

PATTERNS OF PULMONARY MORPHOLOGICAL LESIONS SEEN AT AUTOPSY

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ABSTRACT

Introduction: Chronic respiratory diseases are a group of chronic diseases affecting the airways and the other structures of the lungs. Hundreds of millions of people around the world suffer from preventable chronic respiratory diseases. Prompt investigation and diagnosis are essential to improving patient survival.

Objective: The objective of this study was to observe the frequencies of different lung diseases on the basis of histopathological examination of lung tissue specimens removed at autopsy. This study was a non-interventional, cross – sectional and was conducted on 810 specimens of lungs at Pathology department of Allama Iqbal Medical College, Lahore in collaboration with the Forensic Medicine department of King Edward Medical University, Lahore.

Methods: Relevant autopsy data was recorded in a proforma. The tissue specimens were fixed and processed. Paraffin sectioning was done followed by Haematoxylin and Eosin staining. The sections were then examined by a panel of consultant Histopathologists. Autopsies of 810 subjects with respiratory diseases were reviewed, and the following data were obtained: age, sex and cause of death.

Results: During a period of one year, a total of 810 lungs and hilar lymph nodes specimens from autopsy subjects were studied. Maximum numbers of cases (68.14%) were in 20 – 49 years age group. The commonest cause of death (42.96%) was tuberculosis. On microscopic examination of the sections from the lungs, there were 348 cases of tuberculosis, 324 out of 810 (40%) cases of emphysema and silicosis was present in 89 (11%) cases. Squamous metaplasia was present in 49 (6%) and Pneumonia in 4% cases.

Conclusion: Advances in diagnostic technology have not reduced the value of autopsy and a goal directed autopsy remains a vital component for the study and evaluation of the disease process. Emphysema and tuberculosis are quite common in our population.

Key words: Emphysema, silicosis, tuberculosis.

INTRODUCTION

Chronic respiratory diseases are a group of chronic diseases affecting the airways and the other structures of the lungs.¹⁻⁵ Hundreds of millions of people around the world suffer from preventable chronic respiratory diseases.⁶⁻⁸ Prompt investigation and diagnosis are essential to improving patient survival. The clinical and radiological findings in pulmonary diseases are nonspecific, and prompt pathology investigation and diagnosis are essential to improve patient survival.⁹⁻¹² In this context, the complexity of clinical presentations makes diagnosis a constant challenge for the clinician. Despite recent advances, most types of diagnostic support are still expensive. Clinicians often initiate treatment to avoid the rapid progression of the disease and to spare the patient from more invasive procedures.¹³⁻¹⁸ 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 pul-

monary dysfunction and avoiding the need for lung biopsies.¹⁹⁻²⁶

An 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. An autopsy may be required in deaths that may have medical and legal issues.²⁷⁻³¹

Pathologic examination of autopsy lungs 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.³²⁻³⁸

The aim of this study was to present the pulmonary histopathological alterations identified in autopsies of patients who died from respiratory diseases, as well as to determine whether underlying diseases and associated comorbidities increase the risk of developing specific histopathological patterns.

MATERIALS AND METHODS

Setting

The study was conducted at Pathology department of Allama Iqbal Medical College, Lahore in collaboration with the Forensic Medicine department of King Edward Medical University, Lahore.

Duration of Study

One year.

Sample Size

The study was conducted on 810 specimens of lungs and hilar lymph nodes to find out the frequency of various pulmonary lesions at autopsy.

Sample Technique

Non-probability convenience sampling was done.

Sample Selection*Inclusion Criteria*

Autopsy subjects above 10 years of age and of both sexes were included in the study. The subjects were selected irrespective of cause of death.

Study Design

This study was a non-interventional, cross-sectional study.

Data Collection Procedure

Autopsy information regarding name, age, address and history of smoking were obtained from the relatives of the deceased.

Specimen Collection and Preservation

The lungs were fixed in 10% formalin prepared in 0.9% saline for at least 4 weeks. Irrespective of the presence or absence of morphologically demonstrable lesions, a minimum of five sections per lung were studied (total 10 sections per person). Paraffin – embedded tissue sections (5 mm thick) were assessed using haematoxylin and eosin stain.

Data Analysis Plan

Data was entered and analyzed on SPSS version 10. Descriptive statistics were calculated. Age was presented as mean \pm SD. Sex and cause of death were shown as percentages. Pattern of pulmonary lesions were also presented as percentages.

RESULTS

During a period of one year from January 2007 to December 2007, a total of 810 specimens of lungs from autopsy subjects were studied, in collaboration with Forensic Medicine department of King Edward Medical University Lahore, at the Histopathology section of the Pathology department of Allama Iqbal Medical College.

