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EVALUATE THE RELIABILITY OF FINE-NEEDLE ASPIRATION CYTOLOGY (FNAC) IN DETERMINING THE ACCURATE DIAGNOSIS OF THORACIC LESIONS

Dr. Ahmed Nooruldeen Abdulrahman
Senior specialist in Diagnostic Radiology .M.B.Ch.B, FCABMS (Rad) AL Sheikh Zayied Hospital

Dr. Haider Hussain Salman
M.B.CH.B /F.I.C.M.S. Consultant in anesthesia and intensive care .Subspeciality in an interventional pain management

Introduction:

Fine needle aspiration cytology (FNAC) involves studying cells obtained with a small gauge needle and vacuum system(1). FNAC is safe, easy, painless, accurate, and cost-effective, especially for diagnosing chest densities(2). It is increasingly used to diagnose thoracic diseases, with improved accuracy and safety due to imaging advancements and smaller needles. FNAC can be performed on various body areas, including masses visible only through imaging, for diagnostic and therapeutic purposes.(2). Chest ultrasound is beneficial for assessing various chest lesions. Fine Needle Aspiration (FNA) is performed under ultrasound guidance using specific tools.(1,2). Ultrasound guidance is effective in sampling lung and mediastinal masses. Ultrasound-guided thoracentesis is useful for hard-to-reach pleural effusions (3).

Percutaneous needle aspiration has a long history in diagnosing pulmonary lesions. Leyden and Mentetrier were pioneers in needle aspiration techniques for lung diseases. The widespread use of percutaneous needle aspiration began in the late 1940s. (4) .Percutaneous needle aspiration was used in the 1960s with x-ray screening and cutting needle. In 1965, Anderson and Coworkers used needle aspiration with a rigid scope.(5). Authors used different methods for cytological diagnosis based on symptoms, signs, x-ray findings, and examination purpose (5,6).

The thoracic cage includes sternum, 12 thoracic vertebrae, 10 pairs of ribs, and 2 pairs of floating ribs(7).. The thoracic inlet is a structural ring made up of the sternal manubrium, first ribs, and vertebral column. The chest floor is supported by the diaphragm. The mediastinum is the central cavity of the thorax, bordered by pleural cavities, diaphragm, and merging with the thoracic inlet.(8,9) .

The trachea and bronchi are lined with ciliated columnar cells and goblet cells(10). Basal cells are at the bottom, followed by intermediate cells that differentiate into goblet and ciliated columnar cells. Goblet cells are less common in segmental bronchi and absent in bronchioles. Alveoli consist of epithelial cells, macrophages, interstitial cells, and capillary endothelial cells. There are two types of alveolar epithelial cells - type I and type II pneumocytes. Type I cells cover most of the alveolar wall with few organelles and high sensitivity to damage.(1). Type II cells are taller, more numerous, and contain various organelles including surfactant vacuoles. Bronchial glands in bronchi's submucosal layer have mucous and serous cells (10)

Indications of fine needle aspiration cytology: (1,11)

1. Solitary lung shadows in well-defined masses, common in older age group (>60 years) and non-calcified lesions.
2. Diagnosis needed for patients unfit for surgery due to age or respiratory conditions.
3. Diagnosis also needed for patients with inoperable lung lesions, such as those with primary neoplasm or large lesions.
4. Non-surgically treated malignant tumors like mediastinal lymphoma respond better to radiotherapy or chemotherapy.(12).
5. Distinguishing between secondary pulmonary metastasis in patients is also important(13).
6. Identifying causative agents in inflammatory conditions through full microbiological study of suspicious cases in immune-compromised patients(5).
7. Diagnosing potentially respectable localized solitary tumors, primary or secondary, especially in the periphery.
8. Performing staging procedures to assess endo-bronchial tumors and extrinsic peribranchial areas for nodal involvement in pleural masses.
9. Diagnosing symptomless surgically treatable hamartomas and differentiating them from neoplastic lesions(14)..

