastectomy, thyroidectomy) or missed or delayed diagnosis and treatment⁵. In this study the total false positive and false negative rates were 1.8% and 2.93% respectively, with an overall diagnostic accuracy rate of 95.23%. The overall sensitivity of FNA procedure was 89.47% and specificity 97.46%. The predictive value for positive diagnosis 93.15% and for negative diagnosis 96%. Detailed reasons for the causes of false results will not be discussed. Thyroid enlargement was the most common lesion encountered (48.23%). Interpretation of its FNA cytology can be difficult and challenging; however, in our hospital the insufficiency (2.5%), accuracy (96.8%), false positive (2.3%) and false negative (0.7%) rates were good and comparable with that of regional and international studies^{18,24,25}. Indeed the insufficiency rate in this study is significantly low in comparison to others studies^{26,27}. Furthermore, FNA was helpful not only in the discrimination between benign and malignant lesions but also in accurate diagnosis as in specifying the subtypes of thyroiditis and malignancy

(table 2). As expected, nodular hyperplasia was the most common finding (52.38%). FNA in follicular lesions remains challenging and differentiation between benign and malignant follicular lesions is one of the difficult diagnostic areas in thyroid fine needle aspiration²⁸. In this study, such cases were reported as suggestive of follicular neoplasm and that the differential diagnosis include adenomatous hyperplasia and follicular neoplasms and surgical excision is advised for further clarification. Of the 24 follicular cases, one case was diagnosed as hurthle cell neoplasm and subsequent biopsy showed hurthle cell adenoma. Twenty one cases were labeled as suspicious for malignancy, 10 had subsequent excision and of which 7 were diagnosed as malignant. So the rate for histologically confirmed malignancy in this category was 70% which is slightly better than that of similar study²⁹. The sensitivity and specificity rates in the current study (94.73% and 97.27% respectively) were similar to that achieved in other studies¹⁷. Positive predictive value 85.71% and the negative predictive value 99.07%. Breast lesions ranked second in frequency. Breast FNA is a confirmed reliable diagnostic procedure for patients with palpable breast masses³⁰. In this study, the insufficiency (2.3%), accuracy (94.1%), false positive (1.4%) and false negative (4.4%) rates were similar and even better than that of others^{5,17,31,32,33}. The sensitivity, specificity, positive and negative predictive values (90.32%, 97.29%, 96.55% and 92.30% respectively) in this study were remarkably high and comparable to that of others^{5,29,30,33,34,35,36} showing that FNA at this institution is acceptable. Scirrhous carcinoma tends to be reported as false-negative, mostly because of inadequate cytologic material for diagnosis. However, in this study, false negativity did not occur in this type of lesion. All of the false-negative cases were histologically diagnosed as lobular carcinoma. The false positive case turned out to be cellular fibroadenoma, which is

notorious for have a significantly higher chance of being miss diagnosed by aspiration cytology^{34,37}. Other causes for false positivity include epithelial proliferative lesions (both ductal and lobular hyperplasia)⁵ but none was encountered in our institute.

Fine-needle aspiration (FNA) cytology has an established role in the investigation of lymphadenopathy, which occurs in a wide spectrum of diseases including reactive conditions, infections, and primary and metastatic malignancy. However, one of the main limitations of the cytologic preparation is the lack of architectural pattern. However, during the past decade, increasing numbers of initial lymphoma diagnoses have been made by FNA particularly after the application of flow cytometric techniques to FNA³⁸. Indeed many studies have concluded that by using a combination of cytomorphologic examination and flow cytometric analysis, a substantial portion of lymphomas could be diagnosed based on FNA alone without further tissue biopsy³⁹. However, FNA could not completely replace tissue biopsy, and there were still cases of NHL that required surgical biopsy for confirmation of the diagnosis. In this study, all cases of reactive, suppurative, and granulomatous lymphadenitis as well as cases of metastatic malignancy were accurately diagnosed by FNA as shown by the subsequent biopsies. While all false negative and positive cases were lymphomas. This is because we depend solely on cytomorphologic features due to the lack of flow cytometric and immunohistochemical tests at Al-Salam teaching hospital. Despite this, the sensitivity and specificity of FNA were 82.6% and 97.36% respectively, which is comparable to that of other^{39,40,41}. FNA is being increasingly used in the diagnosis of salivary gland lesions because the accessibility of major salivary glands and some minor salivary glands make them optimal targets for FNA. Furthermore, FNA of salivary glands can distinguish inflammatory lesions from neoplastic conditions, lymphomas from epithelial malignancies and primary tumors from metastatic tumors²³. Such

