

MORPHOLOGICAL ANALYSIS OF PULMONARY LESIONS IN AUTOPSIED PATIENTS AT A TERTIARY HEALTHCARE CENTER

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ABSTRACT

Introduction: Lungs are vital organs involved in various diseases like infectious, inflammatory, nonneoplastic, neoplastic lesions and involved secondarily in almost all forms of terminal diseases. The lungs are also involved in almost all terminal events of cardiovascular disease. As pathological examination of lungs gives valuable information, autopsy is performed to know the distribution and progression of diseases and to detect undiagnosed lung diseases. **Aims and objectives:** To study histomorphological pattern and frequency of pulmonary lesions encountered in lung autopsies. **Materials and methods:** This study is a retrospective study done in the autopsy section, department of pathology, government medical college, surat over a period of 1 year from January-December, 2022. The cases were investigated for lung pathology. **Results:** After thorough histopathological examinations, of total 945 cases, various pulmonary lesions were identified in 446 cases. 393 out of 446 cases were males (88%), while 53 were female (12%). Most commonly affected age group was 41-50 years 113 cases (25.33%) followed by 31-40 years 101 cases (22.64%). In the present study, non neoplastic lesions were more common. Most common was pulmonary edema in 218 cases (48.87%). Other were pneumonia (27.57%), alveolar hemorrhage (22.86%), chronic venous congestion (11.88%) and tuberculosis (8.96%). Rare lesions reported were adenocarcinoma, squamous cell carcinoma and non-hodgkins lymphoma. **Conclusion:** In our population, the present study reveals that infectious disease are still the most common cause of mortality, despite recent advances in diagnostic technology. Post-mortem examination of diseased lung offers the chances to establish a diagnosis and help us to confirm an uncertain antemortem diagnosis.

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INTRODUCTION

- Lungs are one of the vital organs in body and participate in exchange of gases between inspired air and blood.[1]
- Lungs are vulnerable for wide range of diseases like infectious, inflammatory, nonneoplastic, neoplastic lesions and involved secondarily in almost all forms of terminal diseases, including all terminal events of cardiovascular disease. Millions of people around the world suffer from preventable chronic respiratory

diseases, which are based on various factors such as age, sex, socioeconomic status, food habits, lifestyle, locality, associated infections and endemic diseases. [1]

- The clinical and radiological findings in pulmonary diseases are nonspecific, hence prompt pathology investigations and diagnosis are essential to improve patient's survival and reduce further morbidity and mortality.[2]
- Autopsy is an important and most useful way to find out the condition of internal organs.[3] As pathological examination of lungs gives valuable information, autopsy is performed to know the distribution and progression of diseases and to detect undiagnosed lung diseases.[1]

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- Aim of present study was to examine spectrum of histomorphological pattern and frequency of pulmonary lesions encountered in lung autopsies like pneumonia, tuberculosis, pulmonary edema and chronic venous congestion etc.

MATERIALS AND METHODS

- This study was a retrospective study carried out at autopsy section, Department of Pathology, tertiary healthcare hospital of south gujarat. All the autopsy cases received during a period of one year from January 2022 to December 2022 irrespective of age, sex and cause of death were included in the study.
- Completely autolysed specimen and partial autopsies where lung specimens were not received were excluded from the study.
- The records and histopathological slides of autopsy cases during the study period were retrieved and reviewed.
- Information regarding age, sex, brief history of illness, any clinical findings, investigations and in situ postmortem findings were obtained from the request form sent by Medical Officer / Forensic expert.
- Gross examination findings of lungs including size, weight, color, consistency, status of bronchi and pleura and any pulmonary lesions like presence of consolidation, nodule, bullae, abscess, necrosis or infarction, fibrosis/scarring, congestion, edema and secretion were retrieved from autopsy record.
- All the histopathological slides were reviewed and findings were noted. Pathological findings of other organ specimens were also recorded and relevant findings were correlated for systemic involvement.
- Descriptive statistics were used for data analysis and data were entered into Microsoft excel sheet. Results were demonstrated in the form of tables and graphs

RESULTS

- In the present study a total of 945 autopsy cases were received during study period from January 2022 to December 2022, out of which 798 cases were included in study after excluding autolysed cases and cases where lungs were not received for examination. After thorough histopathological examinations, of total 798 cases, various pulmonary lesions were identified in 446(55.88%) cases while in 352 cases(44.11%) no significant pathology was seen.
- In the present study, out of 446 cases where pathological findings were observed in lung, 442(55.38%) cases showed non neoplastic lesions and 4(0.50%) cases showed neoplastic lesions.
- 393 out of 446 cases were males(88%), while 53 were female(12%). In the present study males to females ratio was 7.41:1.
- Most commonly affected age group was 41-50 years,i.e., 113 cases(25.33%) followed by 31-40 years 101 cases(22.64%) followed by 21-30 years 96

cases(21.52).(Fig.1)

- Fig.2 show distribution of various pulmonary lesions.

