

## CLINICOPATHOLOGICAL ASSESSMENT OF LUNG LESIONS IN A SAMPLE OF IRAQI PATIENTS

Aisha O. Jasim\*<sup>1</sup>, Alaa Gh. H. Mubarak<sup>2</sup> and Ban J. Qasim<sup>2</sup>

<sup>1</sup>Dept. of Pathology/ Al-Imamin Al-Kadhmain AS Medical City.

<sup>2</sup>Dept. of Pathology/ Col. of Medicine/Al-Nahrain University.

Article Received date: 22 November 2023

Article Revised date: 12 December 2023

Article Accepted date: 02 January 2024



\*Corresponding Author: Aisha O. Jasim

Dept. of Pathology/ Al-Imamin Al-Kadhmain AS Medical City.

### ABSTRACT

**Background:** Diseases of the lung can be classified into four general categories: obstructive lung disease; restrictive lung disease; infectious disease; and neoplastic disease. In Iraq lung cancer was the second most commonly diagnosed cancer and was the second leading cause of cancer death in both sexes combined.

**Objective:** The aim of this study is to assess the correlation between histopathological diagnosis (benign and malignant lesions) and different clinico-pathological parameters (Age, sex, lesion site, type of surgical intervention, gross features, grade, pathological stage and lymph node status) in this study. **Methods:** A retrospective study including analysis of 97 randomly selected patients with lung lesions collected from Teaching Laboratories of Ghazi Al-Harriri teaching hospital, from 2020 to 2023. **Results:** Lung lesions found to be more frequent in male (62.9%), (60-69) year is the most frequent age group, benign lesions constitutes (38.1%), malignant lesions (61.9%), bronchiectasis is the most common benign lesion (37.8%), female: male ratio 1:1.3, most common age group (20-29)(18.9%), most common site is left lower lobe (29.7%), adenocarcinoma is the most common lung cancer (45%), female: male ratio 1:2, most frequent age group (60-69) (40%), most common site is right upper lobe (26.7%), most common grade is poorly differentiated (51.2%) and most common stage is T2aN0. **Conclusion:** Most of the cases were between 60-69 years old and female: male ratio was 1:1.6; bronchiectasis is most frequent encountered benign lung lesion, adenocarcinoma is most common malignant cancer and most frequent pathological stage is T2aN0.

### INTRODUCTION

Diseases of the lung can be classified into four general categories: (1) obstructive lung disease; (2) restrictive lung disease; (3) infectious disease; and (4) neoplastic disease. The four main types of obstructive lung disease are emphysema, asthma, bronchiectasis, and chronic bronchitis.<sup>[1]</sup>

Bronchiectasis is the abnormal and persistent dilatation of the smaller bronchi and mainly the segmental or sub-segmental bronchi due to destruction of elastic tissues and muscles of the bronchial wall. Bronchiectasis is still an important health problem. Bacterial and viral infections are still ranked first in the etiology of bronchiectasis in developing countries, while immune deficiency syndromes (IgG, IgA deficiency), metabolic defects (cystic fibrosis, alpha-1 antitrypsin deficiency) and ultrastructural defects (primary ciliary dyskinesia) are dominant in developed countries.<sup>[2]</sup>

Restrictive lung disease can be divided into acute and chronic forms which can be subdivided by etiology (i.e.,

work related, drug induced, autoimmune, and idiopathic).<sup>[1]</sup>

Interstitial lung disease is a heterogeneous group consisting of more than 200 different disorders, requiring a multidisciplinary approach for diagnosis. Idiopathic pulmonary fibrosis, also known as usual interstitial pneumonia, is a chronic, progressive, and fibrotic. The etiology of it is unknown, IPF has a very poor prognosis.<sup>[1,3]</sup>

The seven major forms of infectious lung disease (i.e., pneumonia) are community-acquired typical; community-acquired atypical; nosocomial; aspiration; necrotizing pneumonia; chronic pneumonia (e.g., fungal, mycobacterial); and pneumonia in immunocompromised hosts.<sup>[1]</sup>

Despite the global introduction of a vaccine and the discovery of an effective four-drug treatment regimen, M. tuberculosis still likely infects approximately one-quarter of the world's population and is the leading

infectious cause of mortality worldwide. This could be due to socio-economic factors, lack of timely and accessible medical therapy, diverse manifestations of the disease and difficulties in identification of the organism. Furthermore, the development of drug resistance of varying levels such as multi-drug resistant has been on the increase.<sup>[4,5]</sup>

M. tuberculosis exists in either a metabolically inactive latent state or a metabolically active disease state. In this framework, about 5% of people infected with TB progress rapidly to active disease, while the vast majority of people develop a latent infection and remain at risk for progression to active disease ("reactivation").<sup>[4]</sup>

Hydatid disease, an infestation commonly caused by *Taenia echinococcus*, is still an important health and socio-economic problem. The disease has a worldwide distribution with areas of above-average disease prevalence in South-Eastern Europe, the Middle-East, North-, Central- and Eastern Asia and South-America. Lung is the second localization organ in adults after liver.<sup>[6,7]</sup>

Pediatric cystic lung lesions represent a rare group of predominantly benign pulmonary anomalies, including congenital pulmonary airway malformations (CPAM), bronchogenic cysts, bronchopulmonary sequestrations (BPS), and congenital lobar emphysema (CLE).<sup>[8]</sup>

In Iraq's GLOBOCAN data from 2020 made by international agency for research on cancer, in both sexes combined, lung cancer was the second most commonly diagnosed cancer and was the second leading cause of cancer death. Lung cancer is the most frequent cancer and the leading cause of cancer death among males while it was the eighth in women.<sup>[9]</sup>

Clinical management of Lung cancer highly depends on the histological subtype, the two major categories are: small-cell lung cancer (SCLC) and non-small-cell lung cancer (NSCLC). The first category constitutes 15%, and the second is responsible for approximately 85% of tumors. The two most common entities in the NSCLC category are pulmonary adenocarcinoma (ADC) and pulmonary squamous cell carcinoma (SqCC), together make up approximately 90% of all NSCLC.<sup>[10]</sup>