Contraindications and precautions for fine needle aspiration:

include avoiding aspiration in hydatid cyst cases and cautious aspiration in patients with coagulation defects and pulmonary hypertension. Precautions are also necessary for patients with lack of cooperation, uncontrolled cough, vascular lesions, previous pneumonectomy, and advanced emphysema or severe COAD(14,15).

Complications of fine needle aspiration:

include pneumothorax, which can be reduced by skilled clinicians, avoiding wide bore needles, and considering factors like lesion location, age, repeated punctures, and underlying lung disease. Hemoptysis incidence is higher with central or infiltrative lesions. Shock can occur in a small percentage due to vasovagal or hypovolemic reasons. Hemothorax and nonfatal cardiac tamponade could happen. Infection like Pyothorax(7). is possible. Air embolism may occur from lung aspiration(16). Implantation in needle tract is rare but serious(6).. Death cases linked to large needles exist, not with FNA. Fine Needle Aspiration Cytology is for patients with suspicious lung field abnormalities, needing specific criteria for accurate diagnosis:(17).

Pulmonary lesions are categorized into:

Benign lesions may include infectious lesions which require aspiration for various reasons: (18). Aspiration is not advised for lung cysts without excluding hydatid. Benign tumors in the bronchus and lung are uncommon and do not exfoliate. Other conditions like pneumoconiosis and chronic interstitial lung disease require careful diagnosis, often through tissue biopsy. Pulmonary infarct, amyloidosis, and eosinophilic pneumonia are among the conditions to consider. Malignant lesions, particularly epithelial neoplasms, are the leading cause of cancer deaths(3,19).. They can be primary or secondary, with primary tumors presenting with various signs and symptoms. Secondary lesions are mostly asymptomatic and are often detected during follow-up. (13).

Fine Needle Aspiration Cytology of Mediastinal lesions: (20)

Nordstrom pioneered mediastinal lesion evaluation through needle aspiration guided by radiology. Aspiration in vascular lesions or superior vena-cava syndrome requires caution. Needle insertion approach varies based on lesion location. Different approaches are preferred for superior, anterior, and posterior or subcarinal lesions. Typically, middle mediastinum lesions are not punctured but accidental punctures of large vessels are now found to be less risky. Patients with mediastinal lesions often present similar clinical and radiological features.

FNA of mediastinal lesions is indicated for various purposes such as evaluation of unknown masses, staging, diagnosing inaccessible lesions, metastatic disease, non-surgically treatable lesions, and evaluating relapse post-therapy. Needle aspiration can provide a definitive diagnosis or guide further diagnostic procedures. (13,21).

Cytologically we Classify Malignant Specimens into: (22) Malignant specimens can be classified cytologically as unsatisfactory due to various reasons or satisfactory. i dentification of cell type is crucial in positive cases with major malignancy criteria, dictating therapy for lung cancer subtypes: small cell carcinoma and non-small cell carcinoma. Suspicious cytological samples pose challenges due to lack of abnormal cells, where radiological findings guide repeat aspiration or immediate biopsy.

Lung cancer's histologic progression:(23(includes basal cell proliferation, metaplasia, dysplasia, and infiltration. Spread occurs to lymph nodes and through hematogenous dissemination.

FNA criteria differentiate benign and malignant lesions(14) based on cellularity, dyshesion, monomorphism, anisonucleosis, and irregular nuclear membrane. Minor criteria include chromatin clumping, binucleation, loss of polarity, nuclear crowding, and necrotic debris presence. Benign lesions show paucity of cells, cohesive properties, polymorphism, and regular nuclear membrane, among other criteria.

The Sensitivity and Specificity of FNA

A- Sensitivity issues(false -ve) are due to technical errors and hard-to-puncture lesions. lesions may result in poor aspirates. Lesions with necrosis, inflammation, and hemorrhage can also cause issues. Misinterpretation Neoplastic of findings can be improved with multiple observers.

