

Prevalence of lung lesions at autopsy: A histopathological study

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ABSTRACT

Introduction: Infections, occupational diseases and neoplastic lesions are common in lungs. In Autopsy internal organs including lungs are studied to determine cause of death and to study prevalence of various lung lesions. So, prophylactic prevention plan can be prepared for prevention of various lung lesions induced mortality and reducing need for invasive biopsy as well. **Materials and Methods:** This retrospective study was carried out in Pathology department. Tissue bits from lungs, retrieved at the time of autopsy, were preserved in 10% formalin, processed and examined microscopically. A total of 200 cases were received during the period of June 2021 to October 2022. **Results:** Among these 200 cases, in 10 cases (5%) the tissue was autolysed. Wide spectrum of microscopic findings were seen, the commonest being congestion (39%) followed by pneumonia (19.5%). There were 13% cases of inflammation in which 5.5% are of granulomatous type. There were 3% cases of intra alveolar hemorrhage and around 0.5% cases of interstitial fibrosis. The study also had 3.5% cases of malignancies. **Conclusion:** This study highlights various lesions in lungs confirmed by histopathology, which were either incidental or direct cause of death. The shortcoming in present study was non receipt of whole organ or representative sample at the time of autopsy, which if overcome will set much higher standard of autopsy reporting and would be a more useful tool in understanding cause of death.

Key words: Histopathology, Medicolegal autopsy, Lung lesions.

INTRODUCTION

Autopsy as a word means self-study of dead body. It is an important way to find out the condition of internal organs, to evaluate disease or injury that could explain the cause and manner of person's death¹. Autopsy is often followed by histopathological examination of tissues from various organs. Inflammation, Infections, occupational diseases and neoplastic lesions are common pathology observed in lungs^{2,3}. Clinical history, laboratory tests and radiological study support diagnosis of lung lesions but invasive biopsy for histopathological examination is necessary for confirmation and deciding prognosis of lung lesions.⁴

Modern diagnostic tests are costly and sometime clinicians have less time for diagnostic work up due to rapid progression of disease. Therefore, it is very important to determine common cause of death and prevalence of various lung lesions to prepare prophylactic plan for prevention of such lung lesions induced mortality.^{5,6} In that manner, need of invasive procedure like lung biopsy can be minimized.⁷

Histopathological examination of autopsy samples of the lungs analysed has been presented in this study. This study describes the prevalence and pattern of lung diseases in medicolegal autopsies, confirmed by histopathological examination.

AIMS AND OBJECTIVES

To study the prevalence and pattern of lung diseases in medicolegal autopsies, confirmed by histopathological examination.

MATERIALS AND METHODS

This retrospective study was carried out in Autopsy section, Department of Pathology, B.J.Medical college, Ahemdabad over a period from June 2021 to October 2022. All consecutive cases that underwent medicolegal autopsy during this period, irrespective of age and sex, were included in this study. Ethical clearance was not taken because of medicolegal nature of cases. A total of 200 cases of lung autopsy samples were received in the department. All these autopsies were performed by forensic experts. Tissue bits from lungs were preserved in 10% Neutral buffered formalin, then sent to pathology department along with history and clinical details. In this study 4 mm to 5 mm pieces from lung tissues were taken in cassettes and after routine processing, paraffin embedding, blocks were prepared. All the histological sections were stained with Haematoxylin and Eosin stain. Ziehl-Neelson stain and Periodic Acid- Schiff (PAS) stain were also done, wherever required. Then examined microscopically and findings were recorded.

RESULTS

A total of 200 cases were received during the period of study along with relevant clinical details and autopsy findings. Histopathological examination was carried out in each case. Among these 200 cases, in 10 cases (5%) the tissue was autolysed. The age ranged from 2 days to 71 years. There were 11.5% cases below 20 years of age. The majority of the lung samples belonged to autopsies carried out in between 31-40 years age group (23%). There were only 4 cases of more than 70 years age group where autopsies were carried out. In this study 64% cases are of male and 36% cases are of females. [Table-1].

Table 1 - Age and sex wise distribution of Lung lesions in autopsy.