In addition there are the Lung neuroendocrine neoplasms (NENs) encompass four histologic subtypes. Accordingly, lung NENs include typical carcinoid (TC), atypical carcinoid (AC), large cell neuroendocrine carcinoma (LCNEC), and small cell lung carcinoma (SCLC).<sup>[11]</sup>

Although approximately 10 percent of lung cancers in asymptomatic patients are detected on chest radiographs, most patients are symptomatic when diagnosed, chest discomfort, cough, dyspnea, and hemoptysis are common manifestations of primary tumor occurring in 75 percent

of patients. In addition approximately 10 percent of patients with lung cancer develop systemic symptoms related to paraneoplastic syndromes. Common endocrine syndromes include hypercalcemia, syndrome of inappropriate antidiuretic hormone and Cushing's syndrome.<sup>[12]</sup>

The American joint committee on cancer adopted the 8th edition of the International Association for the Study of Lung Cancer's (IASLC) staging project and are based on the new TNM ('tumor, nodes and metastases') classification which is as follows:

T (Tumor): T1a  $\leq 1$  cm, T1b  $>1$  to 2 cm, T1c  $>2$  to 3 cm, T2a  $>3$  to 4 cm, T2b  $>4$  to 5 cm, T3  $>5$  to 7 cm and T4  $>7$  cm. Tis and T1mi were introduced for adenocarcinoma in situ and minimally invasive adenocarcinoma.

N (Node): N1 ipsilateral hilar node, N2 ipsilateral mediastinal or subcarinal node, N3 contralateral mediastinal or supraclavicular/scalene node.

M (Metastases): M1a, for intrathoracic metastases. Extrathoracic metastases have been reclassified into M1b; single extra-thoracic metastasis in a single organ or M1c; multiple extrathoracic metastases in a single organ or multiple organs.<sup>[13]</sup>

## MATERIAL AND METHODS

A retrospective study including analysis of 97 randomly selected patients with lung lesions collected from Teaching Laboratories of Ghazi Al-Hariri Hospital from February 2020 to October 2023.

The clinico-pathological data that were collected from patients pathology reports included:

- Age
- Sex
- Lesion site
- Type of surgical intervention (True cut biopsy, cystectomy, nodule resection, wedge resection, lobectomy or pneumonectomy)
- Gross findings, pathological stage and nodal status for resection specimen of malignant lesions
- Histopathological type and grade for the malignant lesions

## Exclusion Criteria

- Patients diagnosed with metastatic malignancy to the lung.
- Incomplete clinical or pathological data.

Formalin-fixed paraffin-embedded tissue blocks were collected. Then, sections 4-6 microns stained routinely with Hematoxylin & Eosin and the diagnosis was revised by two pathologists. All statistical analyses were performed utilizing SPSS, version 23 and including mean, standard deviation, frequency and percentage using Yates Chi square with p. value  $<0.05$  regarded as statistically significant.

**RESULTS**

**3.1 Age and sex distribution of the studied sample**

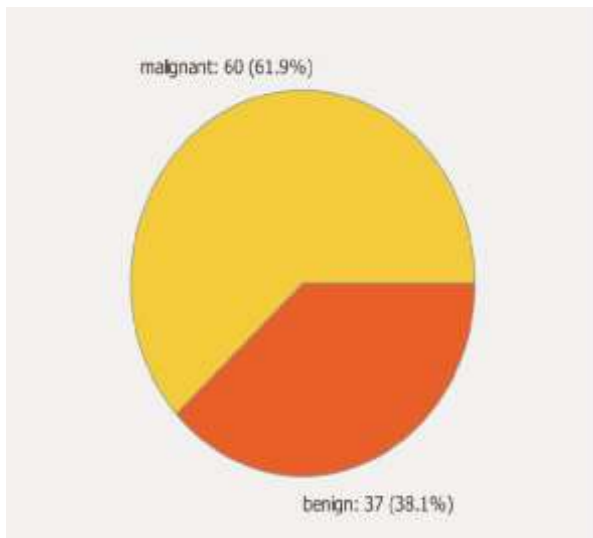
The total number of studied sample were 97 case. Regarding age, most of the cases were in the age group 60-69 years (25.8%). The female: male ratio was 1:1.69 as illustrated in table (1)

**Table (1): Age and sex distribution of all lung lesions.**

Age(yr)	Frequency	%
2-9	5	5.20
10-19	8	8.20
20-29	9	9.30
30-39	7	7.20
40-49	10	10.30
50-59	16	16.50
60-69	25	25.80
70-79	12	12.40
≥80	2	2.10
TOTAL	97	100
Sex	Frequency	%
Male	61	62.90
Female	36	37.10
TOTAL	97	100

**3.2 Histopathological types of the studied sample**

The total number of the studied sample is 97 cases, 37 (38.1%) case were benign lesions, and 60 (61.9%) cases were malignant lesions as shown in figure (1).



**Figure (1): Benign versus malignant lung lesions.**

**Benign lesions 3.3 Age and sex distribution of benign lesions**

Regarding age, most of the benign cases were in the age group 20-29 year (18.90%), median age (28) year with range of 28 days (male with congenital lobarempysema) and 78 years (female with bronchiectasis). As for sex, female: male ratio (1:1.3), as illustrated in table (2).

**Table (2): Age and sex distribution of benign lesions.**

Age (years)	Frequency	%
≤1	3	8.10
2-9	5	13.50
10-19	6	16.20
20-29	7	18.90
30-39	5	13.50
40-49	4	10.80
50-59	5	13.50
60-69	1	2.70
70-79	1	2.70
TOTAL	37	100
Sex	Frequency	%
Male	21	56.80
Female	16	43.20
TOTAL	37	100

**3.4 Site and types of surgical intervention of benign lesions**

The site and types of surgical intervention of benign lesions in the studied sample are illustrated in table (3), the most common side was right lung 22/37(59.5%), left lower lobe was the most common lung lobe involved by benign lung lesion 11/37(29.7%) and lobectomy is the most frequent type of intervention 25/37(67.6%).

