

Histopathological alterations in lung tissue received as autopsy specimens- a study of 410 cases

Nirali S. Amin, Pooja Y. Shah, Ravi G. Patel, Varsha S. Khant, Shreedhan G. Prajapati

Department of Pathology, B.J. Medical College, Ahmedabad, Gujarat, India.
Correspondence to: Nirali S. Amin, E-mail: nirali.no1@gmail.com

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Abstract

Background: Many millions of people around the world suffer from preventable pulmonary diseases. The clinical and radiological findings in most of the respiratory diseases are nonspecific and correct diagnosis cannot be made solely from them. Histopathological examination serves the purpose in such cases. An autopsy is an important complementary tool for identifying and understanding the pathology of respiratory diseases and to find out the condition of internal organs.

Objective: The objective of this study was to find out the prevalence of various lung pathologies by histopathological examination of lung tissue received as autopsy specimens.

Material and Methods: The study was done on 410 lung specimens from autopsy cases received in this department over the period of 18 months. Gross findings and microscopic features were recorded. The tissue specimens were fixed in 10% formalin and processed. Paraffin sectioning was done followed by haematoxylin and eosin staining. The sections were then examined by experienced histopathologists.

Result: During the period between January 2015 to June 2016, a total of 410 lungs from autopsy specimens were studied. Lung diseases were more common in males as compared to females. Most common lung pathological findings were of pneumonia (20%), tuberculosis (16.1%), emphysema (6.6%) and malignant lesions (1.7%) among the cases studied.

Conclusion: Advances in diagnostic technology have not reduced the value of autopsy and a goal-directed autopsy remains a vital component in the study and evaluation of the disease process. There are large numbers of cases of preventable respiratory diseases. This indicates that the autopsy has remained an important complementary tool for identifying and understanding respiratory diseases despite recent advances in diagnostic technology.


KEY WORDS: Autopsy, Tuberculosis, Pneumonia, Emphysema

Introduction:

The lungs are commonly involved in various inflammatory, neoplastic, and other disease processes. They are also secondarily involved in almost all forms of terminal events due to cardiovascular causes.^[1] Hundreds of millions of people

around the world suffer from preventable chronic respiratory diseases.^[2] A large number of conditions involve the parenchyma of the lung, which may be associated with inflammation, fibrosis or granulomatous reactions.^[3] The clinical and radiological findings in pulmonary diseases are nonspecific and prompt pathological 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.^[4] 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.^[5]

An autopsy is an important and most useful way to find out the condition of internal organs, in which a thorough

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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.^[6] This study was performed to evaluate the gross as well as microscopic findings in the lungs received as autopsy specimens. Gross pathologic examination of autopsy lungs yields information regarding the status of lung collapsed or hyperinflated, the presence of scarring, fibrosis, bullae, consolidation, nodules, infarction, secretions, oedema, congestion, granuloma/abscess formation, and also provides information regarding the status of bronchi and pleura which may provide a hint to the diagnosis.

The aim of this study was to determine the prevalence of various pathological changes in lung tissue received as autopsy specimens. The study also focuses on the histopathological patterns observed in persons who died from respiratory diseases, as well as to determine whether underlying diseases and associated comorbidities increase the risk of developing specific histopathological patterns.

Material and Methods

The present study was conducted on lung specimens of 410 routine autopsies received in the Department of Pathology, Autopsy section of the tertiary care hospital in Ahmedabad, Gujarat to find out the frequency of various pulmonary alterations at autopsy. All the autopsy subjects irrespective of age, sex, and cause of death were included in the study. We examined both lungs grossly and microscopically. The medical history and clinical history were traced. The lungs were fixed in 10% formalin, weighed and dimensions measured. Grossly, lungs were examined for colour, volume (collapsed or inflated), consistency, presence of scarring, fibrosis, bullae, consolidation, nodules, infarction, secretions, oedema, congestion, granuloma /abscess formation, the status of bronchi and pleura, and findings are recorded. Irrespective of the presence or absence of morphologically demonstrable lesions, a minimum of 2 sections per lung were studied (total 4 sections per autopsy). After routine processing and paraffin embedding, 4-micrometer sections were taken. All the histological sections were stained with H and E stain and mounted. All

the histological sections were examined microscopically and findings were recorded.

Results

During a period from January 2015 to June 2016, a total of 410 specimens of lungs from autopsy subjects received at autopsy section of Histopathology Department at a tertiary care hospital in Ahmedabad were studied. Age wise distributions of these autopsy cases are shown in Table 1.

