INTRODUCTION

Autopsy is a procedure that helps to determine the cause and time of death by identifying the changes that occur in the organs, by thorough examination of the body after death. It also helps in the study of antemortem and postmortem aspects of death. Autopsy is followed by histopathological examination (HPE) to look for any undiagnosed or untreated disease process, which did not show any clinical sign and symptoms and remained unknown during his or her lifetime. HPE can also draw attention toward incidental findings.

ABSTRACT

Background: Lungs are the major organ involved in infectious and occupational diseases almost secondarily involved in all forms of terminal diseases. Autopsy plays an important role in identifying and understanding the pathology of various respiratory diseases and lung lesions to find out the parenchymal pathology. Aims and Objectives: This study aims to study the histopathological spectrum of non-neoplastic lung lesions in medicolegal autopsy and to assess the frequency of spectrum of lung lesions. Materials and Methods: The present retrospective study was carried out in the Department of Pathology, Shyam Shah Medical College, Rewa, M.P., for a period of 18 months from July 2020 to January 2022. All 98 consecutive specimens of medicolegal autopsy were included with age from newborn to 70 years irrespective of gender and cause of death. The results were analyzed based on gross and microscopic findings. Results: Among the 98 cases studied, 82 cases (84%) were of diseased and 16 cases (16%) were of non-diseased lung. The most common age group affected was 30–39 years with 30% of affected cases followed by 20–29 years with 21% of affected cases. Among 82 cases, the most common pulmonary lesion was pneumonia in 46% (45/98) of the total cases followed by congestion and edema seen in 22% (21/98) of the cases. Conclusion: Histopathological study of lung autopsy helps in providing information for clinical diagnosis of non-neoplastic lung lesions that act as a tool for better clinical assessment and help to establish a correct prophylactic measure. The histopathological examination (HPE) helps in establishing the final cause of death. The HPE helps in establishing the final cause of death. Therefore, autopsy study is very helpful in refining the vision and diagnostic setup for better evaluation.

Key words: Autopsy; Histopathology; Lungs; Pneumonia

Examination of the lungs is the most important part of autopsy, as the lungs are a vital organ in the human body and are directly and constantly exposed to the surrounding atmosphere. Respiratory diseases progress rapidly and are particularly common in extremes of ages such as neonates, old ages, and immunocompromised individuals. There has been a rapid increase in respiratory morbidity in the current population due to increase in air pollution, smoking, and chemical substances that lead to preventable chronic respiratory diseases affecting millions of people all over the world. They are vulnerable to develop various kinds of inflammatory, infectious, and neoplastic conditions.
done on lung specimens after autopsy can help identifying the cause of death and correlate these findings with the clinical features. Therefore, it is important to determine the leading causes of death to establish correct prophylactic actions, which is the least expensive strategy for preventing further pulmonary dysfunction and avoiding the need for lung biopsies. Clinical and autopsy diagnoses have been found to differ significantly in major and minor ways in few studies.

Aims and objectives
The aim of the present study was to find out the spectrum of various histopathological findings in autopsy specimens of lung and its prevalence.

MATERIALS AND METHODS
The current retrospective study was carried out in the Department of Pathology, Shyam Shah Medical College, Rewa, Madhya Pradesh, for a period of 18 months from July 2020 to January 2022. After taking ethical clearance from the Institutional Ethical Committee, departmental records were checked, and all the details of the medicolegal autopsies conducted were included in the study. A total of 98 consecutive cases that underwent medicolegal autopsies in this period were taken irrespective of age, gender, and followed by HPE to identify the cause of death. These specimens were received in 10% formalin and were studied grossly. In all the cases, available clinical details (age, gender, and clinical diagnosis) were collected and details regarding the gross findings of the lung specimens, including the type of specimen, size, and weight were noted. The characteristics of the lesions seen grossly were also noted in terms of size, site, consistency, and distribution were also noted. Later, sections from the lung tissues measuring 4–5 mm in thickness were taken and after routine processing and paraffin embedding, blocks were prepared. Slides for HPE were prepared by taking 4–5 micron thick serial sections of the prepared blocks and stained by hematoxylin and eosin stain. All the histopathological blocks were reviewed from the department archives and the microscopic findings were noted.

RESULTS
The present study was conducted on 98 consecutive lung specimens received in the pathology department of a tertiary care institution in Central India, for the HPE following medicolegal autopsy. Age-wise distribution of these autopsy cases is shown in Table 1. The age of the deceased ranged between neonates and 70 years old, with most of the samples belonging to the age between 30 and 39 years of age (31%) followed by 20–29 years (19%). The least common age group in the current study was 0–9 years (9%). The lung pathology was seen in 82 cases (84%). The most common age group affected is between 30 and 39 years (30%) (Table 1). Out of the total 98 cases, 63% of cases were male and 37% were female with a male-to-female ratio of 1.7:1.

Following the HPE, these specimens were divided on the presence of histopathological changes suggestive of any lung disease contributing to the cause of death or histologically unremarkable. In the present study, 16% of the cases were histologically unremarkable, whereas 84% of the cases showed significant histological changes and were classified as diseased lungs. The cases with significant histopathological changes were further subclassified based on the type of the lesion encountered, as shown in Tables 2 and 3.