preoperative information concerning the tumor type can be informative to plan the best surgical approach. Of the 24 cases only 10 had subsequent excisional biopsy with high cytohistologic concordance rate (100%). Such results are comparable to those of others^{23,42,43,44}.

FNA in the diagnosis of soft tissue and bone tumor has been proven to be accurate and successful^{2, 45,46}. However, largely due to a lack of experience, familiarity, and/or confidence, few centers rely on simple fine-needle aspiration for the diagnosis of sarcomas and related tumors. This may explain the low no. of cases in this study (only 5) despite the high cytohistologic concordance rate (100%). Fine needle aspiration cytology of testes has proved to be useful in testicular tumors as well as in non neoplastic and inflammatory conditions of testes, in addition, recently it has also gained popularity for its diagnostic and therapeutic role in male infertility where it can conserve tissue of already failing organ^{47,48}. It is especially helpful in differentiating obstructive azoospermia from spermatocytic arrest⁴⁹. This helps in correct choice of therapy and obviating the need for other costlier and traumatic invasive investigations. Correlation between histology and cytology in evaluating spermatogenesis exceeds 90% in most studies^{12,47,50}. Infertile patients feel more secure with aspiration than with biopsy.

The procedure of FNA is known to be safe, with few reported complications^{51,52} which include pneumothorax, hemorrhage, and infections^{14,15}. Needle track seeding has also been reported⁵³. In this study, however, no post procedure complications were recorded confirming the safeness of this test.

Conclusion:

In conclusion, FNA is a reliable safe and efficient tool that can yields a definitive diagnosis in a wide range of inflammatory, benign and malignant lesions. The results of this study are similar to those found in previous regional and international studies.

Its use for routine diagnosis must be encouraged.