Age (in years)	Male	Female	Total	Percentage
0-10	2	2	4	2%
11-20	12	7	19	9.5%
21-30	18	20	38	19%
31-40	31	15	46	23%
41-50	29	10	39	19.5%
51-60	22	8	30	15%
61-70	12	8	20	10%
>70	2	2	4	2%
Total	128	72	200	100%

Wide varieties of microscopic findings were seen in lungs which included edema and congestion, inflammation (acute, granulomatous and nonspecific), changes in interstitium, pneumonia and intra alveolar hemorrhage. There were seven cases of malignancies are seen which include one case each of Squamous cell carcinoma, Metastatic carcinoma, Ewings sarcoma, Non hodgkins lymphoma and Neuroendocrine carcinoma and two cases of Adenocarcinoma of lung. [Table 2].

Among the pathological findings detected in lung autopsies, there were 128 (64%) males and 72 (36%) females. Congestion and edema were the commonest pathology seen. These cases showed congested blood vessels and intra-alveolar haemorrhages, alveoli distended with protein rich fluid. The second common pathology was pneumonia seen in 39 cases characterized by vascular engorgement, intra-alveolar fluid and neutrophilic infiltrate. Granulomatous inflammation was also seen 11 cases and they were ZN stain positive showing presence of Acid Fast Bacilli (AFB). Caseous necrosis was present in all these cases and these were diagnosed to be suffering from pulmonary tuberculosis. [Fig-1 and 2].

Table 2- Distribution of various Lung lesions in autopsy

Sr. no.	Lesions	Total number of cases	Percentage
1	Congestion	78	39%
2	Pneumonia	39	19.5%
3	Pulmonary edema	33	16.5%
4	Inflammation	15	7.5%
5	Tuberculosis	11	5.5%
6	Autolysed	10	5%
7	Malignancy	7	3.5%
8	Intraalveolar haemorrhage	6	3%
9	Fibrosis	1	0.5%
10	Total	200	100%

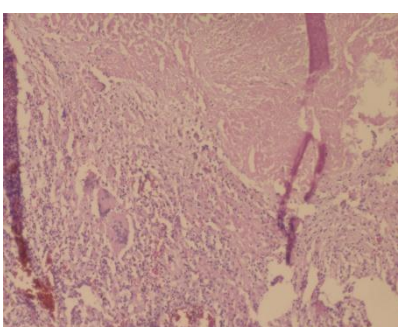


Fig-1: Gross image of Tuberculosis. Showing multiple white foci and cavitary lesions. Fig-2: Histology shows Langhans type giant cells and caseous necrosis suggestive of granulomatous inflammation.

In this study we have also observed 7 cases of malignancy which includes primary malignancies i.e cases of Adenocarcinoma, Squamous cell carcinoma, Small cell carcinoma and Neuroendocrine tumor of lungs; secondary malignancies i.e. Metastatic Ewings sarcoma and Metastatic carcinoma of lungs. Small cell carcinoma of lung shows the small round to oval basophilic tumor cells that are arranged in sheets and can be identified spreading just under the bronchial epithelium [Fig-3 and 4]. Neuroendocrine tumor shows organoid or nesting pattern, cells are large with abundant cytoplasm with nuclear pleomorphism.

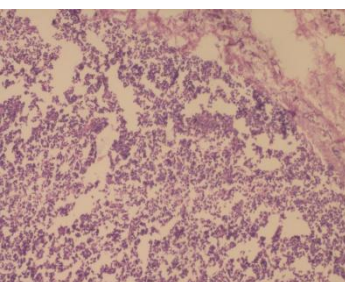


Fig-3: Gross image of small cell carcinoma of lung showing whitish soft friable mass Fig- 4: Shows round to oval blue cells with minimal cytoplasm, thin delicate fibrovascular stroma is

There were two cases of adenocarcinoma of lung showing glandular differentiation, fibrovascular core is also seen in between the nesting of neoplastic cells. [Fig-5 and 6].

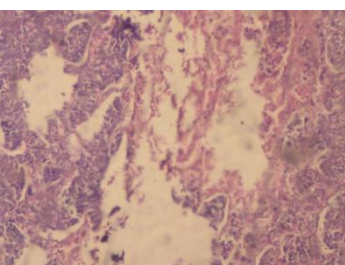


Fig-5: Gross image of Adenocarcinoma of lung whitish, solid firm to hard mass. Fig-6: Microscopic image showing Adenocarcinoma of lung with glandular differentiation.

DISCUSSION

Medicolegal autopsies are a mandatory legal requirement in unnatural deaths to assist the law. To perform a medicolegal autopsy, consent from relatives of the deceased is not required. The facilities for medicolegal autopsies are available across all districts of this country. The autopsy, if combined with relevant details and histopathological examination, is of great value in establishing reasons which led to death¹.

