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Spectrum of Pulmonary Lesions at Autopsy

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Abstract

Background: Respiratory pathology is the commonest autopsy finding and areresponsible for a great deal of morbidity and mortality. Adult respiratory diseases in the developing world are of increasing concern. 1 This study was undertaken to detect the pulmonary pathology findings in adult autopsy cases as there is limited availability of data.

Aim: The aim of present study is to analyse the spectrum of pulmonary lesions in adult autopsy and to correlate the pulmonary pathology with the cause of death given as final autopsy diagnosis.

Design: Observational type of study.

Material and Methods: This is a prospective and retrospective study wasconducted inTertiary Care hospital, Kalaburagi over a period of 3years from July 2016 to June 2019.A total of 218 lungs of adult autopsies were performed. Autolysed specimens of lungs are excluded from the study.

Results: A total of 218 lungs of adult autopsies were performed.All cases showed one or other histopathological lesions in lung.The various pulmonary lesions were classified as pulmonary infection 49 cases (22.2%), COPD 29 cases (13.3%) and pulmonary vascular diseases 140 cases (63.9%). The pulmonary vascular diseases encountered were (CVC) Chronic Venous Congestion (Fig. 4A) (05 Cases, 2.3%), Pulmonary Edema (Fig 2 A,B) (47 cases, 21.5%), Pulmonary Hemorrhage. With Congestion (Fig 3A) (83 Cases, 38%), Acute respiratory distress syndrome (ARDS) (Fig 3B) (04 Cases, 1.8%), Pulmonary Embolism (Fig 5B) (01 Case, 0.45%). Pulmonary haemorrhage with congestion was more frequent in cases of road traffic accident and burns. Chronic obstructive pulmonary disease includes emphysema (Fig 4B) (29 cases, 13.3%).The pulmonary infections encountered were Lobar pneumonia (Fig 1A) (40 cases, 18.3%), Interstitial Pneumonia 04 cases (1.8%), Bronchopneumonia (Fig 1B) (2cases, 0.9%) and 01 cases (0.4%) each of foreign body aspiration pneumonia (Fig 9) ,Lung abscess and Tuberculosis (Fig 5A) respectively. The age ranged from 20 to 80 years. Majority of the cases were in the age group of 30–39 years. 70 cases (32.1%) with M:F Ratio 1.9 :1. The incidental findings in this study are each case of foreign body aspiration pneumonia and Tuberculosis.

Conclusion: In this study highlights various lesions in lungs which were confirmed by histopathological examination, which were either incidental or direct cause of death. Irrespective of cause of death, autopsy study is essential to evaluate diseases or injury that may be present and to determine the cause and manner of death.

Keywords: Adult autopsy; Pulmonary pathology; Pneumonia; Histopathological examination.

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Introduction

The lungs occupy a unique position in human body receiving virtually the entire cardiac output. They have immense structural complexity and which are concerned not only with gas transport mixing and exchanging but also with homeostasis.[2] Lungs

are involved in various kinds of inflammatory, neoplastic and other lesions in adults but they are secondarily involved in almost all form of terminal diseases. The autopsy may reveal diagnosis which may not be suspected clinically or may in some way discredit.[3]

Out of a global total of 52.2 million deaths in 1997, 3.7 million were due to acute lower respiratory tract infections, 2.9 million to tuberculosis, 2.3 million to HIV/AIDS, 1.1 million to lung cancer and 2.9 million to variety of other respiratory diseases, mainly chronic obstructive pulmonary disease.[2] Today Tuberculosis remains one of the world's most lethal infectious diseases. Despite the availability of effective treatment for most cases, TB is still a cause of death in our environment. Some cases of active TB are not identified until after the patient had died and an autopsy has been performed.[4] Adult respiratory diseases in the developing world are the major burden in terms of morbidity and mortality and particularly as related to chronic respiratory disease are increasing concern.[1]

Pathologic examination of lungs on autopsy gives valuable information such as various stages of fibrosis , including early patchy fibrosis and honey combing lesions, and their distribution and progression in the lungs.[5]

Therefore it is crucial to determine the cause of death in order to adopt correct prophylactic actions for the prevention of pulmonary dysfunctions and for that matter histopathological examination of lung autopsy is of great values.[6]

In view of the above and with limited data on autopsy studies related to pulmonary system, this study was undertaken to detect the pulmonary system findings in all adult autopsy cases.