The patient characteristics were as follows: The study included 810 autopsy subjects. Maximum number of cases (68.14%) was in 20 – 49 years age group (Table 1) in the present study. Significantly greater ($p < 0.001$) number of males (552 out of 810) were autopsied (Table 2).

Microscopic examination of the sections from the lungs showed that there were 324 (40%) cases of emphysema (Fig. 1). Majority of these subjects (251 out of 324), were in age group 20 – 49 years. Emphysema was seen in significantly greater ($p < 0.005$) number of males (251 out of 324, 77.50%), and majority (259 out of 324, 79.94%) were smokers.

Granulomatous lesions were found in 154 out of 810 cases (19%). Majority (84.41%) were below the age 50 and significantly greater ($p < 0.01$) number (122 out of 154, 79.22%) number of males were affected.

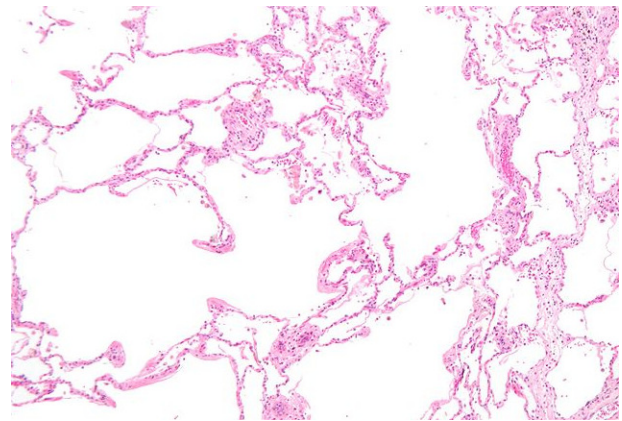


Fig. 1: Photomicrograph from the lung shows emphysema.

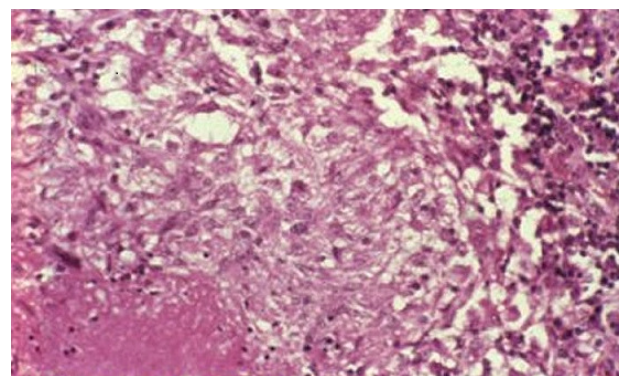


Fig. 2: Photomicrograph show granulomatous reaction in silicosis of lung (H&E).

There were 89 (11%) cases of silicosis (Fig. 2). Majority of silicosis i.e. 57 (64%) were in age group 30– 49 years. Greater number of males i.e. 65 out of

89 (73%) were affected.

Squamous metaplasia of bronchiolar epithelium was seen in 49 (6%) of 810 cases. Majority of these lesions (41 out of 49, 83.67%) were seen in subjects below the age of 50 years and males with history of smoking were significantly greater ($p < 0.001$) greater than the females and nonsmokers.

Pneumonia was present in 32 out of 810 cases (4%) Majority (75%) cases were below the age of 50 years and there was no sex difference.

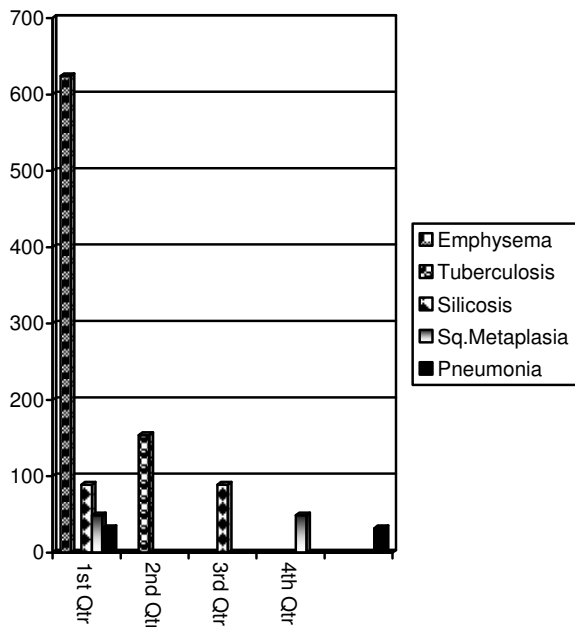


Fig. 3: Distribution pattern of pulmonary diseases.