Reference

- 1- Al-Damegh SA. Ultrasound guided fine needle aspiration using 25G needle as a new technique for a wide range of pathological conditions. : Saudi Med J. 2004 Oct;25(10):1374-7.
- 2- William G. Ward, Paul Savage, Carol A. Boles, and Scott E. Kilpatrick. Fine-Needle Aspiration Biopsy of Sarcomas and Related Tumors. Cancer Control 2001; 8(3):232-238.
- 3- DeMay RM. Stains. In: DeMay RM, ed. The Art and Science of Cytopathology. Vol 1. Chicago, Ill: ASCP Press; 1996:14-15.
- 4- Hamburger JI, Husain M, Nishiyama R, Nunez C and Solomon D. Increasing the accuracy of fine-needle biopsy for thyroid nodules. Arch Pathol Lab Med 1989;113:1035-41.
- 5- Takashi Ishikawa, Yohei Hamaguchi, Mikiko Tanabe, Nobuyoshi Momiyama, Takashi Chishima, Yukio Nakatani, et al. False-Positive and False-Negative Cases of Fine-Needle Aspiration Cytology for Palpable Breast Lesions. Breast Cancer 2007;Vol. 14 No. 4: 388-392.
- 6- Grant CS, Hay ID, Gough IR, McCarthy PM and Goelliner JR. Long-term follow-up of patients with benign thyroid fine-needle aspiration cytologic diagnoses. Surgery 1989;106:980-6.
- 7- Liel Y and Barchana M. Long-term follow-up of patients with initially benign fine-needle aspirations. Thyroid 2001;11:775-8
- 8- Abele J., Kline T., Silverman J.F., et al: What constitutes adequate sampling of breast lesions that appear benign by clinical and mammographic criteria?. Diagn Cytopathol 1995; 13:473-485.
- 9- Sneige N.: Should specimen adequacy be determined by the opinion of the aspirator or by the cells on the slides? Cancer (Cancer Cytopathol) 1997; 81:3-5
- 10- Andrew A. Renshaw. Focal features of papillary carcinoma of the thyroid in fine-needle aspiration material are strongly associated with papillary carcinoma at resection. Am J Clin Pathol 2002; 118(2):208-210.
- 11- <http://www.liebertonline.com/doi/abs/10.1089/105072503321087051?journalCode=thy>. Accessed in Sept 2008.
- 12- Madhu S Agarwal, Atul Gupta, Kiran Chaturvedi, Prashant Lavania. Assessment of the utility of testicular FNAC in infertile males with special reference to differential counts. Indian J Urol 2004;20:148-53.
- 13- Harewood GC, Wiersema MJ, Edell ES, Liebow M. Cost-minimization analysis of alternative diagnostic approaches in a modeled patient with non-small cell lung cancer and subcarinal lymphadenopathy. Mayo Clin Proc 2002; 77: 155-164.
- 14- Al-Damegh S. Fine needle aspiration of solitary pulmonary lesions. Eur J Radiol 2001; 37: 200-203.
- 15- Mostafa MG. Computed tomography guided fine needle aspiration cytology in the diagnosis of thoracic lesions. J Indian Med Assoc 2001; 99: 550-551.
- 16- Layfield LJ, Bentz JS, Gopez EV. Immediate on-site interpretation of fine-needle aspiration smears: a cost and compensation analysis. Cancer 2001; 93: 319-322
- 17- Guo Z, Kurtycz DF, Salem R, De Las Casas LE, Caya JG, Hoerl HD. Radiologically guided percutaneous fine-needle aspiration biopsy of the liver: retrospective study of 119 cases evaluating diagnostic