Materials and Methods

This is a retrospective and prospective study was conducted in Tertiary Care hospital, Kalaburagi over a period of 3 years from July 2016 to June 2019. A total of 218 lungs of adult autopsies were performed. Clinical data were recorded as per proforma. Virchows technique of en block dissection was carried out. The lungs are separated from the heart as close to the hilum as possible and lungs, pleura were examined and then weight of the lungs and a detailed external gross assessment is done. Several slices are made from apex to base (sagittal) from the periphery to the hilum. Thin slices are made and fixed in 10% formalin then tissue samples were taken for study. Formal in fixed Lung specimens received in the Department of Pathology, kalaburagi were included in the study. Autolysed specimens of lungs are excluded from the study.

Results

A total of 218 lungs of adult autopsies were performed. All cases showed one or other histopathological lesions in lung. The various pulmonary lesions were classified as pulmonary infection 49 cases (22.2%), COPD 29 cases (13.3%) and pulmonary vascular diseases 140 cases (63.9%). The pulmonary vascular diseases encountered were (CVC) Chronic Venous Congestion 05 Cases (2.3%), Pulmonary Edema 47 cases (21.5%), Pulmonary Hemorrhage With Congestion 83 Cases (38%), Acute respiratory distress syndrome (ARDS) 04 Cases (1.8%), Pulmonary Embolism 01 Case (0.45%). Pulmonary haemorrhage with

Table 1: Distribution of Cases of Pulmonary Lesions.

i)	Pulmonary infection	No of cases	Percentage%	% Total pulmonary lesions (n=218)
1.	Lobar pneumonia	40	82	18.3
2.	Interstitial pneumonia	04	08	1.8
3.	Bronchopneumonia	02	04	0.9
4.	Aspiration pneumonia	01	02	0.4
5.	Lung abscess	01	02	0.4
6.	Tuberculosis	01	02	0.4
	Total	49	100	
ii)	**Pulmonary Vascular diseases**			
1.	Pulmonary Hemorrhage With Congestion	83	59	38
2.	Pulmonary Edema	47	33.5	21.5
3.	Chronic Venous Congestion	05	3.5	2.2
4.	ARDS	04	03	1.8
5.	Pulmonary Embolism	01	01	0.4
	Total	140	100	

Table 2: Age wise distribution of pulmonary lesions.

i)	Pulmonary infection	20–29 yrs	30–39 yr	40–49 yr	50–59 yr	60–69 yr	70–80 yr	Total	% of total pulmonary lesions(n=218)
1.	Lobar pneumonia	16	15	8	–	–	1	40	18.3
2.	Bronchopneumonia	02	–	–	–	–	–	02	0.9
3.	Interstitial pneumonia	–	02	01	–	01	–	04	1.8
4.	Aspiration pneumonia	–	–	01	–	–	–	01	0.4
5.	Lung abscess			01				01	0.4
6.	Tuberculosis						01	01	0.4
ii)	**Pulmonary Vascular diseases**								
1.	Chronic Venous Congestion	01	01	02	01	–	–	05	2.2
2.	Pulmonary Edema	13	17	11	05	01	–	47	21.5
3.	Pulmonary Hemorrhage With Congestion	20	27	21	11	02	02	83	38
4.	ARDS	01	02	01	–	–	–	04	1.8
5.	Pulmonary Embolism	–	01	–	–	–	–	01	0.4
iii)	**Emphysema**	09	08	08	03	01	–	29	13.3

congestion was more frequent in cases of road traffic accident and burns. Chronic obstructive pulmonary disease includes emphysema 29 cases (13.3%). The pulmonary infections encountered were Lobar pneumonia 40 cases (18.3%), Interstitial Pneumonia 04 cases (1.8%), Bronchopneumonia 2 cases (0.9%) and 01 cases (0.4%) each of foreign body aspiration pneumonia, Lung abscess and Tuberculosis respectively (Table 1). The incidental findings in this study are each case of foreign body aspiration pneumonia and Tuberculosis.

The age ranged from 20 to 80 years. Majority of the cases were in the age group of 30–39 years 70 cases (32.1%) with M:F Ratio 1.9 :1 (Table 2).

There were total 38 concomitant lesions which were overlapping with two lesions which includes Pneumonia With Edema With Emphysematous Change 25 cases, ARDS With Pulmonary Edema With Emphysematous Change 02 cases and Pulmonary Edema With Emphysematous Change. (Table 3).

Table 3: Concomitant Lesions.