**Table (3): Site and types of surgical intervention for benign lesions.**

Lung side of the lesion	Frequency	%
Right	22	59.50
Left	15	40.50
TOTAL	37	100
Site of the lesion	Frequency	%
Left lower lobe	11	29.70
Right lower lobe	9	24.30
Right middle lobe	5	13.50
Right Upper lobe	5	13.50
Left upper Lobe	4	10.80
Right multiple lobes	3	8.10
TOTAL	37	100
Type of intervention	Frequency	%
Lobectomy	25	67.60
True cut biopsy	4	10.80
Cystectomy	3	8.10
Wedge resection	3	8.10
Nodule resection	2	5.40
TOTAL	37	100

**3.5 Histopathological diagnosis of benign lesions**

A total number of 37(38.1%) benign lesions were included in this study among them 14/37 (37.8%) cases were diagnosed with bronchiectasis, 7 cases (18.9%) with hydatid cyst and 5 of 37 cases (13.5%) with tuberculosis, congenital airway malformation constituted 4/37(10.8%) and other lesions constituted 10/37 (18.9%), as illustrated in table (4).

**Table (4): Histopathological diagnosis of benign lesions.**

Diagnosis	Frequency	%
Bronchiectasis	14	37.80
Hydatid cyst	7	18.90
Tuberculosis	5	13.50
Tuberculosis and fungalinfection	2	5.40
Congenital lobar emphysema	2	5.40
Type 1 congenital airwaymalformation	1	2.70
Type 2 congenital pulmonaryairway malformation	1	2.70
Bronchiectasis withTuberculosis	1	2.70
Inflammatory Pseudotumor	1	2.70
Pneumonia and bronchitis	1	2.70
Fungal infection	1	2.70
Usual interstitial pneumonia	1	2.70
TOTAL	37	100

### 3.6 Distribution of the most common benign lesions in this study according to different variables

The three most common benign lesions in this study are bronchiectasis, hydatid cyst, and tuberculosis. Distribution of each according to age, sex and lesionsite is illustrated in table (5).

Bronchiectasis is found to be affecting females in a percentage of 12/14 (85.7%), and a male: female ratio of 1:6, regarding age there was equal percentages among age groups 2-19 and 20-39 years (35.7%), it's found to be affecting right lung in 8/14 (57.1%), and lower lobes

in 9/14 (64.3%).

42.9% of hydatid cyst cases were in the 2-19 year age group, 85.7% of the cases are male, female: male ratio 1:6, in 6/7 of cases right lung and lower lobes were affected (85.7%).

3/5 (60%) of tuberculosis cases were in the 20-39 year age group, female: male ratio 1:4, 5/5(100%) of cases in the right lung and there was equal percentages between upper and middle lobes of 40% each.

**Table (5): Distribution of the most common benign lesions according to age,sex and site of lesion.**

Variable	Bronchiectasis	Hydatid cyst	Tuberculosis
<b>Age:</b>			
<b>2-19</b>	5/ 5/4 (N)	3/2 /2 (N)	1/3/1 (N)
<b>20-39 ≥40 yr</b>	35.7/35.7 /28.6 (%)	42.9/28.6/28.6 (%)	20/60/20 (%)
<b>Sex</b>			
<b>Female</b>	12/2(N)	1/6 (N)	1/4 (N)
<b>Male</b>	85.7/14.3 (%)	14.3/85.7 (%)	20/80(%)
<b>Lung</b>			
<b>Right</b>	6/8 (N)	6/1 (N)	5 (N)
<b>Left</b>	42.9/57.1 (%)	85.7/14.3 (%)	100(%)
<b>Lobe</b>			
<b>Upper Middle</b>	0/4/9/1 (N)	0/0/6/1 (N)	2/2/1/0(N)
<b>Lower Multiple</b>	0/28.6/64.3/7.1 (%)	0/0/85.7/14.3 (%)	40/40/20/0 (%)

(N:Number)

### Malignant lesions 3.7 Age and sex distribution of malignant lesions

Regarding age, most of the malignant cases were in the age group 60-69 year 24/60(40.0%) median age (63) years with age ranged 17 years (male with typical carcinoid tumor) to 82 years (male with squamous cell carcinoma). As for sex, female to male ratio (1:2), as illustrated in table (6).

**Table (6): Age and sex distribution of malignant lesions.**

Age	Frequency	%
10-19	2	3.30
20-29	2	3.30
30-39	2	3.30
40-49	7	11.70
50-59	10	16.70
60-69	24	40.00
70-79	11	18.30
≥80	2	3.30
<b>TOTAL</b>	<b>60</b>	<b>100</b>
Sex	Frequency	%
Male	40	66.70
Female	20	33.30
<b>TOTAL</b>	<b>60</b>	<b>100</b>

### 3.8 Site and types of surgical intervention of malignant lesions

CT guided true cut biopsy by bronchoscope is the most common type of intervention used to diagnose malignant

lesions 34/60(56.7%), right lung is affected more than left lung in 36/60(60%) of cases and right upper lobe is involved slightly more than right lower lobe 16/47 (34.04%) vs 15/47 (31.91%), as illustrated in table (7).

**Table (7): Site and types of surgical intervention for malignant lesions.**

Lung side of the lesion	Frequency	%
Right	36	60.00
Left	22	36.70
Bilateral	2	3.30
<b>TOTAL</b>	<b>60</b>	<b>100</b>
Site	Frequency	%
Right upper lobe	16	34.04
Right lower lobe	15	31.91
Left upper lobe	9	19.14
Left lower lobe	5	10.63
Right multiple	2	4.25
<b>Total</b>	<b>47</b>	<b>100</b>
Types of intervention	Frequency	%
True cut biopsy	34	56.70
Lobectomy	19	31.70
Wedge resection	5	8.30
Pneumonectomy	2	3.30
<b>TOTAL</b>	<b>60</b>	<b>100</b>

### 3.9 Histopathological diagnoses of malignant lesions

Tumor size and pathological staging of malignant lesions (T and N stage), were assessed in the 26 cases of lobectomy, wedge resection and pneumonectomy and was found that the majority of tumors are of 4-5 cm in size 11/26(42%), and have a T stage of T2a in 6/26(23.1%) of cases and most commonly have nodal status of N0 13/26(50%), as for tumor grading most of the lesions were poorly differentiated in 21/41(51.2%) as illustrated in table (8).