- effectiveness and clinical complications. *Diagn Cytopathol* 2002; 26: 283-289.
- 18- El Hag IA, Kollur SM, Chiedozi LC. The role of FNA in the initial management of thyroid lesions: 7-year experience in a district general hospital. *Cytopathology*. 2003 Jun;14(3):126-30.
 - 19- Howell LP, Gandour-Edwards R, Folkins K, Davis R, Yasmeeen S, Afify A. Adequacy evaluation of fine-needle aspiration biopsy in the breast health clinic setting. *Cancer*. 2004 Oct 25;102(5):295-301.
 - 20- Goellner JR. Problems and pitfalls in thyroid cytology. *Monogr Pathol* 1997;39:75-93.
 - 21- Park IA, Ham EK: Fine needle aspiration cytology of palpable breast lesions. Histologic subtype in false negative cases. *Acta Cytol* 1997;41:1131-1138.
 - 22- Eckert R, Howell LP Number, size, and composition of cell clusters as related to breast FNA adequacy. *Diagn Cytopathol*. 1999 Aug;21(2):105-11.
 - 23- Canan Ersöz¹, Aysun H. Uguz¹, Ülkü Tuncer², Levent Soylu², Mete Kiroglu². Fine needle aspiration cytology of the salivary glands: a twelve years' experience. *APJ* 2004; 1:51-56.
 - 24- Yang J, Schnadig V, Logrono R, Wasserman PG. Fine-needle aspiration of thyroid nodules: a study of 4703 patients with histologic and clinical correlations. *Cancer* 2007 Oct 25;111(5):306-15.
 - 25- Renshaw AA, Pinnar N. Comparison of thyroid fine-needle aspiration and core needle biopsy. *Am J Clin Pathol*. 2007 Sep;128(3):370-4.
 - 26- Tublin ME, Martin JA, Rollin LJ, Pealer K, Kurs-Lasky M, Otori NP. Ultrasound-guided fine-needle aspiration versus fine-needle capillary sampling biopsy of thyroid nodules: does technique matter? *J Ultrasound Med*. 2007 Dec;26(12):1697-701.
 - 27- Lee YH, Lee NJ, Kim JH, Suh SI, Kim TK, Song JJ. Sonographically guided fine needle aspiration of thyroid nodule: discrepancies between cytologic and histopathologic findings. *J Clin Ultrasound*. 2008 Jan;36(1):6-11.
 - 28- El Hag IA, Kollur SM. Benign follicular thyroid lesions versus follicular variant of papillary carcinoma: differentiation by architectural pattern. *Cytopathology*. 2004 Aug;15(4):200-5.
 - 29- Ballo MS, Sneige N. Can core needle biopsy replace fine-needle aspiration cytology in the diagnosis of palpable breast carcinoma. A comparative study of 124 women. *Cancer*. 1996 Aug 15;78(4):773-7.
 - 30- Arisio R, Cuccorese C, Accinelli G, Mano MP, Bordon R, Fessia L: Role of fine-needle aspiration biopsy in breast lesions: analysis of a series of 4,110 cases. *Diagn Cytopathol* 1998;18:462-467..
 - 31- O'Neil S, Castelli M, Gattuso P, Kluskens L, Madsen K, Aranha G. Fine-needle aspiration of 697 palpable breast lesions with histopathologic correlation. *Surgery*. 1997 Oct;122(4):824-8
 - 32- Choi YD, Choi YH, Lee JH, Nam JH, Juhng SW, Choi C. Analysis of fine needle aspiration cytology of the breast: a review of 1,297 cases and correlation with histologic diagnoses. *Acta Cytol*. 2004 Nov-Dec;48(6):801-6.
 - 33- Mizuno S, Isaji S, Ogawa T, Tabata M, Yamagiwa K, Yokoi H, Uemoto S. Approach to fine-needle aspiration cytology-negative cases of breast cancer. *Asian J Surg*. 2005 Jan;28(1):13-7.
 - 34- Medina-Franco H, Abarca-Pérez L, Cortés-González R, Soto-Germes S, Ulloa JA, Uribe N. Fine needle aspiration biopsy of

