

## Accuracy of Fine Needle Aspiration of Pelvic Masses, A Cyto-histological Correlation

Research Article

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## Abstract

**Objective:** Evaluation of diagnostic efficacy of Fine Needle Aspiration Cytology in differential diagnosis of pelvic masses and correlation between histopathologic and FNA diagnoses.

**Methods:** In this prospective study fifty pelvic masses submitted for pathologic examination, were aspirated by fine needle and analyzed for cytological findings. Cytological findings were categorized as benign, malignant, indeterminate and non-diagnostic. Histological classification was assigned using the guidelines established by the World Health Organization (WHO). A single pathologist evaluated cytological examinations and was blinded to the histological findings of each mass. The same lesions were examined histologically and cytohistological correlation was carried out.

**Results:** Fifty masses from 47 women constituted the study material. The average age of women was 45.7±14.7 years. In Cytological study 32 samples (64%) reported as benign and 9 of them (18%) diagnosed as malignant. Six cases (12%) were non-diagnostic and 3 FNA samples (6%) reported as indeterminate. Histological examination of the masses revealed 30 (60%) benign and 20 malignant lesions. The sensitivity and specificity of FNA cytological study of pelvic masses were 50% and 96%, respectively. The false-positive rate for pelvic masses was 11.1% and the false-negative rate was 25%.

**Conclusion:** Cytological examination of aspirated pelvic masses could not accurately predict pelvic masses histological diagnosis in our university hospital. Since the sensitivity of the technique is not high enough therefore one should not rely on aspiration cytology alone.

**Keywords:** Fine Needle Aspiration; Pelvic Masses; Histopathology.

## Introduction

Adnexal masses are frequently found in both symptomatic and asymptomatic women. In premenopausal women, physiologic follicular cysts and corpus luteoma cysts are the most common adnexal masses. However, the possibility of ectopic pregnancy must always be considered. Malignant neoplasms are uncommon in younger women but become more frequent with increasing age.

A large study performed in 1989 by Campbell et al., on more than 5000 healthy women found that roughly 6% had adnexal masses, 90% of which were cystic tumors [1]. Grimes and Hughes reported that ovarian functional cysts were the fourth most common gynecological cause of hospital admission in the United States in the late 1980s [2]. Moreover, simple ovarian cysts

are more common in postmenopausal women than what was previously believed [3-5].

Information from the history, physical examination, ultrasound evaluation and selected laboratory tests will enable the physician to find the most likely cause of an adnexal mass. An ultrasound examination is the most valuable diagnostic study in the evaluation of an adnexal or pelvic mass. Serum tumor markers are helpful in some cases. Tumor markers that are useful in this setting include alpha-fetoprotein, lactic dehydrogenase (LDH), and β-hCG.

Although accuracy of FNA in evaluation of thyroid and breast cystic lesions is high the technique has received little attention by gynecologists involved in the care of patients with adnexal masses [6, 7]. Concerns about diagnostic sensitivity and specificity and

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complications of this method (rupture of cystic ovarian tumors with resultant tumor dissemination) have limited its routine clinical utilization. Some recent studies have shown the method to have a considerable diagnostic accuracy for ovarian tumors. Also, there are several publications about the low accuracy of technique for these tumors. The purpose of this study is to evaluate our experience with FNA and to correlate between histopathologic and FNA diagnoses of adnexal masses.

**Materials and Methods**

In this study patients with clinically proven adnexal masses were evaluated by FNA cytology and histopathological studies. Between 1 April 2012 and 30 March 2013, 50 adnexal masses from 47 women were resected at the Alzahra Hospital of Tabriz University of Medical Sciences. FNA was performed by surgeons on resected masses as follows: a 21-gauge needle was attached to a 20 ml syringe then two separate passes were made into the lesion with the needle. During each pass, the needle was moved throughout the lesion several times while aspirating. Smear from the aspirates were fixed in 95% alcohol and stained with the Papanicolaou stain. The FNA specimens were examined and assigned to one of four different diagnoses: benign, malignant, indeterminate and non- diagnostic.

The final pathologic diagnosis was made by our colleague pathologist who did not have any prior knowledge about the cytological study (FNA) results. The reliability of FNA was evaluated for all cases. The predictive values were calculated for cases, which were “malignant” by FNA. Then the sensitivity and specificity were calculated for the entire group presuming that the “suspicious” and “malignant” lesions were positive for

malignancy, while the “indeterminate” and “normal or benign” lesions were not.

The pathologist, who studied the specimens, has more than 12 years experience in gynecology pathology. The number of cases who studies is more than 10-15/week. He studied Pathology in Iran and had some fellowship period in Austria and Canada.

**Results**

Fifty adnexal masses from 47 women were obtained and prepared for histologic and cytological study. The age range was 45.7±14.7 years. Histologic evaluation revealed 20 (40%) malignant tumors and 30 (60%) benign lesions. Histological classification of masses was as: 29 (58%) epithelial, 8 (16%) leiomyoma and leiomyosarcoma 4 (8%) metastasis, 3 (6%) functional, 2 (4%) endometrioma and germ cell, sex cord stromal, adenocarcinoma and oophoritis that each were detected in one mass (2%). It has to be noticed that the series is too small so we should indicate that in this particular series, the frequency of malignancy was not different between pre and post menopausal women so fourteen masses (40%) from premenopausal women and 6 (40%) of postmenopausal cases were reported as malignant. FNA cytological studies revealed 32 (64%) benign masses and 9 (18%) malignant. The FNA smear was non diagnostic in 6 (12%) studies and indeterminate in 3 (6%) of samples.

Table 1 shows summary of both studies results.

