



Original Article

Histomorphological patterns of lung lesions –An Autopsy-Based Study in a Tertiary care Hospital in North-East India

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ABSTRACT

Introduction: Lungs are the most important organs of the respiratory system and can be affected by various infections, inflammations, occupational diseases, neoplastic conditions and secondarily involved in almost all terminal events. Autopsy plays an important role to determine the cause and time of death by identifying the changes that occur in organs after death.

Objective: This study aimed at evaluating various Histo-morphological patterns of lung lesions in autopsied lung specimen.

Material & method: This observational study was conducted in Dept. of Pathology, AGMC & GBP Hospital for a period of 3 years (January 2021 to January 2024). Total 109 cases were received. Gross features were recorded. The tissue specimens were fixed in 10% neutral buffered formalin & processed. Sections were stained by Hematoxylin and eosin stain. Total 109 autopsy specimens of lungs were analyzed.

Results: The commonly encountered lung pathology was congestion and pulmonary edema followed by pneumonia.

Conclusion: This study highlights the importance of histopathological examination of autopsied specimens of lung which help to establish the cause of death.

Keywords: Lung, autopsy, histopathology.

INTRODUCTION

The lungs are principle organs of respiration. The two lungs (right and left) are situated in the thoracic cavity; one on the either side of mediastinum enclosed in the pleural sac. Main function of lungs is to oxygenate the blood.1 through its tubular branches, known as Bronchi, the trachea transports breathed air into the lungs. The Bronchi then split into progressively smaller branches or bronchioles, until air reaches the alveoli. Average adult right lung weighs 450 gm (375-450gm) and left lung weighs 400 gm (325-450 gm).The alveoli and the bronchi and bronchioles (airways) are the two primary constituents of the lung parenchyma. The alveoli are lined by type 1 and type 2 (granular) pneumocytes. Type 2 pneumocytes, which create surfactant, are the primary component that proliferates following alveolar injury. There are capillaries in the alveolar wall whose basement membrane unites with the alveolar epithelium to form a single alveolar capillary membrane.2,3,4 Lungs are infected by various infection, inflammation, occupational disease, neoplastic & other pathologic condition & almost always involved secondarily by terminal events of cardiovascular disease5,6,7,8,9 Autopsy is a medical procedure where the reason and manner of death are ascertained by gross and histopathological examination of the organs after death. The word autopsy comes from the Greek word autopsia, which meaning to view with one's own eyes. Clinical & radiological findings in the most pulmonary diseases are nonspecific & the exact diagnosis cannot be made solely from them. During autopsy, the lungs are checked for illness, trauma and the reason for death or related alterations. Hence histopathological examination of lung is useful to determine association of lung pathology as a primary cause of death or secondary manifestation in autopsy cases. It also adds to our knowledge about lung pathology.11

Objective:

- To evaluate the various histomorphological patterns of lung lesions in autopsy specimens
- To correlate pulmonary findings with associated systemic conditions

MATERIALS AND METHODS:

This observational study took place in the Department of Pathology at AGMC & GBP Hospital over a span of three years, from January 2021 to January 2024. All lung specimens that underwent autopsy and were submitted for histopathological analysis were part of our research. A total of 109 lung autopsy specimens were collected. The lungs were grossly inspected for abnormalities such as scarring, fibrosis, consolidation, edema, congestion, or mass. Their weight and dimensions were recorded. Following standard processing, all histopathological sections were microscopically reviewed by two pathologists, and their consensus diagnosis was documented.

RESULTS:

Among the 109 cases examined, 78 (71.5%) were male and 31 (28.5%) were female, resulting in a male-to-female ratio of 2.5:1. The most prevalent findings were congestion and edema, observed in 57 cases (52.29%), followed by pneumonia, which was present in 44 cases (40.36%). Additionally, there were 2 instances of extramedullary hematopoiesis, 1 case of pulmonary tuberculosis, 1 case of fat embolism, and 1 case of chondrosarcoma.

The majority of cases were found in the age group of 21 to 40 years, followed by those aged 41 to 60 years. The highest occurrences of congestion, edema, and pneumonia were noted in the 21-40 year age group (refer to Table 3). Various histopathological changes in lung specimens and the associated causes of death were analyzed (see Tables 4 and 5).

Out of the 109 cases, 57 cases of pulmonary congestion and edema were identified as the primary cause of death. Other contributing factors included myocardial infarction (11 cases), dilated cardiomyopathy (3 cases), cirrhosis (9 cases), hepatitis (6 cases), acute tubular necrosis (26 cases), and cerebrovascular accidents (2 cases).

Similarly, from the 44 pneumonia cases that contributed to death, 30 had additional factors such as myocardial infarction (10 cases), cirrhosis (6 cases), and acute tubular necrosis (14 cases).

The study also identified extramedullary hematopoiesis in 2 lung cases, which were associated with findings of fulminant hepatitis. The fat embolism case did not present any abnormalities in other organs, while the chondrosarcoma of the lung revealed a primary lesion in the bone.