Table 2 shows the sex wise distribution of lung lesions. Out of the 410 autopsy study of lungs, 326 (79.5%) were males and 82 (20.5%) were females.

Pneumonia is seen in 82(20%) out of 410 cases. Among which 31(18%) are males and 18(2%) are females. Majority of cases (10.7%) were in the 6th and 7th decade of life.

Granulomatous (tuberculous) lesions are seen in 66(16.1%) out of 410 cases. Among these cases, 59 males affected (14.4%) as compared to 7 females (1.7%). Granulomatous lesions found more commonly in 2nd and 3rd decade of life (6.6% cases).

Emphysematous lesions are seen in 27(6.6%) cases. It was found more commonly in the age group of 30–49 years

Table 2: Sex wise distribution of lung lesions (n=410)

Lesion	Male	Female	Total no. of cases
Pneumonias	74	08	82
Tuberculosis	59	07	66
Emphysema	21	06	27
Abscess	02	00	02
Malignant	06	01	07
Terminal stages	118	33	151
Autolysed	11	07	18
Normal lung	35	22	57
Total	326 (79.5%)	84 (20.5%)	410 (100%)

Table 1: Age-wise distribution of lung lesions (n=410)

Lesion	0-9 years	10-19 years	20-29 years	30-39 years	40-49 years	50-59 years	>=60 years	Total (%)
Pneumonia	05	08	09	07	09	25	19	82 (20%)
Tuberculosis	04	11	16	07	08	11	09	66 (16.1%)
Emphysema	00	00	02	06	11	05	03	27 (6.6%)
Abscess	00	00	00	01	01	00	00	02 (0.5%)
Malignant	00	01	00	00	01	03	02	07 (1.7%)
Terminal stages	06	09	10	18	22	40	46	151 (36.8%)
Autolysed	00	00	03	07	06	02	00	18 (4.4%)
Normal lung	02	12	09	08	15	10	01	57 (13.9%)
Total	17	41	49	54	73	96	80	410 (100%)

(4.1% cases). Twenty one (5.1%) males affected out of 410 cases and 6 (1.5%) females affected out of 410 cases.

There were 7 cases of malignant lesions, among which 6 (1.5%) cases were in males above 40 years of age. Among malignant lesions, there were 2 cases of squamous cell carcinoma, 1 case of small cell carcinoma, 1 case of adenocarcinoma, 2 cases of poorly differentiated large cell carcinoma and 1 case of leukemic infiltration of lung tissue.

Discussion

The results of this study show that among the pulmonary diseases, pneumonia (Figure 1) is the commonest disease affecting more commonly persons above 50 years of age (7.45% cases). There are 82 (20%) cases of pneumonia out of 410. Males (18%) are more commonly affected than females (2%). History of smoking is present in 28% of cases. This result is comparable to the findings of Fang et al., (2004) study which shows 15% of cases of pneumonia. Forty percent of cases of pneumonia have a history of smoking.^[9]

In our study, there were 66 (16.1%) cases of tuberculosis out of 410 cases, among which 11 cases (16.7%) are of miliary tuberculosis involving lung, liver, kidney, and spleen. Granulomatous lesions are more common in males than females, occurring more commonly in 2nd and 3rd decade of life (6.6% cases). In our study, 14 male cases (14.4%) and 7 female cases (2.3%) have granulomatous lesions (Figure 2). These findings are comparable to Hjortn et al study and similar results also found in Sanefugi et al study, in which 19% of cases are of miliary tuberculosis among all tuberculosis cases.^[10,11]

The result showed that there are 27 (6.6%) cases of emphysema out of 410 cases. Emphysema (Figure 3) affected 21 (5.1%) males and 6 (1.5%) females, among which 44.4% of the cases were associated with smoking. Similarly, Niazi in her Morphological study of pulmonary embolism in autopsy cases found significantly greater numbers (77.5%) of emphysema cases in smokers.^[12]

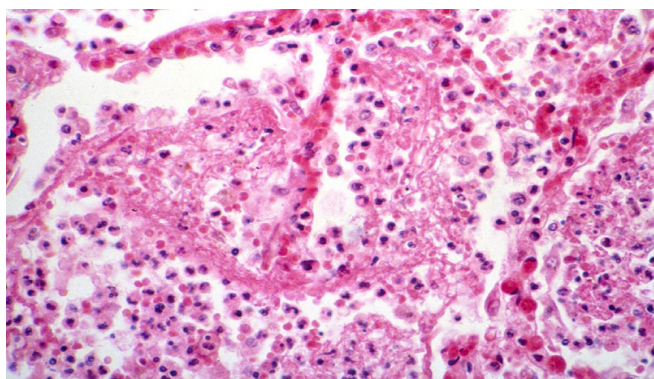


Figure 1: Shows abundant acute inflammatory cell infiltrate, focal areas of oedema, and congestion (pneumonia, H, and E stain)

