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Original Research Article

Autopsy: a value to primordial and primary prevention for lung diseases

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ABSTRACT

Background: Lung disorders spectrums include congestion, oedema, various inflammatory lesions, chronic obstructive pulmonary diseases and neoplastic lesions. The clinical and radiological findings in respiratory diseases are nonspecific and therefore a histopathological study is essential. Autopsies are necessary to establish cause of death of the person with help of antemortem history and investigations to rule out lung lesions. Aims and objectives were to identify the histopathological spectrum of lung disease and frequency of various lung pathologies in respect to age and sex.
Methods: The retrospective study of 285 lung autopsy specimens received were fixed and processed. Routine paraffin sectioning was done followed by hematoxylene and eosin (H and E) staining. Relevant clinical and postmortem findings, gross and microscopic examination findings were recorded.
Results: Most common lung pathology found was Edema and congestion in 149 cases (52.2%), pneumonia in 87 cases (30.5%) followed by tuberculosis in 33 cases (11.5%). Out of total 285 cases, 222 (77.9%) were males and 63 cases (22.2%) were females. The male to female ratio was 3.5:1. Maximum numbers of cases, in age group of 31-45 years were 108 cases (37.89%) followed by in age group 46-60 years were 90 cases (31.57%) followed by age group of 16-30 years 15.8%.
Conclusions: Advances in diagnostic technology have not reduced the value of autopsy for the study and evaluation of the disease process. It has become crucial for adopting correct prophylactic actions for primordial and primary prevention of pulmonary dysfunctions.

Keywords: Autopsy, Lung, Pneumonia, Tuberculosis

INTRODUCTION

Lung disorders are most prevalent in today's world due to environment changes and a wide range of toxic gases and substances which are both infectious and tumorogenic. These diseases though treatable to some extent, often remain undiagnosed till late stage. A close observance of such diseases and their presentation is needed to start treatment in time. Therefore, it is a crucial to determine the leading cause of death in order to adopt correct prophylactic actions for primordial and primary prevention of pulmonary dysfunctions.[1,2]

The spectrums of lung lesions include congestion, oedema, various inflammatory lesions, chronic obstructive pulmonary diseases and neoplastic lesions. Lungs are also secondarily involved in almost all form of terminal events due to cardio vascular causes.

The clinical and radiological findings in pulmonary diseases are nonspecific and prompt pathology investigation and diagnoses are essential to improve patient survival, to avoid the rapid progression of the disease and to spare the patient from more invasive procedures.[3-6]

An autopsy is a medical practice that consists of a thorough examination performed on a body after death. It is very helpful in evaluating disease or injury of a person and determines the cause and manner of a person's death. An autopsy is required in deaths having medico-legal issues or in deaths where the cause is not established. Thus, autopsy helps to study process in situ and enriches medical knowledge. In addition to ascertain clinico-pathological differences, autopsy has a role in the development of new understanding of old diseases and facilitate the opportunity to discover new diseases.[7-10]

Therefore, it is important to define the leading causes of death to launch correct prophylactic actions, which is the least expensive strategy for preventing further pulmonary dysfunction and circumvent the need for lung biopsies.[8,11,12]

Pathologic examination of autopsy lungs gives valuable information such as various stages of fibrosis, honey combing lesions with their distribution and progression in the lungs.[2]

The aim of this study was to identify and categorize the pulmonary histopathological changes in autopsies of patients who died from respiratory diseases or other causes with pulmonary involvement. This study also aimed to throw a light on principal causes of death due to pulmonary involvement.

METHODS

The retrospective study was conducted on lung specimens of 285 cases during a period of December 2018 to February 2019 from autopsy subjects received from different districts of Haryana at the Autopsy section of the Pathology department of PGIMS Rohtak, Haryana to find out the frequency of various pulmonary lesions at autopsy.