The most common lesion observed in the present study was pneumonia showing patchy discoloration and consolidation grossly and microscopic picture showing bronchioles and peribronchiolar alveoli filled with inflammatory exudates and intra-alveolar exudates of polymorphonuclear cells and red cells seen in 46% of cases (45/98) (Figure 1a). The next common lesion was congestion and edema seen in 22% (21/98) of the cases, characterized by congested blood vessels and eosinophilic edema fluid present in intra-alveolar

| Table 1: Demographic variable of all the lung specimens |
|-------------------------------------------------------|
| **Age-wise distribution**                             |
| **Age groups**                                         |
| 0–9 years                                              | 7 | 2 |
| 10–19 years                                           | 11 | 1 |
| 20–29 years                                           | 17 | 2 |
| 30–39 years                                           | 25 | 5 |
| 40–49 years                                           | 9 | 3 |
| >50 years                                             | 13 | 3 |
| **Gender distribution**                                |
| Males                                                 | 53 | 09 |
| Females                                               | 29 | 07 |
| **Total**                                             | 82 (84%) | 16 (16%) |

| Table 2: Frequency of various histopathological findings of lung specimens |
|---------------------------------------------------------------------------|
| **Histopathological findings**                                           |
| Pneumonia                                                                 | 45 | 46 |
| Tuberculosis                                                             | 04 | 04 |
| Congestion and edema                                                     | 21 | 22 |
| Diffuse alveolar damage                                                  | 05 | 05 |
| Chronic bronchitis                                                       | 03 | 03 |
| Emphysema                                                                | 04 | 04 |
| Normal lung                                                              | 16 | 16 |
| **Total**                                                                | 98 | 100 |

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| LESIONS                                      | 0–09 Years | 10–19 Years | 20–29 Years | 30–39 Years | 40–49 Years | >50 Years | Total | M | F |
|----------------------------------------------|------------|-------------|-------------|-------------|-------------|-----------|-------|---|---|
| Infective etiology                           |            |             |             |             |             |           |       |   |   |
| Pneumonia                                    | 02         | 02          | 09          | 16          | 07          | 09        | 45    | 28| 13|
| Granuloma                                    | 01         | 00          | 01          | 02          | 00          | 00        | 04    | 01| 03|
| Congestion and edema                         | 01         | 03          | 07          | 05          | 02          | 03        | 21    | 14| 08|
| Diffuse alveolar damage                      | 02         | 02          | 00          | 01          | 00          | 00        | 05    | 05| 02|
| Chronic bronchitis                           | 00         | 01          | 02          | 00          | 00          | 00        | 03    | 03| 01|
| Emphysema                                    | 00         | 02          | 00          | 01          | 00          | 01        | 04    | 02| 02|
| Total                                        | 07         | 11          | 17          | 25          | 09          | 13        | 82    | 53| 29|
| Normal lung                                  | 02         | 01          | 02          | 05          | 03          | 03        | 16    | 09| 07|

**DISCUSSION**

HPE of medicolegal autopsy is done to find out the disease process and cause of death. The present study was carried out to identify the histopathological changes seen in the lung specimens done after the medicolegal autopsy. The prevalence of significant histopathological changes in the present study was 84%, which was comparable to the several previous similar studies. Male predominance was observed in the present study with 63% of the cases which was comparable to the past similar studies.
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Table 5: Comparison of different lung lesions in HPE with the previous studies

| Lungs findings        | Present study | Goswami et al.17 | Nazish et al.18 | Udayshankar et al.14 |
|-----------------------|--------------|------------------|----------------|----------------------|
| Congestion            | 25.6%        | 30.2%            | 20.68%         | -                    |
| Pneumonia             | 54.8%        | 33.8%            | 41.67%         | 31.81%               |
| ARDS/diffuse alveolar damage | 6.1%    | -                | -              | -                    |
| Granuloma             | 4.9%         | 12.9%            | 22.22%         | 22.72%               |
| Chronic bronchitis    | 3.7%         | -                | -              | -                    |
| Emphysema             | 4.9%         | 15.8%            | 2.78%          | 9.09%                |

In the present study, the most affected age group was 30–39 years followed by 20–29 years which was comparable to the results of similar studies done by Patel et al., Kurawar and Vasaikar, and Dhruw et al. (Table 5). In the present study, the most common histopathological lesion was pneumonia seen in 46% of cases which was comparable to Udayshankar et al., Selvambigai et al., Goswami et al., and Nazish et al. Although tuberculosis is prevalent in our India as seen in study done by Amin et al., in the current study, only 4 (4%) cases were found. The reason may be attributed to early diagnosis and better cure rate and, therefore, tuberculosis being primary cause of death in only four cases.

Limitations of the study

The short coming of the study was small sample size and missed histopathological diagnosis in cases where only a part of the lung tissue was received for HPE. To reach the final cause of death, the histopathological findings of lungs should be correlated with the findings of other organs, medical and surgical history, and circumstantial evidence. This study has not considered these factors to establish the cause of death.

CONCLUSION

HPE of lung autopsy has helped to find out findings which were incidental or direct cause of death. This study concludes that the most common lung lesions include pneumonia followed by congestion. Lung lesions were more common in males as compared to females. The HPE helps in establishing the final cause of death. Therefore, autopsy study is very helpful in refining the vision and diagnostic setup for better evaluation.

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