1.	Pneumonia With Edema With Emphysematous Change	25
2.	ARDS With Pulmonary Edema With Emphysematous Change	02
3.	Pulmonary Edema With Emphysematous Change	11
	Total	38

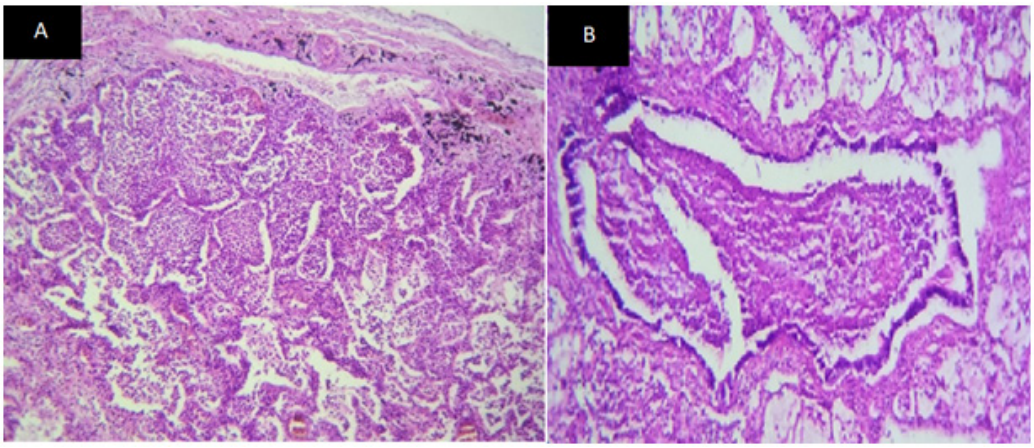

Fig 1: Lobar Pneumonia: a) H & E : Alveoli are filled with neutrophils, and surrounding alveolar walls show congested capillaries (10X). b) Bronchopneumonia: H & E :shows neutrophils filling a bronchiole and expanding into the adjacent alveoli.(10x)

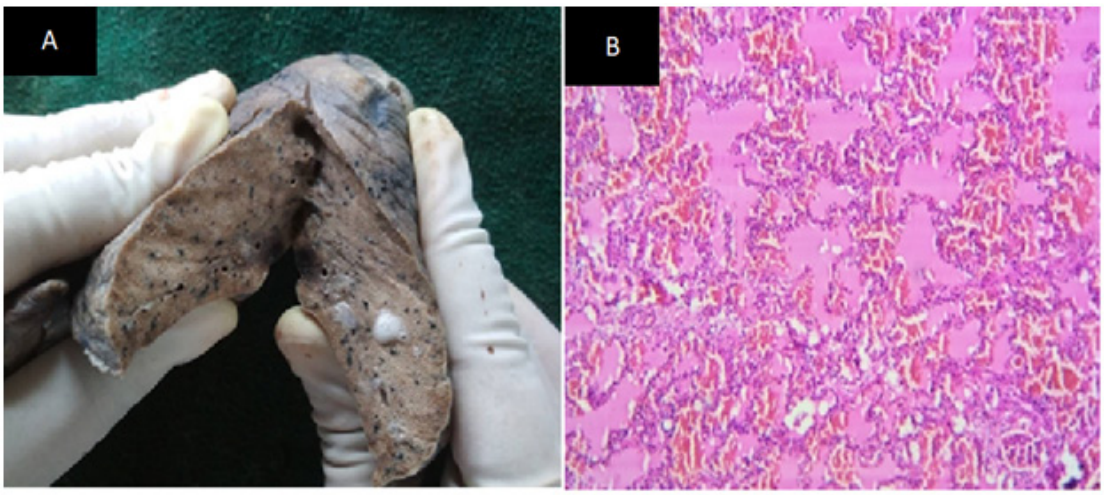

Fig 2: Pulmonary Edema : (a) Gross: lung, heavy, congested (b) Alveolar spaces occupied by an eosinophilicproteinaceous material with congestion (10x).