- breast lesions: institutional experience. *Rev Invest Clin.* 2005 May-Jun;57(3):394-8.
- 35- Ariga R, Bloom K, Reddy VB, Kluskens L, Francescatti D, Dowlat K, et al: Fine-needle aspiration of clinically suspicious palpable breast masses with histopathologic correlation. *Am J Surg.* 2002 Nov;184(5):410-3.
- 36- Mansoor I, Jamal AA. Role of fine needle aspiration in diagnosing breast lesions. *Saudi Med J.* 2002 Aug;23(8):915-20.
- 37- Mori I, Han B, Wang X, Taniguchi E, Nakamura M, Nakamura Y, et al: Mastopathic fibroadenoma of the breast: a pitfall of aspiration cytology. *Cytopathology* 2006; 17:233-238.
- 38- Wakely PE Jr. Fine-needle aspiration cytopathology in diagnosis and classification of malignant lymphoma: accurate and reliable? *Diagn Cytopathol.* 2000;22:120-125.
- 39- Sneige N, Dekmezian RH, Katz RL, et al. Morphologic and immunocytochemical evaluation of 220 fine needle aspirates of malignant lymphoma and lymphoid hyperplasia. *Acta Cytol.* 1990;34:311-322
- 40- Young NA, Al-Saleem TI, Ehya H, et al. Utilization of fine-needle aspiration cytology and flow cytometry in the diagnosis and subclassification of primary and recurrent lymphoma. *Cancer.* 1998;84:252-261.
- 41- Nicol TL, Silberman M, Rosenthal DL, et al: The accuracy of combined cytopathologic and flow cytometric analysis of fine-needle aspirates of lymph nodes. *Am J Clin Pathol.* 2000;114:18-28.
- 42- Noor ul Aan and Ashok Kumar Tanwani. Pitfalls in Salivary Gland Fine-Needle Aspiration Cytology. *International Journal of Pathology;* 2009; 7(2): 61-65.
- 43- Brennan PA, Davies B, Poller D, Mead Z, Bayne D, Puxeddu R, et al. Fine needle aspiration cytology (FNAC) of salivary gland tumours: Repeat aspiration provides further information in cases with an unclear initial cytological diagnosis. *Br J Oral Maxillofac Surg.* 2010 Jan;48(1):26-9. Epub 2009 Feb 23.
- 44- Hughes JH, Volk EE, David C. Wilbur. Pitfalls in Salivary Gland Fine-Needle Aspiration Cytology: Lessons from the College of American Pathologists Interlaboratory Comparison Program in Nongynecologic Cytology. *Archives of Pathology and Laboratory Medicine* 2005; 129: 26-31
- 45- Fleshman R, Mayerson J, Wakely PE Jr. Fine-needle aspiration biopsy of high-grade sarcoma: a report of 107 cases. *Cancer.* 2007 Dec 25;111(6):491-8.
- 46- Ward WG, Kilpatrick S. Fine-needle aspiration biopsy of primary bone tumors. *Clin Orthop.* 2000;373:80-87.
- 47- Jha R, Sayami G. Testicular Fine Needle Aspiration in Evaluation of Male Infertility. *J Nepal Med Assoc.* 2009;48(173):78-84.
- 48- Al Jitawi SA, Al ramahi SA, Hakooz BA. Diagnostic role of testicular fine needle aspiration in male infertility. *Acta cytol* 1997;4:1705-8.
- 49- Bettella A, Ferlin A, Menegazzo M, Ferigo M, Tavolini IM, Bassi PF, et al. Testicular fine needle aspiration as a diagnostic tool in non-obstructive azoospermia. *Asian J Androl.* 2005 Sep;7(3):289-94.
- 50- Meng MV, Cha I, Ljung BM, Turek PJ. Testicular Fine-Needle Aspiration in Infertile Men: Correlation of Cytologic Pattern With Biopsy Histology. *Am J Surg Pathol* 2001;25(1):71-79.
- 51- Tung W.C., Juang Y.J., Leung S. W., et al: Incidence of needle tract seeding and responses of soft tissue metastasis by hepatocellular carcinoma post

radiotherapy. Liver
Int 2007; 27:192-200.

52- Mccames C.G., McCrory C.D., Pa
vey D.A., et al: Endoscopic
ultrasound-guided fine-needle
aspiration for non-small cell lung
cancer staging: A systematic
review and

metaanalysis. Chest 2007; 131:53
9-548.

53- Powers C.N.: Complications of
fine needle aspiration biopsy. The
reality behind the myths.
Cytopathology Annual 1996 vol.
1, Chicago: ASCP
Press; 1996:69-96.

Table 1: Patients characteristics & adequacy rate:

Organ aspirated	Female	Male	Age Range (mean)	Total	No. of insufficient aspirate (%)
Thyroid	237	36	12-80 (36)	273	7 (2.56)
Breast	118	9	17-77 (36.1)	127	3 (2.3)
Lymph node	51	47	2-77 (36.7)	98	1 (1.02)
Salivary gland	16	8	13-60 (36.7)	24	0 (0)
Soft tissue lesions	3	2	2-35 (22)	5	0 (0)
Testis	--	39	20-53 (32.2)	39	0 (0)
Total	404	162	2-80 (33)	566	11 (1.94)

Table 2: Results of thyroid FNA

Diagnosis	Female	Male	Total
Insufficient for diagnosis	6	1	7
Nodular hyperplasia	121	22	143
Colloid cyst	24	5	29
Lymphocytic thyroiditis	21	0	21
Hashimoto's thyroiditis	10	0	10
DeQuervains' thyroiditis	1	0	1
Suggestive of follicular neoplasm	21	3	24
Suspicious	19	2	21
Positive for malignancy	14	3	17
Total	237	36	273