Malignant masses in cytological study were 5 cases (14%) in premenopausal women and 4 cases (26.7%) in postmenopausal group. Cytological study reports of 6 (17.1%) masses from

**Table 1.**

Adrenal Masses	Age of cases	Histologic Evaluation		FNA Evaluation		
		Malignant	benign	Malignant	Benign	Non-specific
50	45/7 +/_ 14/7	(%40) 20	30 (60%)	9 (18%)	32 (64%)	9 (18%)

premenopausal women were non-diagnostic.

The cytological diagnosis was true positive in 8 cases (40% sensitivity) and true negative in 24 cases (88% specificity), whereas the false positive and false negative ratio was 11.1% and 40% respectively. The positive and negative predictive values were 88%, and 70%, respectively. The sensitivity and specificity were not significantly different between pre- and postmenopausal women.

It must clarify that in 18% of FNA samples we could not determine the malignancy or benignity of the mass and this is a major disadvantage of the FNA. In fact 4 masses (44%) of “Non diagnostic” or “indeterminate” cases in cytological study group were malignant in histological study.

**Discussion**

FNA cytology has received little attention by gynecologists involved in the management of patients with adnexal masses. Concerns

about its diagnostic accuracy and technique complications such as rupture of cystic masses leading to the malignant cells dissemination, have limited this technique's utilization. Martinez et al. assessed the usefulness of FNA cytology in the diagnosis of 147 histologically established adnexal cysts. Cytology helped to identify 67% of non-neoplastic and 56% of neoplastic cysts. In their study the lowest diagnostic sensitivities were observed in functional cysts and benign serous neoplasms (50%), while the highest were shown by endometriotic cysts (76%) and malignant epithelial neoplasms (71%). Inadequate samples were obtained from all types of cysts, even malignant ones (two mucinous cystadenocarcinomas). Diagnostic cytology was not useful in extraovarian cysts (33% sensitivity). Adnexal mass FNA cytology demonstrated low sensitivity, with 43% of samples obtained from all types of cysts. Malignant cystic neoplasms may be overlooked in inadequate samples. Their study also revealed that specificity in this type of analysis is high in inadequate samples, provided that the technique is carried out correctly [8].

To evaluate the role of aspiration cytology in the distinction between neoplastic and non-neoplastic ovarian cysts, Ganjei et

al. examined the cytology of 81 aspirates from 80 women ranging from 14 to 67 years of age. They found that aspiration cytology is an accurate predictor of malignancy in ovarian cystic lesions, but they concluded that because the sensitivity of the technique is not high enough, one should not rely on aspiration cytology alone [9].

According to Mulvany study results prior to FNA of the ovary in an individual patient, care should be regarding the likelihood of diagnosis, the limitations of the technique and the high false negative rate for non-follicular cystic lesions [10].

Tahir et al., in a series of 53 cases concluded that the specificity and sensitivity for cytological diagnosis of follicular cyst was 100% and 60% respectively. For leuteal cysts, false positive and false negative results on cytological examination were 0% and 16.6% respectively with a specificity and sensitivity value of 100% and 83% respectively. For neoplastic serous cysts cytologically false positive and false negative diagnosis was 0% and 46.6% respectively with specificity and sensitivity of 100% and 53%. For mucinous cystadenomas sensitivity and specificity of cytological diagnosis was 100%. For endometriotic cysts a sensitivity of 67% and specificity of 100% was procured with cytological evaluation. According to their conclusion, guided fine needle aspiration cytology may prove to be one of the most valuable and acceptable tools in the differential diagnosis of ovarian cystic lesions [11].

Another disadvantage of FNA in the evaluation of adnexal masses is its limited value in borderline ovarian tumors which are a low grade form of epithelial ovarian carcinoma with a low rate of growth and a low potential to invade or metastasize. This limitation is mainly because of its inability to establish the absence of stromal invasion. The diagnostic accuracy of FNA in these cases can be improved by supplementing cytologic examination with diagnostic techniques as immunocytochemistry and cytometry [16]. In 18% of our cases cytological study of FNA samples was not useful because of its inability to determine malignancy or benignity of the tumors. They instead need operation for excision biopsy in order to perform histological studies.

Sheombar et al examined 27 ovarian cysts cytologically as well as histologically. Cytological study in 17 of the cases did not show malignancy, but histological examination of these samples demonstrated malignancy in 5 of them (29.4% false negative). The fluid of the other 10 cysts indicated malignancy, which was confirmed histologically in only 4 cases. According to the findings of this study, cytological examination has little reliability in diagnosing the true nature of ovarian cysts [17].

Sood et al. in a study on 57 aspirates from 50 patients found the overall sensitivity of cytology in diagnosing neoplastic and non-neoplastic ovarian lesions as 93.9% and the specificity as 100%. According the results of their study the positive predictive value was 100% and negative predictive value 90.9% and the overall diagnostic accuracy was 96.2 % [18]. Recently Gupta et al., in a retrospective study of ultrasound-guided (US) FNAC of 584 ovarian lesions evaluated that FNAC sensitivity for a diagnosis of malignancy was 85.7%, specificity 98.0%, positive predictive value 97.7%, negative predictive value 87.7% and accuracy 92.0%. They concluded that FNAC has a high specificity for diagnosis

of ovarian/adnexal lesions but greater experience is required for the accurate subtyping of neoplasms and sensitivity is limited by inconclusive/inadequate results [19].

The number of cases who studies each year by our center pathologists is more than 500 cases. In conclusion we found that FNA technique does not have enough sensitivity to detect malignancy in aspirated masses in our hospital. We don't recommend the routine use of this technique to evaluation of adnexal masses. As Layfield found, FNA technique is an excellent method for the detection of recurrent or metastatic disease in patients being followed for malignancies but when FNA is used for the management of newly diagnosed adnexal masses, patient selection is critical [20].

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