Table1: Distribution of histopathological changes in autopsy lung specimen

Histopathological changes in lung	Number of cases	Percentage
Congestion and edema	57	52.29%
Pneumonia	44	40.36%
Fat embolism	1	0.92%
Extramedullary hematopoiesis	2	1.84%
Chondrosarcoma (metastatic)	1	0.92%
Pulmonary Tuberculosis	1	0.92%
Autolysed	3	2.75%
Total	109	100%

Table 2: Gender wise distribution of lung lesions

Lesions	Male	Female	Total no.of cases
Congestion & edema	44	13	57
Pneumonia	28	16	44
Fat embolism	1	-	1
Extramedullary hematopoiesis	1	1	2
Chondrosarcoma (metastatic)	1	-	1
Pulmonary tuberculosis	1	-	1

Autolyzed	2	1	3
Total	78	31	109

Table3: Age wise distribution of lung lesions

Lesions	0-20	21-40	41-60	>60	Total no. of cases
Congestion&edema	5	26	23	3	57
Pneumonia	5	19	11	9	44
Fatembolism	-	-	1	-	1
Extramedullaryhematopoiesis	1	1	-	-	2
Chondrosarcoma(metastatic)	-	1	--		1
Pulmonarytuberculosis	-	1	-	-	1
Autolyzed	-	2	1	-	3
Total	11	50	36	12	109

Associated changes in other organs: -

- Pneumonia (30 cases)
- Heart (10) → Myocardial infarction (10)
- Liver (6) → Cirrhosis (06)
- Kidney (14) → Acute tubular necrosis (14)

Lung

- Fat embolism → other organs: No significant pathology
- Chondrosarcoma → Pelvic bone: Primary lesion
- Extramedullary hematopoiesis → other organs: Fulminant hepatitis

Congestion & Edema (57 cases)

- Heart (14) → Myocardial infarction (11), Dilated cardiomyopathy (3)
- Liver (15) → Cirrhosis (9), Hepatitis (6)
- Kidney (26) → acute tubular necrosis (26)
- Brain (2) → Cerebrovascular accident (2)

Images:

Fig.1. Lobar pneumonia (H&, 400x)

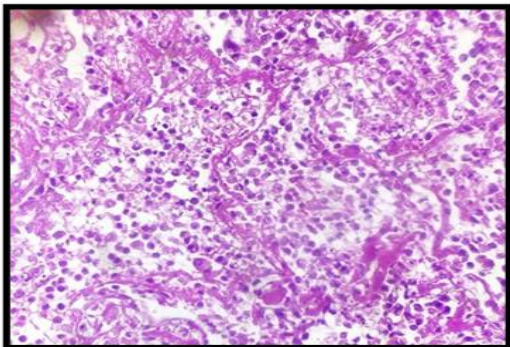


Fig2. Fat embolism (H&E, 400x)

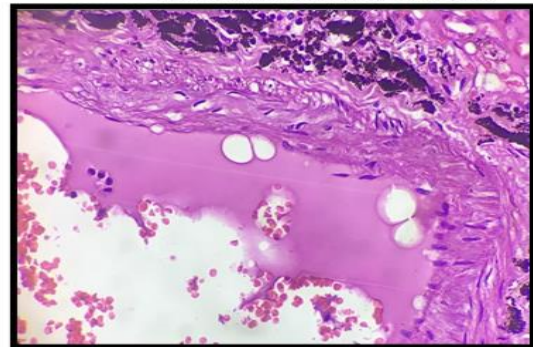
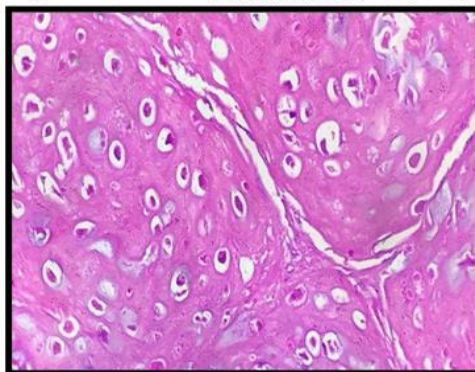


Fig3: Chondrosarcoma, lungmetastasis (H&E, 400x)



DISCUSSION:

The study was compared to the previously done studies.

Findings	Present Study (106 cases)	Guru A et al (98cases)	Khare P et al (86cases)	Kour B et al (250 cases)	Gupta c et al	Goswami PE et al (139 cases)
Most common Age group	21-40	20-39	16-30	20-30	30-39	40-59
Most common gender	Male	Male	Male	male	Male	Male
Most common pathology	Congestion & edema	Pneumonia	Congestion & edema	Congestion & edema	congestion & edema	pneumonia

Most of the deceased in our study were in the age group of 21-40 years, similar to studied by Guru A and Gupta C et al. Most common pathology found in lung is pulmonary congestion and edema as cause of death. Which is similar to Khare P, Kour B & Gupta c et al. Some of which also had cardiac pathology as contributing factor. which are not mentioned in other studies. In our study males are more commonly affected than females (2.51) which is similar to study done by Guru A et al, Khare P et al, Kour B et al, Gupta C et al, Goswami PE.

Thirty cases of pneumonia had associated myocardial infarction (10), liver cirrhosis (6) and acute tubular necrosis (14). Pneumonia and associated changes in other organ lead to death which was not reported by any other study. 2 cases of extramedullary hematopoiesis, 1 case of pulmonary tuberculosis & 1 case of fat embolism which was not reported by any other study.

In the present study, we got only 1 case of malignancy i.e. chondrosarcoma of lung which was contrary to other studies where they got many other malignancies.

CONCLUSION:

This study concludes that most common finding observed in lung autopsy is congestion and edema followed by pneumonia. Males are mostly affected by pneumonia. This study emphasizes the importance of histo-pathological examination of autopsy specimens to establish the sequential events of pathological changes that lead to death.

Conflict of Interest: Nil

Funding: Nil

Ethical approval was taken prior to study.

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