B- Specificity (false + ve)problems are caused by fibrotic lung lesions and respiratory cytological atypia. Various conditions and factors contribute to misdiagnosis. The use of proper technique and immediate sample handling can reduce unsatisfactory aspirates. Benign lesions are harder to diagnose accurately than malignant ones. (24).Accuracy of FNAC Factors affecting FNAC accuracy include location, size, depth, patient cooperation, and lesion type. (25)

MATERIALS AND METHODS

This is a study that was carried on 60 consecutive patients With Solitary Peripheral chest nodules less than 3 cm, whom were examined between April 2011 and January 2012 They were 35 males (58.3%) and 25 females (41.7%). Their ages were ranged from 14 to 85 years (mean of 58 years). Sonographicaly guided FNA was performed in all cases. They were referred when no definitive diagnosis could be established by other methods including sputum cytology and bronchoscopy in spite of a positive x-ray and cross sectional study(C.T examination).

Patients were placed in the supine, prone, right lateral or left lateral position depending on the location of the lesion so that the lesion was nearest to the aspirator. Lesions we considered in our study were peripheral when 1-3 cm in diameter and within 4 cm from the skin

Sonographic equipment: Use linear array/convex-electronic array scanners for examinations. Perform all examinations with a single operator at Al-Kadhimyia teaching hospital. Biopsy transducer has central channel for needle guidance and real-time evaluation for proper aspirate.

Measurements: Define mass as area with weak or absent echoes compared to aerated lung and soft tissues. Measure distance between mass and thoracic wall using chest x-ray & C.T. Sonographicaly measure needle path from skin surface to mass using electronic calipers.

Methods of obtaining the sample: Locate nodule using chest roentgenogram/CT. Perform sonographic examinations with electronic array scanner. Prepare skin with antiseptic solution, use local anesthetics, puncture under U/S guidance with spinal needle. Advance needle towards lesion under U/S guidance, use breath holding technique when needed. Confirm needle location by U/S showing needle tip moving with lesion. Remove stylet and attach a (10-cc) syringe. the spinal needle was manipulated during suction before being removed. Material was spread on slides and sample adequacy was assessed. The slides were fixed in ethyl alcohol for 30 minutes.

Follow up of patients

Patients were observed post-procedure without routine chest x-rays. Symptoms like shortness of breath or chest pain prompted chest x-rays. Patients were discharged with instructions to return for symptoms. Challenges in FNAC of peripheral chest opacities include elderly patients and unsatisfactory samples. Proper technique and teamwork can address unsatisfactory samples. Suspicious samples can be managed through immediate fixation and correlation with clinical and radiological findings.

RESULTS

The number of our patients who presented with pulmonary and (anterior/posterior) mediastinal masses varied greatly according to age group •The most common age group affected was 41–70 years (67.5%),with a peak between (60-69) years. However age groups in both extremes of life were affected less.

Table (1) show the age distribution amongst these patients

Age	Number	percentage
10-19	1	1.67
20-29	1	1.67
30-39	2	3.33
40-49	8	13.34
50-59	15	25
60-69	21	35
70-79	10	16.66
80-89	2	3.33
Total	60	100%

Table (2) show this sex distribution

Sex	Number	percentage
Male	35	58.33
Female	25	41.67
Total	60	100%

Regarding the sex distribution: 35 male patients' (58.33%) and 25 -female patients (41,67%) were encountered, with a total of 60 patients A male preponderance was therefore noted in this study with a M:F

ratio of 1.5 Regarding the age and sex distribution of patients with malignant lesions, there were 52 patients (89.2%), and of these 30(57.7%) were males and 22 (42.3%)were females. (Table 3&4). While for patients with benign lesions, there were 8 patients (10.8%), and of these 5(62.5%) were males and 3 (37.5%)were females. (Table 5& 6).