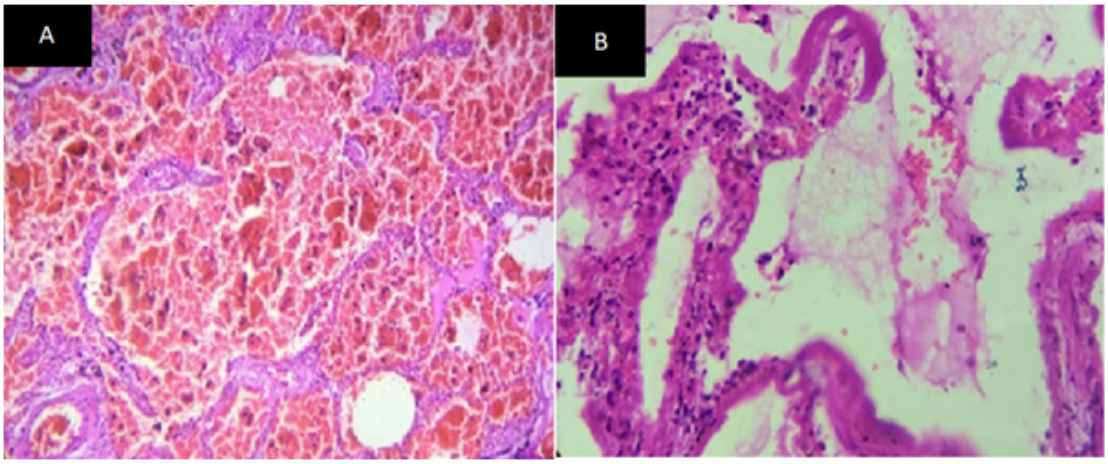

Fig 3: a) Pulmonary Hemorrhage : H & E shows Intra-alveolar hemorrhage fills alveolar spaces with blood with pigment laden macrophages (10x). b) Diffuse Alveolar Damage: H & E shows hyaline membranes admixed with scattered inflammatory cells (40x).

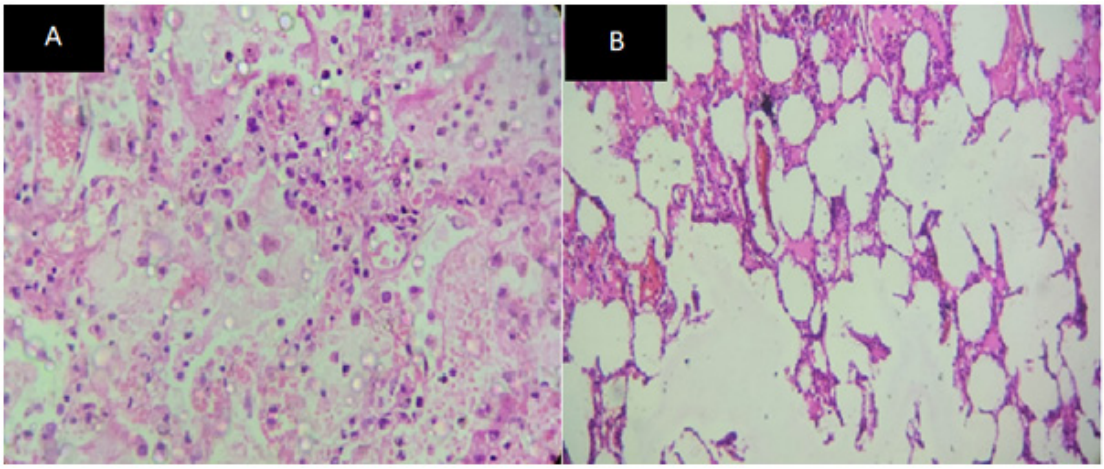

Fig 4: a) Chronic Venous Congestion :H & E shows dilated alveoli containing edema fluid and hemosiderin laden macrophages (heart failure cells) (10x). b) Emphysema: H & E shows abnormally large alveoli with focal destruction of alveoli by thin septa and interstitium containing edematous fluid (10x).

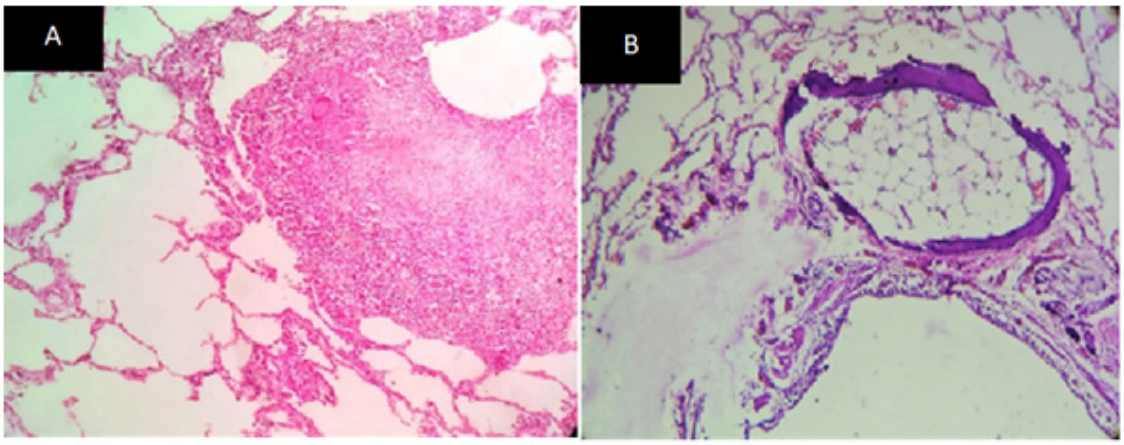

Fig 5: a) Tuberculosis: H & E: Granuloma (10x). b): Pulmonary Embolism: H & E shows Fat embolus -showing small vessel containing fat cells (10x).