Regarding histopathological diagnosis adenocarcinoma was the most common 27/60(45%) followed by squamous cell carcinoma 14/60(23.3%), small cell carcinoma and large cell neuroendocrine carcinoma both as 4/60 (6.70%) and typical carcinoid tumor and mucoepidermoid carcinoma both as 3/60 (5.0%) with other diagnoses as 5/60(8.5%) as illustrated in table (9).

**Table (8): Histopathological characteristics of malignant lesions.**

<b>Tumor size(cm)</b>	<b>Frequency</b>	<b>%</b>
≤3	7	26.90
4-5	11	42.30
6-7	5	19.20
>7	3	11.50
<b>TOTAL</b>	<b>26</b>	<b>100</b>
<b>Pathological(T stage)</b>	<b>Frequency</b>	<b>%</b>
Tis	1	3.80
T1	4	15.40
T1b	3	11.50
T2	4	15.40
T2a	6	23.10
T3	5	19.20
T4	3	11.50
<b>TOTAL</b>	<b>26</b>	<b>100</b>
<b>Pathological(N stage)</b>	<b>Frequency</b>	<b>%</b>
Nx	8	30.80
N0	13	50.00
N1	3	11.50
N2	2	7.70
<b>TOTAL</b>	<b>26</b>	<b>100</b>
<b>Grade</b>	<b>Frequency</b>	<b>%</b>
Well differentiated	2	4.90
Moderately differentiated	18	43.90
Poorly differentiated	21	51.20
<b>TOTAL</b>	<b>41</b>	<b>100</b>

**Table (9): Histopathological diagnosis of malignant lesions.**

<b>Histopathological diagnosis</b>	<b>Frequency</b>	<b>%</b>
Adenocarcinoma	27	45.00
Squamous cell carcinoma	14	23.30
Small cell carcinoma	4	6.70
Large cell neuroendocrine carcinoma	4	6.70
Mucoepidermoid carcinoma	3	5.00
Typical carcinoid tumor	3	5.00
Adenosquamous carcinoma	1	1.70
Adenocarcinoma in situ	1	1.70
Atypical carcinoid tumor	1	1.70
Large b cell lymphoma	1	1.70
Sarcomatoid carcinoma	1	1.70
<b>TOTAL</b>	<b>60</b>	<b>100</b>

### 3.10 Distribution of the most common malignant lesions according to different variables

The three most common malignant lesions in this study are adenocarcinoma, squamous cell carcinoma, small cell carcinoma. Distribution of each according to age, sex and lesion site is illustrated in table (10).

The age of the three is concentrated in the 60-79 year age group with percentages of (55.5%, 85.7%, 75%) for adenocarcinoma, squamous cell carcinoma and small cell carcinoma respectively.

There was also male predominance in all three malignant lesions with female: male ratio of 1:2, 1:1.8, and 1:3 for

adenocarcinoma, squamous cell carcinoma and small cell carcinoma respectively.

Right lung also was most commonly involved by adenocarcinoma, squamous cell carcinoma and small cell carcinoma by (51.9, 87.6 and 100%) respectively, however regarding lung lobes adenocarcinoma showed affinity towards lower lobes in (47.4%) while squamous cell carcinoma and small cell carcinoma affected more commonly upper lobes by percentages of (58.3%, 75%).



**Table (10): Distribution of the most common malignant lesions according to age, sex and site of lesion.**

Variable	Adenocarcinoma	Squamous cellcarcinoma	Small cellcarcinoma
<b>Age</b>			
40-59	10/15/2 (N)	2/12/0 (N)	1/3/0 (N)
60-79 ≥80	37/55.5/7.4 (%)	14.3/85.7 (%)	25/75 (%)
<b>Sex</b>			
Male	18/9 (N)	9/5 (N)	3/1 (N)
Female	66.7/33.3 (%)	64.3/35.7 (%)	75/25 (%)
<b>Lung</b>			
Right	14/11 (N)	11/3 (N)	4 (N)
Left	51.9/40.7 (%)	78.6/21.4 (%)	100 (%)
<b>Lobe Upper</b>	7/9/3(N)	8/6 (N)	3/1(N)
Lower Multiple	36.8/47.4/15.8 (%)	58.3/41.7 (%)	75/25 (%)

(N: Number)

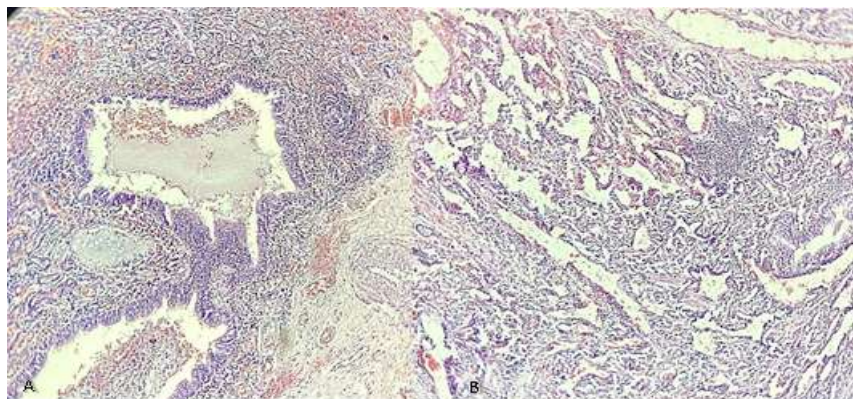
**3.11Relation between histopathological type (benign and malignant lesions) and different parameters in this study**

There was a statistically significant relationship between the histopathological diagnosis and the age group (p-value <0.001) implying that a benign or malignant lung