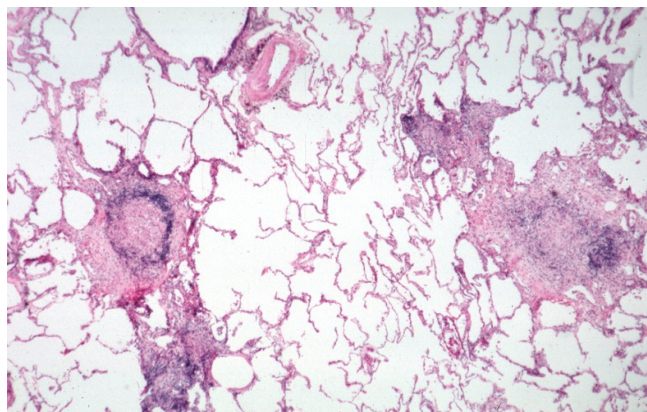


Figure 2: Shows granuloma formation with central area of caseation, Langhans' giant cell at periphery (tuberculosis, H, and E stain)

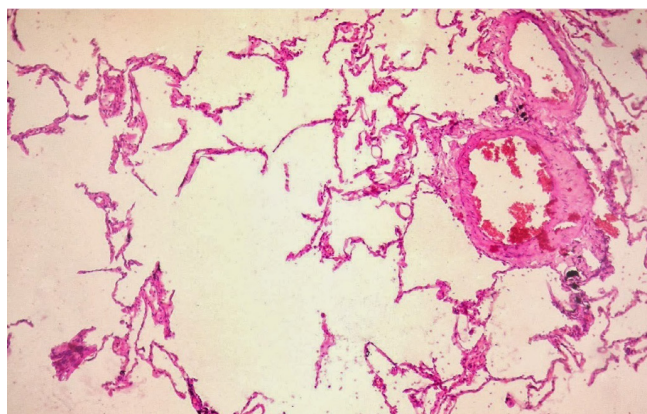


Figure 3: Shows abnormally large alveoli with focal destruction of alveoli separated by thin septa and few pigment-laden macrophages (emphysema, H, and E stain)

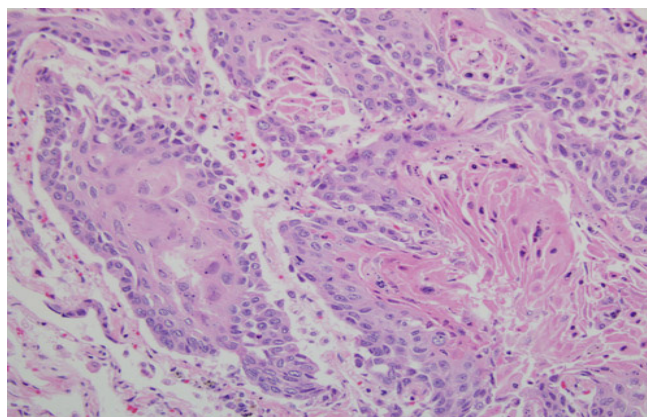


Figure 4: Shows malignant squamous cells involving lung tissue (squamous cell carcinoma, H and E stain)

In our study, we found 7(1.7%) cases of malignancy, most commonly occurring in male above the age of 40 years. Malignant lesions were more common in males (1.5 %) as compared to females (0.2 %). We found 1 case of leukemic infiltration of lung tissue present in female aged 12 years.

In rest of cases, the majority were showing changes of terminal events like interstitial edema, congestion, and changes due to cardiovascular causes e.g. pulmonary embolism. These cases more commonly associated with cardiac pathology e.g. myocardial infarction. In 18 cases, lungs were autolysed and 57 cases showed the morphology of normal lung.

Conclusion

The study shows the incidence of various lung lesions in the autopsy specimens received in a tertiary care hospital in Ahmedabad. Pneumonia is the most common pathological change observed in this study. Lung lesions are more common in males as compared to females. There is a strong association of smoking with emphysema and malignancy which indicates that there is some influence of environmental factors in their pathogenesis.

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