The ethically approved study included all autopsy subjects irrespective of age, sex and cause of death except those in which lungs were not sent. Lungs were examined grossly for colour, weight, volume (collapsed or inflated), consistency, areas of fibrosis, oedema, congestion, abscess formation, bullae, cavitary lesions, status of bronchi and pleura (thickening and nodule formation). The sections were taken from representative areas. The lung tissue was fixed in 10% formalin. Paraffin embedded tissue sections (5 mm thick) were assessed using hematoxylin and eosin stain. All the histological sections were examined microscopically and findings were recorded. Special stains were done wherever necessary.

Statistical analysis

The data was entered in Microsoft excel spreadsheet for analysis. The analysis was done using SPSS (Statistical Package for Social Sciences) version 20.0.

RESULTS

In the present study a total of 285 specimens of lungs were studied.

Table 1: Sex wise distribution of autopsy cases.

Lesion	Male	Female	Total
Congestion/edema/changes In interstitium	124	25	149
Pneumonia	64	23	87
Tuberculosis	22	11	33
Fungal/other granulomatous inflammation	03	02	05
COPD	01	0	01
ARDS	01	0	01
Malignancy	02	01	03
Autolysed	03	0	03
Normal	02	01	03
Total	222	63	285

Out of total 285 cases, 222(77.9%) were males and 63 cases (22.2%) were females. The male to female ratio was 3.5:1. (Table 1).

Table 2: Age wise distributions of these autopsy cases.

Lesion	0-15	16-30	31-45	46-60	>60	Total
Congestion/ edema/changes in interstitium	06	23	49	52	19	149
Pneumonia	04	10	39	27	07	87
Tuberculosis	0	07	17	05	04	33
Fungal/other granulomatous inflammation	0	01	01	02	01	05
COPD	0	0	0	01	0	01
ARDS	0	0	0	01	0	01
Malignancy	0	01	0	01	01	03
Autolysed	0	01	01	01	0	03
Normal	0	02	01	0	0	03
Total	10	45	108	90	32	285

Maximum numbers of cases, in age group of 31-45 years were 108 cases (37.89%) followed by in age group 46-60 years were 90 cases (31.57%) followed by age group of 16-30 years 15.8% (Table 2).

Age wise distributions of these autopsy cases are shown in Table 2.

Majority i.e., 149 (52.2%) of cases showed terminal changes in lung at histopathology like pulmonary edema, mild inflammatory infiltrate and changes due to cardiac causes. This was followed by pneumonia contributing to about 30.5% (i.e. 87 cases). In 03, i.e. 1.0% cases the lung tissue was autolysed.

Cases of terminal changes were more common in age group of 31 to 60 years. Cases of pneumonia were found commonly in age group of 31 to 45 years. Case of tuberculosis and other granulomatous lesions were commonly found in the age group of 31 to 45 years. COPD changes were found in the age group of 46 to 60 years. A low incidence of ARDS was found with only one case in age 46 to 60 years group.

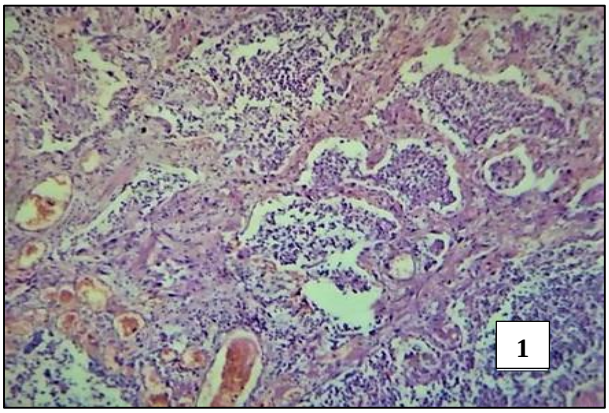

Figure 1: H and E section showing changes of pneumonia (200X).