Kandy NC et al., quoted that even in the era of high-tech medicine the autopsy remains an important tool for quality assessment of clinical diagnoses⁸. As far as lungs are concerned, these were normal in only 9.80% of the total number of autopsies in their study. In this retrospective study of 200 cases, the autopsy samples of lungs were autolysed in ten cases. 46 among these 200 cases were adults between 31-40 years age group. Kaur et al. study also shows similar findings with maximum cases ranges between 20-30 years of age followed by 31-40 years of age. [Table 3]¹³

Table 3: Age distribution of Lung lesions in autopsy in Kaur et al. study¹³.

Age (in years)	This study (%)	Kaur et al. study (%)
0-10	2	0
11-20	9.5	0
21-30	19	30
31-40	23	27
41-50	19.5	21
51-60	15	9
61-70	10	11
>70	2	2
Total	100	100

Bal MS et al., in their study of 150 cases had 19 autolysed sample and 11 cases with normal lung tissue.³ The very low number of autolysed samples in this study was probably due to availability of autopsy facilities in the hospital. There was male predominance in this study with males and females accounting for 128(64%) and 72(36%) respectively. Tahir et al., study had 80.37% of male cases while 19.63% of female cases⁶.

In this study, congestion was the most common finding, seen in 78 cases. It was 39% of the total lung cases with pathological changes. Similar observations were also observed in Kaur et al. as mentioned in the table 4.¹³ It could be a death related change or secondary involvement of lungs in all forms of terminal events due to cardiovascular causes.

Table 4: Distribution of various Lung lesions in autopsy in Kaur et al. study¹³.

Sr. no.	Lesions	This study (%)	Kaur et al. study (%)
1	Congestion	39	63
2	Pneumonia	19.5	10
3	Pulmonary edema	16.5	19
5	Tuberculosis	5.5	6
7	Malignancy	3.5	1
8	Intraalveolar haemorrhage	3	1

The second common finding was pneumonia in this study. Such changes could be due to pollution, smoking or any restrictive lung disease leading to fibrosis. In this study, we came across 39 cases (19.5%) of acute pneumonia. Kandy NC et al., found 26.3% cases of pneumonia on histopathology of lung samples in their study of 51 cases.⁸ Their study emphasized discordance in the diagnosis made on gross examination of lungs and final histopathological diagnosis at autopsy, particularly in cases of bronchopneumonia. Hunt CR et al., also had similar observations of discordance in the final diagnosis.

Granulomatous inflammation was seen in 11 cases (5.5%) in this study. Caseous necrosis and epithelioid cell granulomas were seen in all these cases and positive for AFB on ZN

staining. Thus, Autopsy confirmed these cases having definitive diagnosis of pulmonary tuberculosis. Similar results were seen in Garg M, et al. study.¹² In Garg M, et al. study granulomatous inflammation was an incidental finding in majority of the cases (6 out of 8) not correlating with post mortem findings or history. This could have been due to ignorance on the part of doctors not investigating the possibility of tuberculosis despite suspicious symptomatology. Kandy NC et al., found tuberculous changes in lungs confirmed by histopathology in 15.78% cases in their study of 51 cases.⁸

Malignancies were seen in 7 cases in this study(3.5%). Which includes primary malignancies i.e two cases of Adenocarcinoma and one cases of each of Squamous cell carcinoma, Small cell carcinoma and Neuroendocrine tumor of lungs. Secondary malignancies i.e. Metastatic Ewings sarcoma and Metastatic carcinoma of lungs also observed.

CONCLUSION

Facilities of histopathological examinations of the autopsied tissues are available only in small number of institutions which often leads to delay and damages to the autopsy tissue samples. Also, factors like inadequate sampling, improper fixation and failure to send representative sections lead to contradiction between autopsy findings and histopathological examination. The histopathological examination helps in establishing the final cause of death. In addition to that it also provides additional information about prevalence of nosocomial infections in critical areas of hospital, identifying the hereditary conditions that would require genetic counselling, prevalence of chronic infective diseases like Tuberculosis and diseases related to pollution and work place environment, as found in this study. This study highlights various lesions in lungs which were either incidental or direct cause of death. The histopathological diagnosis on autopsy correlated well with clinical cause of death in this study.

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