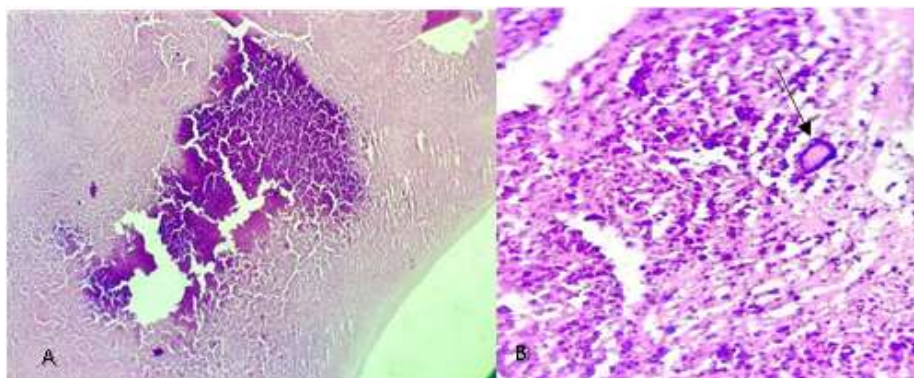
lesion has a tendency to occur in a specific age group, however there was no statistically significant relationship between the histopathological diagnosis and sex nor site of the lesion whether lung side or lobe (0.389, 0.917, 0.118 respectively) as illustrated in table (11).

**Table (11): Relation between benign versus malignant and different parameters in this study.**

Relation between benign versus malignant and p-value different variables	P-value
Histopathological type and age	<0.001
Histopathological type and sex	0.389
Histopathological type and side	0.917
Histopathological type and lobe	0.118



**Fig. (1): Bronchiectasis showing dilated bronchioles with mucus plugging (A) and mixed acute and chronic inflammation causing destruction of the wall (B). (A: H&E, 10x; B H&E, 40x).**



**Fig. (2): Tuberculosis with characteristic caseous necrosis (A) and granuloma containing multinucleated giant cells (arrow) (B). (A: H&E, 10x; B H&E, 40x).**

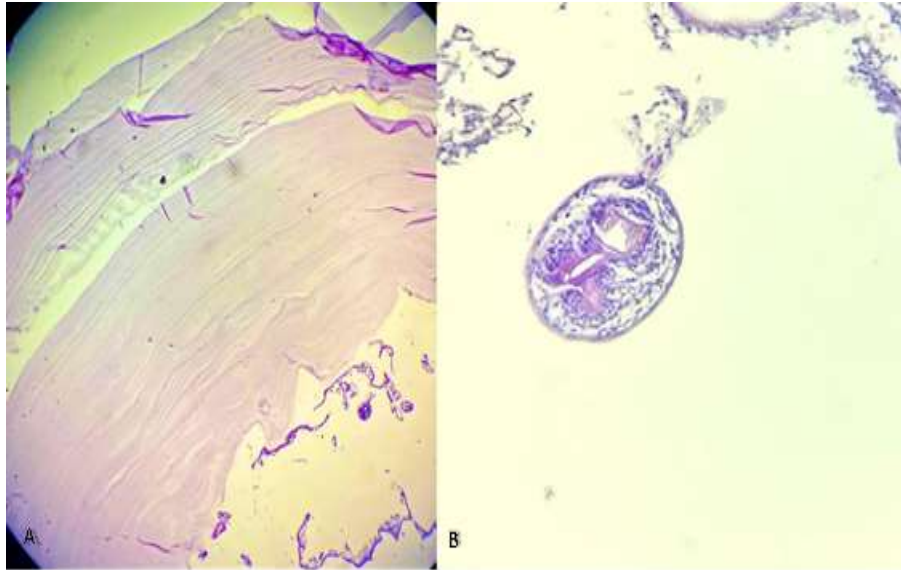


Fig. (3): Hydatid cyst showing characteristic outer acellular laminated membrane (A) and protoscolices (B). (A: H&E, 4x; B H&E, 40x).

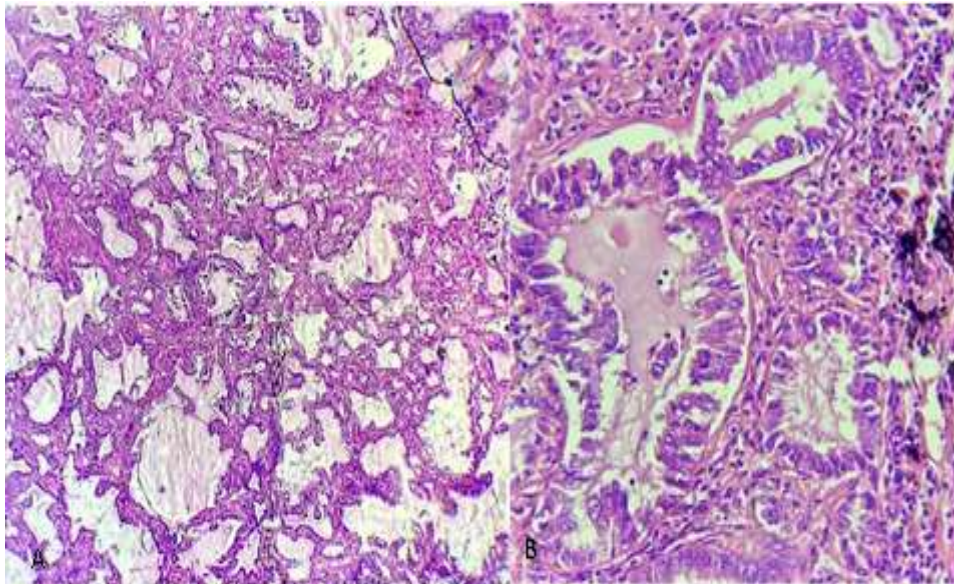


Fig. (4): Moderately differentiated Adenocarcinoma irregularly shaped glands filled with mucin. (A: H&E, 10x ; B H&E, 40x).