Clinical presentation:

Malignant lung tumors show common signs like chronic cough, dyspnea, hemoptysis, and chest pain in most cases. Secondary deposits can lead to symptoms such as shortness of breath due to pleural effusion or liver metastasis-related symptoms. Patients commonly experience general symptoms like anorexia, weight loss, and malaise, but no cases involve paraneoplastic syndrome. Mediastinal malignant lesions often present with local pressure effects like dyspnea, SVC obstruction, or pleural effusion. Benign pulmonary lesions have symptoms such as chronic cough, hemoptysis, fever, and shortness of breath.

Table (3): Age Distribution of patients with malignant lesions.

Age group	Number	percentage
10-19	1	1.92
20-29	1	1.92
30-39	2	3.84
40-49	9	17.31
50-59	12	23.07
60-69	16	30.76
70-79	9	17.30
80-89	2	3.84
Total	52	100%

Table (4): Sex Distribution of patients with malignant lesions

Sex	Number	percentage
Female	22	42.30
Male	30	57.7
Total	52	100%

A benign mediastinal lesion, non-invasive thymoma, clinically manifests as myasthenia.

Regarding tables 7,8,9 & 10 The most common malignant lesion seen was adenocarcinoma in 17 cases (34.69%), Two of these were diagnosed as bronchoalveolar carcinoma Squamous cell carcinoma was diagnosed in 16 cases (32.65%), poorly differentiated 6 cases(12.65%),small cell in 5 cases(10%) , metastasis 5 cases(10.2%),.the metastatic lesions were 2 from breast ,1 from uterine lieomyiosarcoma,1 case from hepatocellular ca., and 1 from prostatic primary Adenocarcinoma was the commonest malignancy seen in females. Three out of four females positive for malignancy were diagnosed as adenocarcinoma. However, adenocarcinoma was still more common in males overall with a M:F ratio of 2.3:1. Squamous cell carcinoma was the commonest malignancy seen in males with a

M: F ratio of 3.5:1. While in mediastinal lesions, lymphoma were the commonest, two cases (66.6%), and thymic carcinoma in one case(33%)

Regarding the benign lesions ▶ representing 8 cases , seven cases of them (11.66%),were pulmonary benign masses ,& 1 case (1.67%) was a mediastinal benign lesion :

The commonest pulmonary benign lesion was Tuberculosis infection, 5 cases (66.6%), and each of granuloma & infection (interlobar sequestration) was 1 case (33.3%). Finally, the benign mediastinal lesion was thymoma (noninvasive type) in one case (1.67%)

Correlation between FNAC & other maneuvers:

Previous reports have conflicted with one another regarding the accuracy of U/S Guided FNAC for the diagnosis of small and large thoracic lesions(14,20) .Hayat et al reported that the diagnostic accuracy was higher for large (>2-cm) peripheral pulmonary carcinomas (94%) than for small ones (75%). Li et al (18)also found that the diagnostic yield was lower for small (<1.5 cm in diameter) peripheral pulmonary nodules (74%) than for large ones (96%). However, equal diagnostic accuracies for large and small thoracic lesions have been reported in other studies . In our study we were find that a high diagnostic yield of US guided FNAC , as we obtain a definite diagnosis in sixteen cases (26.67%) by Bronchoscope in these peripheral lesions, and in 22 patients (36.66%)with exfoliative cytology(sputum, wash), while in all patients were we did FNAC guided by US we reach the diagnosis.