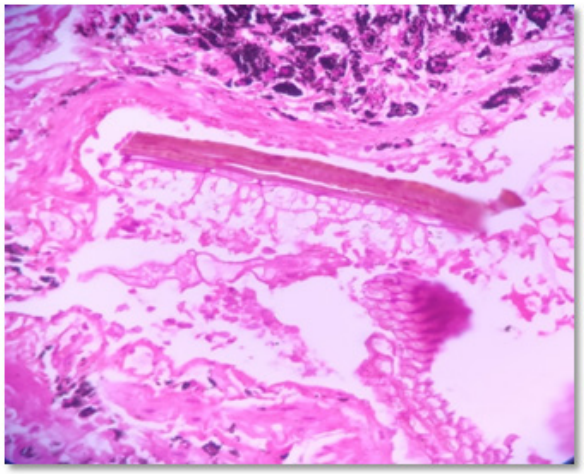

Fig 6: Foreign Body Aspiration Pneumonia: H & E: Foreign body Aspiration Pneumonia (10X).

Discussion

Autopsy is a medical procedure that consists of a thorough examination performed on a body after death, to evaluate disease or injury that may be present and to determine the cause and manner of a person's death.[5]

Present days air pollution, environmental inhalants and chemical cum toxic substances become uncontrollable worldwide.[7] Millions of people around the world suffer from preventable chronic respiratory diseases.[8]

The spectrum of pulmonary lesions were analysed in the present study. The distribution of pulmonary lesions vary with geographic area, age, gender, environmental, nutritional and genetic factors and socioeconomic status of the population.

The various lesions encountered were Pulmonary hemorrhage with congestion, Pulmonary Edema, Pneumonia, Emphysema, Chronic Venous Congestion, ARDS, Tuberculosis, Pulmonary Embolism.

In present study, the commonest pulmonary lesions encountered were pulmonary haemorrhage with congestion in 83 cases (38%) correlating with the study conducted by Selvambigaiet al[7] who found 28% cases. The incidence of pulmonary haemorrhage with congestion have significant association with traumatic cases in our study population as it was observed in Road Traffic Accident and Electrocution.

The second commonest finding was pulmonary edema were seen 21.5% cases which was correlating with study conducted by Patel CB et al[9] with 26.7% cases. In present study, incidence of pulmonary edema was high with history of burns and traumatic condition , the similar history was seen in the study conducted by Pulak Chakma et al.[10]

In present study, the infective conditions like pneumonia constitute third most common histopathological pattern accounted for 21.1% cases which was consistent with study done by Shetty A. et al[11] with 19.4% of cases. Majority of pneumonia cases seen with history burns and trauma cases in present study.

In this study we came across 13.3% cases of Pulmonary emphysema which was consistent with study done by Selvambigai G et al[7] 16% cases. Emphysema predominantly seen in males in present study which was fairly correlating with findings of Selvambigai G et al.[7]

In present study Acute respiratory distress syndrome (ARDS) seen in 02% cases which was correlated with the similar study done by Shetty A. et al[11] with 02% cases.

Chronic venous congestion (CVC) was seen in 2.3% cases in present study where as similar study conducted by Shetty A. et al[11] showed 8.5% cases.

In our study we found incidental findings among which one case of tuberculosis and foreign body aspiration pneumonia where as study conducted by Patel CB et al[9] also found as foreign body aspiration pneumonia as incidental finding. In the present study 38 cases showed concomitant lesions.

Conclusion

Autopsy provides normal as well as diseased human tissue for morphologic studies and it may reveal the diagnosis which may not be suspected clinically or may ,in some way, discredit. In present study, pulmonary haemorrhage and congestion was the most frequently encountered lesion in medicolegal autopsies.

The incidence of pulmonary haemorrhage was found to be 59%. Other lesions found were pulmonary edema , pneumonia, emphysema. This study highlights various lesions in lungs which are either incidental or direct cause of death. The incidental findings of tuberculosis , foreign body aspiration pneumonia also highlights the importance of gross and microscopic examination of each organ in detail from each autopsy irrespective of the cause of death.

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