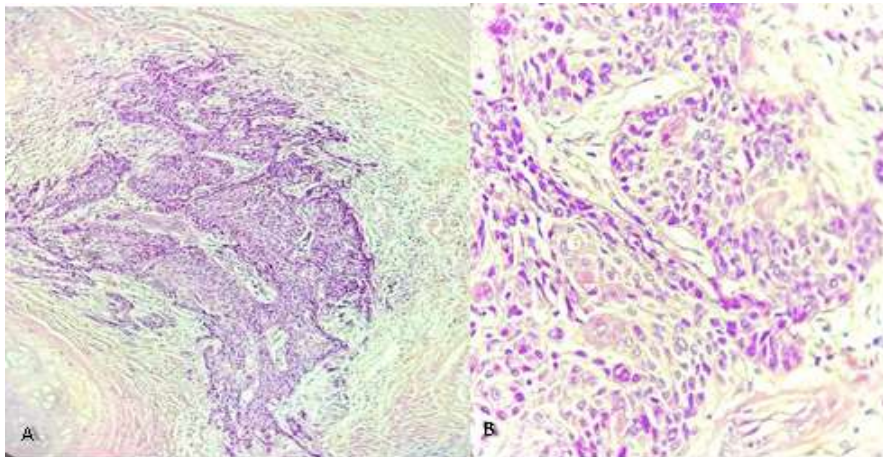
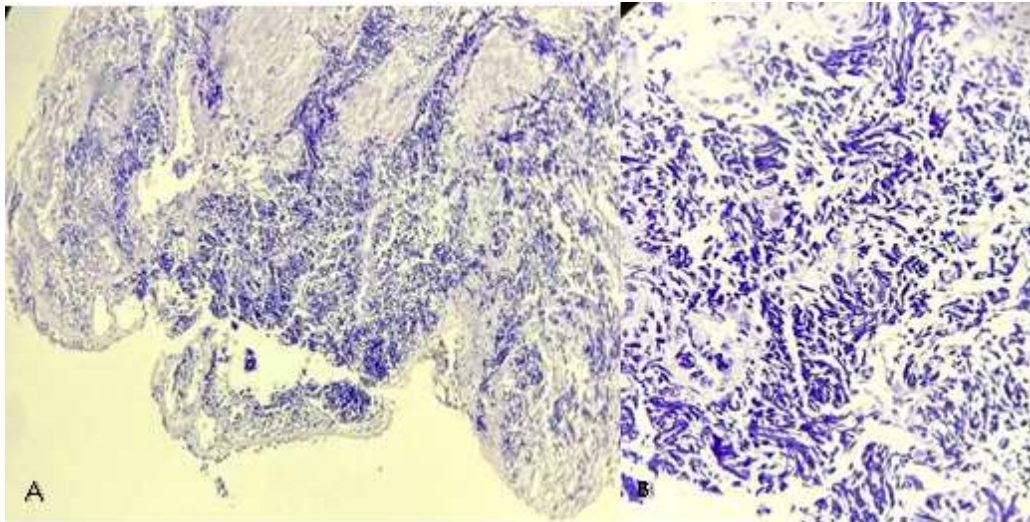


Fig. (5): Moderately differentiated squamous cell carcinoma with identified foci of keratinization. (A: H&E, 10x; B H&E, 40x).





**Fig. (6): Small cell carcinoma round, oval blue cells with characteristic molding and smudging. (A: H&E, 10x; B H&E, 40x).**

## DISCUSSION

In regard to the 37 benign lesions in this study it is found that bronchiectasis is the most common histopathologic diagnosis, females made up (85.7%) of the cases which was concordance with the study by AL-Hayali that showed female predominance by (68%). There was a wide age range affected by bronchiectasis with ages (2-19) and (20-39) affected equally (35.7%) for each, which were in discordant with the same study mentioned in which mean age is 47 years is indicating that pulmonary infections leading to bronchiectasis still constitutes major health problem even among young individuals.<sup>[14]</sup>

Right lung is affected more than left lung (57.1%) and lower lobe is affected more than upper lobes by (64.3%), which is in concordance with other similar studies such as by Nega B. et al. in Ethiopia in which left lung is affected more by (54.5%), and a study by Prieto D. in Portugal, in which lower lobes was affected by (56%).<sup>[15,16]</sup>

The smaller diameter and the greater angulation of the left main bronchus resulting in the greater drainage difficulty is the probable reason for the left lung predominance.<sup>[16,17]</sup>

Hydatid cyst being the second most common histopathological diagnosis in this study, it is found more in males (85.7%) and (42.9%) of cases are in the 2-19 year age group, which is in concordance with similar study by Hammodat O. M. et al. in which males constituted (61.9%), with age group 6-12 year most commonly involved by hydatid cyst by (35.6%).<sup>[18]</sup>

In this study hydatid cyst affected right lung more than left lung by (85.7%), and lower lobes were involved more by (85.7%), which is similar to study done by Shahriarirad, R. in southern Iran in which right lung is affected by (53.9%), and lower lobes by (74.8%).<sup>[19]</sup>

Tuberculosis constituted (13.5%) of benign cases in this

study, males made up (80%), of the cases which is in concordance with study by AL-Jubouri A. et al. in which males constituted (68%).<sup>[20]</sup>

The majority of patients (60%), were in the age group of 20-39 years which is in concordance with a study made by Sultan H. I. et al. in which the majority of patients were in the 21-40 years age group.<sup>[21]</sup>

Regarding site of lesion right lung was the predominant side involved by (100%) of cases, which is similar to other studies that showed right lung predominance such as a study by Hussain Z. S. in which right lung was involved by (45.1%), however regarding lung lobes there was equal percentages between upper and lower lobes, whilst it would have been expected as by many studies to have upper lobes predominance as in the same mentioned study upper lobes were affected by (68.8%), the probable reason to this is the small sample size of benign lesions in this study.<sup>[22]</sup>

Primary lung cancer is a major health issue because of its high incidence and lethal outcome. Being such an aggressive pathology, making a fast and correct diagnosis of lung cancer is vital for the survival of patients, and that requires multidisciplinary approach, having the cooperation of physicians, thoracic surgeons, radiologists, pathologists and oncologist for optimal management for patients.<sup>[23,24]</sup>

The majority of lung cancer patients in this study found is the 60-69 year age group (40%) this was similar to the study by Al.Sabah H. A. et al.<sup>[29]</sup>

Female to male ratio was 1:2 which was in concordance to the study by Al-rahim A. Y. et al. in which the female :male ratio was 1:2.5.<sup>[24]</sup>