Table (5): Age Distribution of patients with benign lesions

Age group	Number	percentage
40-49	1	12.5
50-59	3	37.5
60-69	3	37.5
70-79	1	12.5
Total	8	100%

Table (6): Sex Distribution of patients with benign lesions

Sex	Number	percentage
Female	3	37.5
Male	5	62.5
Total	8	100%

Correlation between histopathology and FNAC results:

we were able to correlate cytological results in (26) malignant peripheral primary lung lesions with histopathology,we have 4 (13.1%)false negative results , no false positive results ,giving a sensitivity of (86.9%) and a specificity of 100% since no false positive reading .The reported accuracy of a sensitivity of diagnosis made on the basis of U/S FNAC ranges from 56% to 90% and is more commonly about 60%–85%. In the study by Calhoun et al, transthoracic fine-needle aspiration yielded a specific diagnosis in (89%). Association between primary lung tumors and smoking was examined. Forty-two smokers were males, 38 had malignancy (90.47%). Squamous cell carcinoma was in 18 cases (47.36%), adenocarcinoma in 14 (36.84%), and one had bronchioalveolar carcinoma. Six cases (15.78%) were small cell carcinoma. Findings were mostly similar to other literature, except for BAC due to cultural and environmental factors. Smokers had a strong predisposition to develop lung carcinoma, with squamous cell carcinoma being the most common malignancy.

Table (7): Malignant Pulmonary Lesions

Type of pulmonary Malignancy	- Number	percentage
Adeno ca.	17	34.69
Sq. cell ca.	16	32.65

Poorly diff. Ca.	**6**	**12.25**
Small cell ca.	**5**	**10.2**
metastasis	**5**	**10.2**
Total	**49**	**100%**

Table (8): Malignant mediastinal lesions:

Type of mediastinal malignancy	Number	Percentage
Lymphoma	**2**	**66.67**
Thymic carcinoma	**1**	**33.33**
total	**3**	**100**

Complications encountered were minimal with two patients having shortness of breath due to shallow pneumothorax but did not need chest tube. One patient had chest pain that faded in three hours with analgesia and negative x-ray. Two patients had minor hemoptysis that stopped quickly with negative x-ray. No complications reported after discharge and no mortality in the series.

Table (9) benign pulmonary lesions

Type of pulmonary benignity	Number.	Percentage
TB infection	**5**	**66.67**
granuloma	**1**	**33.33**
Infection(ILS)	**1**	**33.33**
total	**7**	**100**

Table (10): benign mediastinal mass

Type of benign mediastinal mass	Number	Percentage
Thymoma(noninvasive)	**1**	**1.67**

Table (11) comparison of diagnostic accuracy of FNA & exfoliative cytology/Bronchoscope, regarding tumor site in 60 patient with peripheral lung lesions:

METHOD	Number	Percentage
Bronchoscope	**16/60**	**26.67**
Exfoliative cytology(sputum, wash)	**22/60**	**36.66**
FNAC	**60/60**	**100**

Table (12) compares between the accuracy of FNA & histopathology in the diagnosis of peripheral primary malignant chest lesions:

FNAC	Number	Percentage
True positive +ve	**28**	**86,9%**
False negative -ve	**4**	**13.1%**
False positive +ve	**0**	**0**

FNAC=fine needle aspiration culture.