DISCUSSION

The results of this study show that among the pulmonary diseases, Emphysema is the commonest disease affecting males of 20 – 49 year age group. We found 324 cases of Emphysema which make 40% of the total cases studied. This result is very close to the findings of a study conducted by Latif and his coworkers, in which they found Emphysema in 43.0% cases.³⁹ Similarly, Niazi in her “Morphological study of pulmonary embolism in autopsy cases” found emphysema in 30.89% cases. Significantly greater ($p < 0.005$) numbers (77.5%) of emphysema were found in smokers.⁴⁰ This shows the causal relation of smoking in the pathogenesis of emphysema.⁴¹

Table 1: Age Distribution in different cases (n = 810).

Age Group (Years)	No. of Diseased Cases	Percent %	No. of Non-diseased Cases	Percent %	Total	Percent %
10 – 19	40	6.2	20	12.3	60	7.4
20 – 29	114	217.6	20	12.3	133	16.5
30 – 39	163	25.2	52	32.1	215	26.5
40 – 49	202	31.1	35	22.0	238	29.4
50 – 59	82	12.6	15	9.3	97	11.9
60 and Above	47	7.3	20	12.0	67	8.3
Total	648	100	162	100	810	100

Table 2: Distribution of Pulmonary Diseases on autopsy (n = 810).

Diagnosis	No. of Cases	Percent %
Pulmonary lesions Present	648	80
Pulmonary lesions Absent	162	20
Total	810	100

Table 3: Sex distribution in different cases (n = 810).

Sex	No. of Cases	Percent %
Male	651	80.37
Female	159	19.63
Total	810	100

In our study, there were one hundred and fifty four cases (19.0%) of tuberculosis. One hundred and thirty cases (84.41 %) were below 50 years age group and twenty four (15.59 %) were above 50 years. The findings were comparable to those found by Rasul et al in their study.⁴³ Males were significantly ($p < 0.03$) more commonly affected as compared with females. This male preponderance is reported by other workers as well.⁴⁴

We found 89 (11.0 %) cases of silicosis. This finding is comparable to the prevalence of silicosis in some of the developing countries in persons occupationally exposed to silica dust. The prevalence of silicosis in Bolivia, Brazil, China, Egypt, Korea and Thailand in miners ranged from 1.7 to 12.5 %⁴⁵. The prevalence of silicosis reported by Churchyard et al in South Asian gold miners is 18.3 to 19.9% as these are

exposed to higher intensity of respirable dust and such miners spend longer periods in continuous employment in dusty jobs.⁴⁶ This indicates that in our country, air pollution has reached to such an extent which is comparable to the dust concentrations present in mines of the developing countries. Maximum number of silicotic cases (57 out of 89, 64%) were in the age group of 30 – 49 years. Norboo et al also reported nearly the same age group in India.⁴⁷ In our study there were 65 males and 24 females of silicotic cases. This finding is in disagreement with that of Norboo et al whereby women appear to be more commonly affected than men. This difference is due to the reason that they conducted their study in two villages of India where women were more heavily exposed to dust in the course of their work. But in our autopsy study of medico legal cases, men were more commonly involved.

Squamous metaplasia of bronchioles was seen in 6.0% cases (49 out of 810). This finding is in disagreement to that of Peters et al who examined six bronchial biopsy specimens from 99 subjects and found Squamous metaplasia in 66 cases (66.66%).⁴⁸ This difference is due to the fact that they examined six standard biopsy sites and their patients were cigarette smokers with long history of pack years. Subjects with Squamous metaplasia had history of smoking in 41 (83.67%) cases. This clearly indicates the higher prevalence of Squamous metaplasia in cigarette smokers. Tsuchiya E et al in their study of "Incidence of Squamous metaplasia in large bronchi of Japanese lungs: relation to pulmonary carcinomas of various subtypes" concluded that Squamous metaplasia may be associated with the development of Squamous cell carcinoma but would appear not to be an obligatory step in the development of this neoplasm.⁴⁹ Hirsh FR et al in their study also emphasized that Squamous metaplasia is a common finding especially as a response to cigarette smoking.

There were 32 cases (4 %) of pneumonia in the present study. Niazi found 22 cases (17.88 %) in her study of pulmonary embolism in a total of 123 medico-legal autopsy cases. The higher frequency of pneumonia in her study could be due to the reason that her study included 30% hospitalised patients who remained admitted to the hospital for a longer or shorter period of time.

CONCLUSION

1. Despite recent advances in diagnostic technology, the autopsy has remained an important complementary tool for identifying and understanding chronic respiratory diseases.
2. Emphysema and tuberculosis are quite common in our population. Emphysema and silicosis are clearly due to smoking and environmental air

pollution. This highlights the role of environmental dust in causation of silicosis.

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