By using CT guided bronchoscope true cut biopsies is the most common specimen received in Ghazi Al-Hariri

Labs to diagnose malignant lesions, it is found that right lung is the most common side involved by malignant tumors in (60%) of cases, which is in concordance with similar studies such as study by Hussain Z. S. et. al. in which right lung is also (60.5%).<sup>[25,31]</sup>

Right upper lobe was slightly the most common lobe involved (34.04%) by most malignant lung tumors and that finding was concordant with several other studies including one from Brazil by Lorenzoni. B. et al. who found that right upper predominance by (28%).<sup>[24,25,31,32]</sup>

Adenocarcinoma was also the most common histological diagnosis of malignant lung lesions made in our study (45%), and squamous cell carcinoma (23.3%) which is nearly similar to Schabath. M. B. et al. who found adenocarcinoma and squamous cell carcinoma percentages of (40%) and (20%) respectively, other studies found similar results as well.<sup>[27,28,31]</sup>

Regarding tumor staging this study showed most tumors had T2a (23.1%) and N0 (50%) at presentation which is a bit discordant with regional and world-wide presentation of lung cancer for the most common stage was T1N0 in a study by Irfan M. et. al. in Saudi Arabia (67%) and in the Chinese study by She y. et al. in which the majority of tumors are in stage T1b (33.5%), N0 (87.1%).<sup>[26,27]</sup>

Nevertheless in this study staging is better than previous studies done in our country in previous years in 2015 and 2018 (by Hussein Z. S. et al. and Al-Sabah H. A. et al. respectively) where in both of them advanced stage IV is the most common presenting stage.<sup>[25,30]</sup>

## CONCLUSION

Most of the cases were between 60-69 years old and female: male ratio was 1:1.6; bronchiectasis is most frequent encountered benign lung lesion, adenocarcinoma is most common malignant cancer and most frequent pathological stage is T2aN0.

## RECOMMENDATION

1. We recommend further prospective studies with a larger sample size, full history, clinical data, and radiography.
2. Inclusion of immunohistochemistry is important in for establishing the final diagnosis in difficult problematic cases such as (TTF1, NAPSIN A, P40, P63, Synaptophysin, Chromogranin).

## REFERENCES

1. Chapter 13. pulmonary pathology. Kemp W.L., & Burns D.K., & Brown T.G.(Eds.), *Pathology: The Big Picture*. McGraw, 2008.
2. Hill. <https://accessmedicine.mhmedical.com/content.aspx?bookid=499&sectionid=41568296>.
3. Hacıbrahimoglu G, Fazlioglu M, Olcmen A, Gurses A, Bedirhan MA. Surgical management of

- childhood bronchiectasis due to infectious disease. *J Thorac Cardiovasc Surg*, 2004 May; 127(5): 1361-5. doi: 10.1016/j.jtcvs.2003.11.018. PMID: 15115993.
4. Martinez-Pitre PJ, Sabbula BR, Cascella M. Restrictive Lung Disease.[Updated 2023 Jul 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing, 2023 Jan. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK560880/>
5. Drain PK, Bajema KL, Dowdy D, Dheda K, Naidoo K, Schumacher SG, MaS, Meermeier E, Lewinsohn DM, Sherman DR. Incipient and Subclinical Tuberculosis: a Clinical Review of Early Stages and Progression of Infection. *Clin Microbiol Rev.*, 2018 Jul 18; 31(4): e00021-18. doi: 10.1128/CMR.00021-18. PMID: 30021818; PMCID: PMC6148193.
6. Desai HM, Vaideeswar P, Gaikwad M, Amonkar GP. Pathology of pulmonary tuberculosis: has the tiger changed its stripes? *Autops Case Rep*, 2022 Apr 14; 12: e2021370. doi: 10.4322/acr.2021.370. PMID: 35496733; PMCID: PMC9037862.
7. Arinc S, Kosif A, Ertugrul M, Arpag H, Alpay L, Unal O, Devran O, Atasalihi A. Evaluation of pulmonary hydatid cyst cases. *Int J Surg*, 2009 Jun; 7(3): 192-5. doi: 10.1016/j.ijisu.2008.11.003. Epub 2008 Dec 3. PMID:19369124.
8. Weber TF, Junghanss T, Stojković M. Pulmonary cystic echinococcosis. *Curr Opin Infect Dis.*, 2023 Oct 1; 36(5): 318-325. doi: 10.1097/QCO.0000000000000962. Epub 2023 Aug 14. PMID: 37578473;PMCID: PMC10487362.
9. Kunisaki SM. Narrative review of congenital lung lesions. *Transl Pediatr*, 2021 May; 10(5): 1418-1431. doi: 10.21037/tp-20-133. PMID: 34189102; PMCID: PMC8192987.
10. World Health Organisation 2020, *population fact sheet*, GLOBOCAN 2020, accessed 7 November 2023, < <https://gco.iarc.fr/today/fact-sheets-populations>>.
11. Kriegsmann, M., Haag, C., Weis, C., Steinbuss, G., Warth, A., Zgorzelski, C., Muley, T.R., Winter, H., Eichhorn, M.E., Eichhorn, F., Kriegsmann, J., Christopolous, P., Thomas, M., Witzens-Harig, M., Sinn, P., Winterfeld, M.V., Heussel, C.P., Herth, F.J., Klauschen, F., Stenzinger, A., & Kriegsmann, K.. Deep Learning for the Classification of Small-Cell and Non-Small-Cell Lung Cancer. *Cancers*, 12. DOI10.3390, 2020.
12. Metovic J, Barella M, Bianchi F, Hofman P, Hofman V, Rimmelink M, Kern I, Carvalho L, Pattini L, Sonzogni A, Veronesi G, Harari S, Forest F, Papotti M, Pelosi G. Morphologic and molecular classification of lung neuroendocrine neoplasms. *Virchows Arch*, 2021 Jan; 478(1): 5-19. doi: 10.1007/s00428-020-03015-z. Epub 2021 Jan 21. PMID: 33474631; PMCID: PMC7966641.
13. Collins LG, Haines C, Perkel R, Enck RE. Lung cancer: diagnosis and management. *Am Fam Physician*, 2007 Jan 1; 75(1): 56-63. PMID: 17225705.
14. Jones GS, Baldwin DR. Recent advances in the