Among 87 cases of pneumonia, 64 (73.5%) were males and 23 (26.4%) were females. Majority cases (75% cases) were in 31-60 years age group. Among all cases of pneumonia maximum cases (48) were that of interstitial pneumonia contributing to 55.1%. This was followed by lobar pneumonia (19 cases) making 21.8% input to all types of pneumonias and bronchopneumonia (16 cases) formulating 18.4% cases. Excluding pulmonary involvement in terminal stages, pneumonia was the most common disease involving lungs in both males and females. In our study 64 cases of pneumonia were seen in males out of total 222 cases affecting males which constituted 28.9% and 23 cases in females out of total 63 cases affecting females that constituted 36.5% (Table 1). Interstitial pneumonia was the leading cause of lung involvement at autopsy among all types of pneumonias in both males and females affecting 32 (50.0%) cases in males out of 64 and 16 (69.5%) cases in females out of 23 (Figure 1).

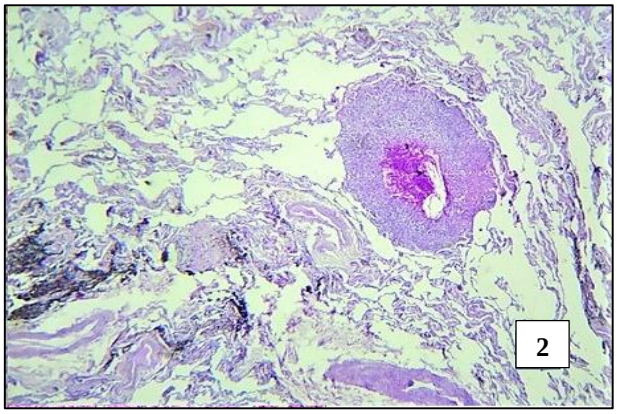

Figure 2: PAS-stained section shows fungal hyphae surrounded by necrosis (200X).

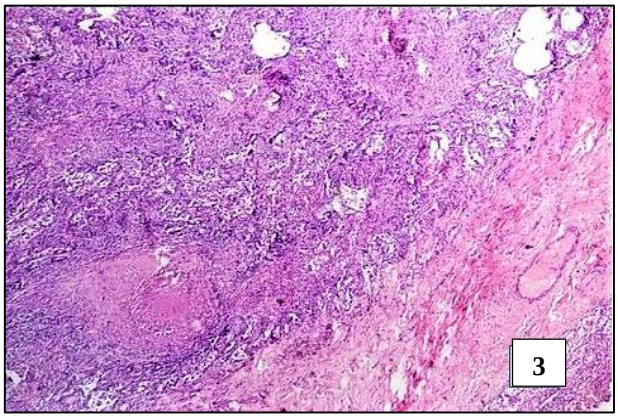

Figure 3: H and E stained section shows granulomatous inflammation along with casseous necrosis (200X).

Granulomatous (tuberculous) lesions were seen in 33 (11.5%) out of 285 cases. Among these cases, 22 males affected (66.6%) as compared to 11 females (33.3%). Granulomatous lesions found more commonly in 3rd and 4thdecade of life (Figures 2 and 3).

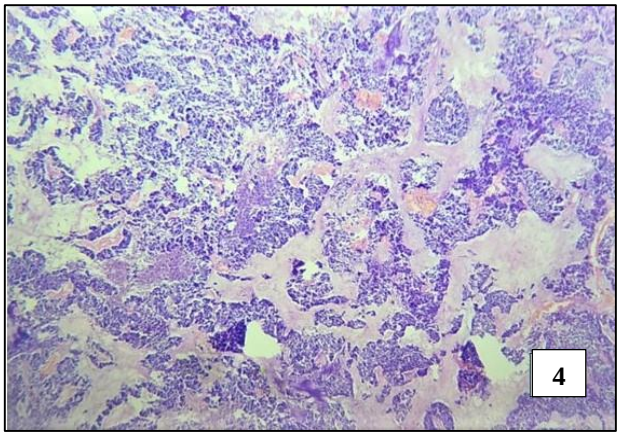

Figure 4: H and E stained section shows small cell carcinoma of lung (200X).