Table (13) smoking and primary malignant lung tumors

History of smoking	Number	Percentage (%)
present	42	70
Absent	18	30
Total	60	100

THE DISCUSSION

Lung cancer is considered one of the most prevalent visceral malignancies, contributing to a third of all cancer-related deaths annually(1). Globally, there are approximately 140,000 new cases each year, with a rising incidence rate(2). In Iraq, lung cancer holds the top position among males and the seventh position among females, as reported by the Tumor Registry Centre in 1991. This trend is reflected in the case studies discussed herein, where 81.66% of the cases (49 out of 60) were diagnosed with malignant lung cancer. Fine needle aspiration is a commonly performed procedure, particularly for peripherally located lesions. While the primary goal of this procedure is to confirm malignancy, it can also aid in diagnosing benign neoplasms and infectious conditions like tuberculosis.(27) In prior series, fluoroscopy was extensively used for needle guidance. However, over time, ultrasonically and computed tomography-guided methods have largely replaced this approach. When comparing computerized tomography to ultrasound, factors such as radiation exposure, accessibility, bedside application, cost-effectiveness, and real-time assessment capabilities come into play(5). Peripheral thoracic lesions are often challenging to assess using fiberoptic bronchoscopy, leading to low diagnostic yields with bronchoscopy biopsies(28). Some experts have suggested more aggressive diagnostic techniques like thoracotomy or thoracoscopic biopsy for small peripheral thoracic lesions(29). Nevertheless, this approach may subject patients to unnecessary surgical interventions, especially those with benign lesions or metastatic tumors. Additionally, a subset of patients may not be suitable candidates for surgery due to medical fragility or the nature of the underlying malignancy, as seen in small cell lung cancer and lymphoma cases(5). To confirm the diagnosis of chest opacities, we utilized fine needles ranging from gauge 18-23 to collect cytologic specimens, aiming to minimize the risks associated with percutaneous needle aspiration when larger gauges are employed. For peripheral lung cancers with lesions sized between 1-4cm, transbronchial brushing/curettage cytology via fiberoptic bronchoscopy and a 3-day sputum cytology collection have shown efficacy, albeit to a lesser extent than percutaneous needle cytology(6).

In our investigation, we were able to visualize all masses identified through chest x-ray/Computed tomography, and successful puncture was achieved in all patients, contrasting with findings from previous studies such as Pedersen and Aasen in 1996, where only 93% of masses were visualized through sonography, and a puncture success rate of 79% was observed(7). This divergence could possibly be elucidated by advancements in U/S machine technology and the accrued expertise over recent years. In three instances (6.5%), repeated aspiration was necessary to procure adequate material due to inadequacy during the initial attempt. These repeat aspirations were prompted by strong suspicions of malignancy based on clinical and radiological evaluations. Literature reports a repeat aspiration rate of 13% following inconclusive first aspirations(8). The current study exhibited a male predominance with a male-to-female ratio of 1.4:1. Ratios in lung lesions reported by different researchers range from 1.4:1 to 2.6:1. This gender disparity is attributed to a higher prevalence of risk factors like smoking, COPD, and alcoholism among males(9). In our study, 52 patients (89.2%) tested positive for malignancy, aligning with findings from various sources indicating malignant tumor incidence on lung FNAC ranging from 58% to 88%(30). Adenocarcinoma emerged as the most common tumor in female patients, with three out of four females receiving this diagnosis. Nonetheless, adenocarcinoma remains more prevalent in males overall, with a male-to-female ratio of 2.3:1. Conversely, squamous cell carcinoma was the predominant tumor among

males, with a male-to-female ratio of 3.5:1. Lung cancer typically affects individuals in middle to late stages of life, with lower incidences below the age of 35, peaking around 60 years, and gradually decreasing thereafter. Among our cases, seventeen were diagnosed with adenocarcinoma (34.69%), including two instances of bronchioloalveolar carcinoma, closely followed by sixteen cases of squamous cell carcinoma (32.65%). Despite squamous cell carcinoma historically being considered the most common lung tumor, recent studies suggest that adenocarcinoma may have surpassed it in terms of occurrence(12).