- management of lung cancer. *Clin Med (Lond)*, 2018 Apr 1; 18(Suppl 2): s41-s46. doi: 10.7861/clinmedicine.18-2-s41. PMID: 29700092; PMCID: PMC6334032.
15. Rami M. A. Al-Hayali, *Bronchiectasis in Northern Iraq Clinical And Bacteriological Characteristics During Acute Exacerbation*, *Annals of college of medicine Mosul*, 2005; 31: 1.
  16. Prieto D, Bernardo J, Matos MJ, Eugénio L, Antunes M. Surgery for bronchiectasis. *Eur J Cardiothorac Surg*, 2001 Jul; 20(1): 19-23: 23-4. doi: 10.1016/s1010-7940(01)00746-1. PMID: 11423268.
  17. Nega B, Ademe Y, Tizazu A. Bronchiectasis: Experience of Surgical Management at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *Ethiop J Health Sci.*, 2019 Jul; 29(4): 471-476. doi: 10.4314/ejhs.v29i4.8. PMID: 31447520; PMCID: PMC6689699.
  18. Ashour M, Pandya L, Mezraqji A, Qutashat W, Desouki M, al-Sharif N, al-Jaboori A, Marie A. Unilateral post-tuberculous lung destruction: the left bronchus syndrome. *Thorax*, 1990 Mar; 45(3): 210-2. doi: 10.1136/thx.45.3.210. PMID: 2330555; PMCID: PMC462386.
  19. Omer Mothafar Hammodat, Bassam Khalid Alhajjar, Ahmad Mothafar Hammodat, Okba F. Ahmed, Rabea Salim Abd Aljabbar, *Capitonnage surgery is effective in all types of pulmonary hydatid cysts*, *Ann Coll MedMosul*, December 2021; 43: 2.
  20. Shahriarirad, R., Erfani, A., Ebrahimi, K. et al. Hospital-based retrospective analysis of 224 surgical cases of lung hydatid cyst from southern Iran. *J Cardiothorac Surg*, 2023; 18: 204. <https://doi.org/10.1186/s13019-023-02327-w>.
  21. Adnan M. AL, Jubouri, Muhammed W. AL, Obaidy, Basil Fawzi Jameel, Waleed Latif Hussein, A Statistical Radiological Analysis in Patients with Sputum Smear Positive Pulmonary Tuberculosis, *THE IRAQI POSTGRADUATE MEDICAL JOURNAL*, 2016; 15: 2.
  22. Hassan I. Sultan, Mohemid M. Al-Jebouri, Pulmonary tuberculosis in Alzab district, *Tikrit Medical Journal*, 2010; 16(1): 37-41.
  23. Hussain Z. S. *Pulmonary Tuberculosis: Impact of Clinical and Radiological Presentations on Mortality, The retrospective cohort study on pulmonary tuberculosis*, 2016; 9(2) DOI: 10.4103/MJBL.MJBL\_48\_22.
  24. Neacșu F, Vârban AȘ, Simion G, Șurghie R, Pătrașcu OM, Sajin M, Dumitru M, Vrînceanu D. Lung cancer mimickers - a case series of seven patients and review of the literature. *Rom J Morphol Embryol*, 2021 Jul- Sep; 62(3): 697-704. doi: 10.47162/RJME.62.3.06. PMID: 35263397; PMCID: PMC9019611.
  25. Al-rahim A. Y. *Lung Cancer in a Sample of Iraqi Patients*, *Al Kindy colmed J.*, 2007; 4: 53-59.
  26. Hussain Z. S., Karadakhly K. A. *Radiological and Clinicopathological Findings in Large Case Series study of Lung Cancer in Erbil City/Iraq*, 2018; 10.232.74.22.
  27. Maghfoor I, Perry MC. Lung cancer. *Ann Saudi Med*, 2005 Jan-Feb; 25(1): 1-12. doi: 10.5144/0256-4947.2005.1. PMID: 15822487; PMCID: PMC6150570.
  28. She Y, Jin Z, Wu J, Deng J, Zhang L, Su H, Jiang G, Liu H, Xie D, Cao N, Ren Y, Chen C. Development and Validation of a Deep Learning Model for Non-Small Cell Lung Cancer Survival. *JAMA Netw Open*, 2020 Jun 1; 3(6): e205842. doi: 10.1001/jamanetworkopen.2020.5842. PMID: 32492161; PMCID: PMC7272121.
  29. Schabath MB, Cote ML. Cancer Progress and Priorities: Lung Cancer. *Cancer Epidemiol Biomarkers Prev*, 2019 Oct; 28(10): 1563-1579. doi: 10.1158/1055-9965.EPI-19-0221. PMID: 31575553; PMCID: PMC6777859.
  30. Hamza Abdullah Al Sabah, Mustafa Ahmed Kattaa, Abdulla Janger Alfarttoosi, *Demographic and Pathological Study in a Sample of Bronchogenic Carcinoma Patients in Baghdad Teaching Hospital, During 2006-2008*, *THE IRAQI POSTGRADUATE MEDICAL JOURNAL*, 2015; 14: 1.
  31. Hamza Abdullah Al Sabah, Asaad Abdal Hameed, Abdulla Janger Alfarttoosi. *Lung Cancer in Non-Smoker Patients in Baghdad Teaching Hospital*, *THE IRAQI POSTGRADUATE MEDICAL JOURNAL*, 2015; 14: 2.
  32. Adnan M. Al-Jobouri, Kassim M. Sultan, Muhammed W.AL, Obaidy, Firas R. Shihab, Bronchogenic carcinoma in sample of Iraqi patients, Fiber optic bronchoscope findings, *J Fac Med Baghdad*, 2014; 56: 4.
  33. Lorenzoni P., Donatti M., Muller E. et. al.; Bronchoscopy in 89 patients with lung cancer. *Pneumol J.*, 2001; 27(2): 83-8.