Table 3: Result of breast FNA

Diagnosis	Female	Male	Total
Insufficient for diagnosis	3	0	3
Unremarkable	3	0	3
Acute suppurative inflammation	17	0	17
Granulomatous	1	1	2
Fat necrosis	4	0	4
Fibrocystic changes	20	0	20
Hyperplasia	5	0	5
Ductectasia	1	0	1
Gynecomastia	0	6	6
Fibroadenoma	32	0	32
Atypical, suspicious	4	0	4
Positive for malignancy	28	2	30
Total	118	9	127

Table 4: Sensitivity and specificity of FNA for thyroid, breast and lymph node

		Results of surgical biopsy		
		Malignant	Benign	total
All cases of FNA	Suspicious & malignant	68	5	73
	Benign	8	192	200
	Total	76	197	273
Thyroid	Suspicious & malignant	18	3	21
	Benign	1	107	108
	Total	19	110	129
Breast	Suspicious & malignant	28	1	29
	Benign	3	36	39
	Total	31	37	68
LN	Suspicious & malignant	19	1	20
	Benign	4	37	41
	Total	23	38	61

دور الفحص الخلوي بواسطة الرشف بالابرّة الدقيقة في التخصيص الاولي لمجموعة واسعة من الحالات المرضية: خبرة 3 سنوات في مستشفى تعليمي

د. نزار محمد ظاهر جوهر

فرع علم الامراض-كلية طب نينوى-جامعة الموصل-العراق

الهدف من هذه الدراسة هو تحديد مدى فائدة ودقة الفحص الخلوي بواسطة الرشف بالابرّة الدقيقة في التخصيص الاولي لمجموعة واسعة من الحالات المرضية، وكذلك زيادة الوعي حول هذا الاختبار لأولئك الذين لم يألفوا مثل هذا الفحص ومن ثم مقارنة نتائج هذه الدراسة مع الدراسات الاخرى. اجريت هذه الدراسة في مستشفى السلام التعليمي في الموصل خلال الفترة من 2009 الى 2011 على المرضى الذين يعانون من آفات وعقد محسوسة وكذلك المرضى الذين يعانون من فقد النطاق المنوية (اللانطفية) وتم تنفيذ هذا الإجراء على 566 مريض (162 من الذكور و 404 من المرضى من الإناث) دون الحاجة الى استخدام اي تخدير عدا حالات الرشف من الخصية حيث تم استخدام مخدر موضعي. بعد استجواب المرضى وأجراء الفحص البدني تم اخذ العينات الخلوية ثم صباغتها وذلك ليتم فحصها ودراستها من قبل الطبيب المختص وكانت نتائج التقارير تتراوح بين اربع تشخيصات: غير مرضي (غير كافية) ، سلبي للخلايا الخبيثة ، غير نمطي / مشبوه ، وإيجابي للخلايا الخبيثة. وقد تمت متابعة هذه الحالات وفي حالة اجراء خزعة جراحية تمت مقارنة نتيجة الخزعة بنتيجة الفحص الخلوي وجرى تقييم لمدى موثوقية ودقة الفحص الخلوي بواسطة الرشف بالابرّة الدقيقة، حيث تبين من المقارنة ان معدل الدقة للفحص الخلوي وصل الى 95.23% في حين كانت الحساسية الكلية للاختبار % 89.47 و الخصوصية % 97.46. القيمة التنبؤية للتشخيص الإيجابي 93.15 % ، والقيمة التنبؤية للتشخيص السلبي 96 % . الخلاصة: اثبتت الدراسة ان الفحص الخلوي بواسطة الرشف بالابرّة الدقيقة هو طريقة موثوقة وآمنة وفعالة يمكن أن تؤدي إلى تشخيص نهائي في مجموعة واسعة من الآفات والالتهابات وكذلك التفريق بين الاورام الحميدة والخبيثة. كذلك ان نتائج هذه الدراسة كانت مماثلة لتلك التي وجدت في الدراسات السابقة الإقليمية والدولية. لذا يجب تشجيع استخدام هذا الفحص لأغراض التشخيص الروتيني.