Bronchioloalveolar carcinoma was identified in two cases in our study (11%) among those diagnosed with adenocarcinoma. One of these patients had a history of smoking (7.1%). BAC accounts for 1-9% of all lung cancer cases across different research studies.(13) squamous cell carcinomas have a higher prevalence in individuals with a history of smoking compared to other types. Over 75% of these cases are still identified in patients who smoke (15). Various literature sources have indicated that poorly differentiated Ca accounts for 7-15% of primary malignant pulmonary histological subtypes (31). In our research, we encountered 6 cases (12.25%) belonging to this specific subtype. Small cell carcinoma represents 10-20% of cases (31). In our investigation, we identified five cases (10.2%) as small cell carcinoma. Our study also found 5 cases (10.2%) classified as Metastatic solitary lesions, including 2 cases from breast cancer, one case of leiomyosarcoma, one case of hepatocellular carcinoma, and one case of primary prostatic cancer. Yang et al. (1992) previously reported that the diagnostic accuracy of transthoracic fine-needle aspiration cytology for metastatic lung cancer ranged from 63% to 86%. Moreover, the diagnostic precision for mediastinal tumors like lymphomas, thymomas, and germ cell tumors was lower compared to lung cancer (31). Greene et al. demonstrated an 87% specific benign diagnosis rate using supplementary tissue core histologic analysis for patients with benign lesions (25). Other sources have reported a range of 52% to 91% accuracy for specific benign diagnoses with transthoracic FNAC. In our study, there were 8 patients (10.8%), with 5 (62.5%) males and 3 (37.5%) females. Among these, seven cases (11.66%) were pulmonary benign masses, and one case (1.67%) was a mediastinal benign lesion. The most common pulmonary benign lesion observed was Tuberculosis infection, accounting for 66.6% of cases. Granuloma and infection (interlobar sequestration) each represented 33.3% of cases. These findings were consistent with studies by Calhoun et al. (17), except for the final case. In our research, the rate of simple complications observed was notably low (4.16%) and managed conservatively, with no reported mortality. Previous studies have highlighted the increased risks of pneumothorax and bleeding associated with the use of various needles for specimen collection. The appropriate selection of patients, patient cooperation, utilization of fine needles, and ultrasound guidance were crucial factors in reducing complications, particularly pneumothorax, in our study. Dorthey and Harold reported rates of pneumothorax ranging from 20% to 40% in their research conducted in 1984 (20).

in a study conducted by Baily and Miller in 1980, pneumothorax incidence was reported to be 11% during fluoroscopically guided aspiration. However, our study revealed a mere 2 cases (1.66%) of shallow pneumothorax, consistent with the findings of Pederson and Aasen in 1996 (2%). The low occurrence of pneumothorax in our study was attributed to several factors(32)

Firstly, by inserting the needle through the chest wall along the shortest distance to the mass, bypassing a minimal amount of aerated lung tissue. In cases where the mass is connected to the chest wall and visible on ultrasound, lung penetration may be unnecessary. Secondly, utilizing fine needles within the 18-23 gauge range for aspiration. Lastly, employing ultrasound guidance to ensure accurate placement of the needle within the mass with a single puncture.

Regarding Histopathology Correlation:

Successful cytology laboratories require a robust quality control program, which includes:- Establishing a correlation between cytological diagnoses and clinical, histopathological, surgical, and autopsy findings. - Rescreening cases that exhibit inconsistencies between cytology, histology, or clinical data. - Providing records of prior histological and cytological examinations for each patient. In our study, correlation was

established (25)for malignant peripheral chest lesions. Tissue biopsies were procured through open thoracotomy, fiberoptic bronchoscopy, or transbronchial biopsy based on lesion location and patient condition. We encountered a 13.1% false-negative rate, with aspiration cytology demonstrating a sensitivity of 86.9% and specificity of 100%. Patients who did not undergo tissue biopsies were typically elderly or had poor cardiopulmonary health, rendering them unsuitable for invasive procedures. It is noteworthy that there is no autopsy research in our region to validate postmortem cases for a definitive diagnosis.

CONCLUSIONS

FNAC of chest lesions is a valuable diagnostic technique with high predictive value. This study proves the reliability and accuracy of FNAC in diagnosing chest lesions, especially for pulmonary malignant cases. A team approach involving patient history, clinician, radiologist, and cytopathologist can reduce diagnostic errors. Ultrasonically guided FNAC should be carefully considered for intrathoracic lesions despite economic and patient-related challenges. Lung cancer is prevalent in Iraq, so establishing FNAC units in hospitals with a team of specialists can aid in early detection and accurate diagnosis. Ultrasonically guided FNAC should be an option when other diagnostic methods are ineffective or unsuitable. Future studies should expand on this research topic with more samples and research points.

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