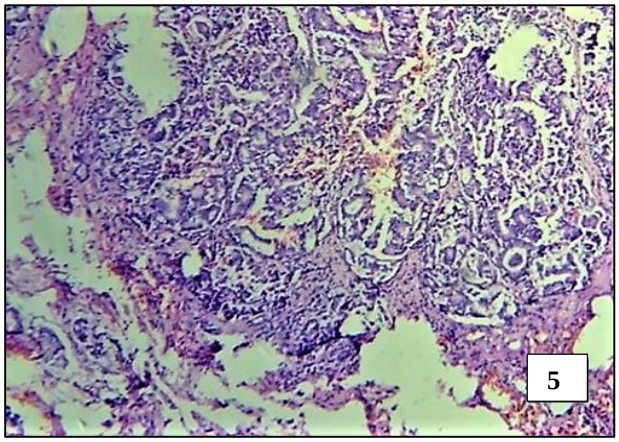

Figure 5: H and E stained section shows adenocarcinoma of lung (400X).

Malignant lesions were observed in 3 cases which include 1 case of small cell carcinoma and 2 case of adenocarcinoma. One of the adenocarcinomas was associated with metastatic deposits in heart. Male preponderance (66.6%) was seen in these cases and affecting >45 years age group. (Figures 4 and 5). Chronic bronchitis was seen in 1 case (male) found in 45-60 years age group.

DISCUSSION

In present study, age wise distribution of pulmonary disease showed the maximum number of cases in 31-45 age group (37.8%) which is in concordance to study done by Chauhan et al (35.8%) and Tahir et al (56.3%) followed by age group of 46-60 years age group 90 (31.6%), which differ with study done by Chauhan et al as their second majority of cases lie within >60 years age group (23.9%).[1,11]

In our study male (77.9%) were more commonly affected than female which was comparable with study done by Bal et al, Amin et al and Sweta et al which showed 80%, 79.5% and 88% of male respectively.[3,10,13]

The terminal events which include congestion/ oedema/changes in interstitium/pulmonary haemorrhage were one of the most common findings in this study and were similar to Chauhan et al, Rupali et al and Puneet et al.[11,14,15]

The results of this study show that among the pulmonary diseases, pneumonia (Table 1) was the commonest disease affecting more commonly persons above 40 years of age (6.2% cases). There are 87 (30.5%) cases of Pneumonia out of 285. Males (73.5%) are more commonly affected then females (26.4%). History of smoking is present in 19% of cases. This result is comparable to the findings of Fang at el study, which showed 15% of cases of pneumonia and 40% of cases of pneumonia have history of smoking.[16]

We found tuberculosis in 33 (11.5%) cases out of 285 cases studied and majority i.e. 22 (7.7%) cases were males and the commonest age group was 31-45 years. Our study was in agreement with Tahir et al as they found 19% cases of tuberculosis with male preponderance and most of them were below 50 years of age group. The difference in the total percentage of tuberculosis could be due to study of specific specimen of lungs with hilar lymph nodes by Tahir et al. Garg et al found 8.7% cases of active tuberculosis at autopsy with male dominance similar to our study.[8,15]

3 (1.0%) cases of malignant lesion were identified among which 1 case was of small cell carcinoma and 2 cases were of adenocarcinoma, one of which showed metastatic deposits in heart. Findings of our study was in concordance with studies done by Chauhan et al, Bal et al and Amin et al which showed 2.08%, 2% and 1.7% malignant lesions respectively.[3,11,13]

In the rest of the cases, we found 3 (1.0%) cases with normal histology of lung. There were 5 (1.7%) cases of fungal and other granulomatous lesions, 1 (0.03%) case of ARDS and chronic bronchitis each.

The limitation of the study was the non-receipt of the whole organ or representative sample at the time of autopsy. If this problem can be overcome then there will be much higher standard of autopsy reporting and would be a more useful tool in understanding cause of death.

CONCLUSION

The process of lung damage may begin in youth and continue for decades, leading to both non- fatal and fatal events. From present study of autopsy specimens of lungs, the most common findings were terminal events, pneumonia and tuberculosis. We should plan to prevent the causes and reduce the prevalence of preventable lung lesions. Despite recent advances in diagnostic technology, there are large number of cases of preventable respiratory diseases for which the autopsy has remained an important complementary tool for identifying and understanding. Histomorphological study of lung in autopsies may quite often disclose common diseases affecting lungs and their relative contribution towards death.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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