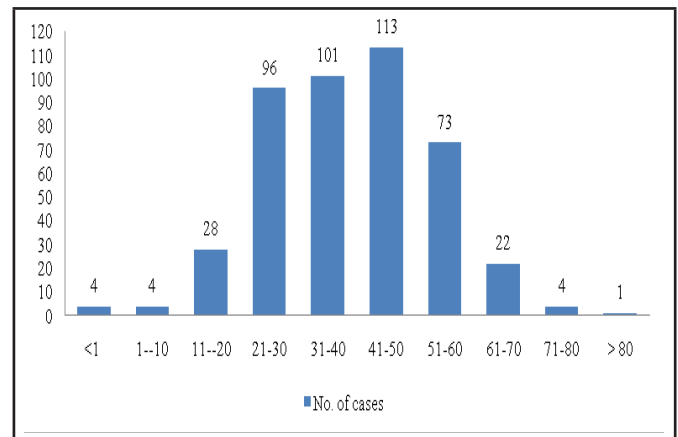


Figure 1. Age wise distribution of cases(N=446)

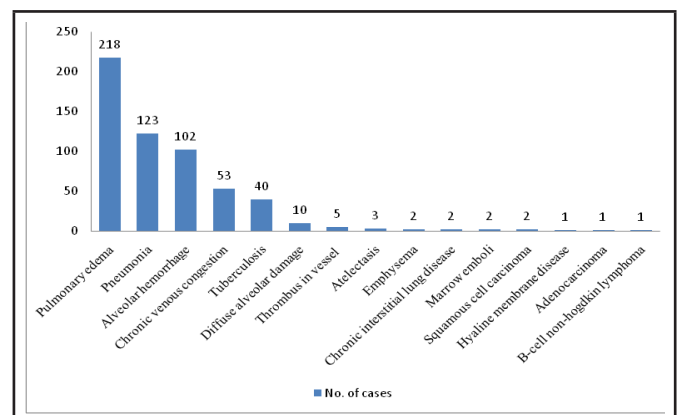


Figure 2. Distribution of various pulmonary lesions(n=446)

- Out of total 446 cases pulmonary edema were the most common findings seen in 218(48.87%) cases followed by pneumonia in 123(27.57%) cases and alveolar hemorrhage in 102(22.86%) cases.[Table.1]
- Pneumonia was found in 123(27.57%) cases. Among which 111 cases(90.24%) were males and 12(9.75%) were females. Majority of cases were in 41-50 years age group(29.26%) followed by 21-30 years age group(21.13%).
- Other concomitant pathological lesions observed in 41 cases of pneumonia. Most common associated lesion with pneumonia was tuberculosis in 22 cases followed by pulmonary edema in 11 cases, diffuse alveolar damage in 4 cases, alveolar hemorrhage in 3 cases and abscess formation in 1 case. [Table.2]
- Another common pathological finding noted were chronic venous congestion in 53 cases(11.88%). Out of 53 cases, 43 cases were associated with atherosclerotic lesion, 26 cases were associated with ischemic heart disease and 8 cases were associated with cardiac hypertrophy.
- Among 40 cases of tuberculosis 35 cases (87.5%) were males and 5 cases (12.5%) were females. The most common age group affected was 41-50 years followed by 31-40 years. Among 40 cases, systemic involvement

Table 1. Age wise distribution of pulmonary lesions

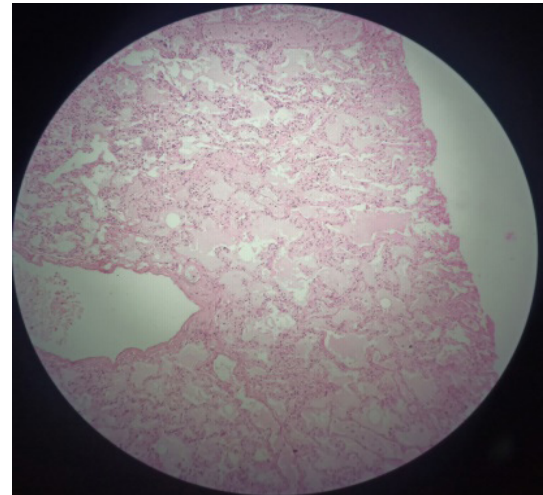
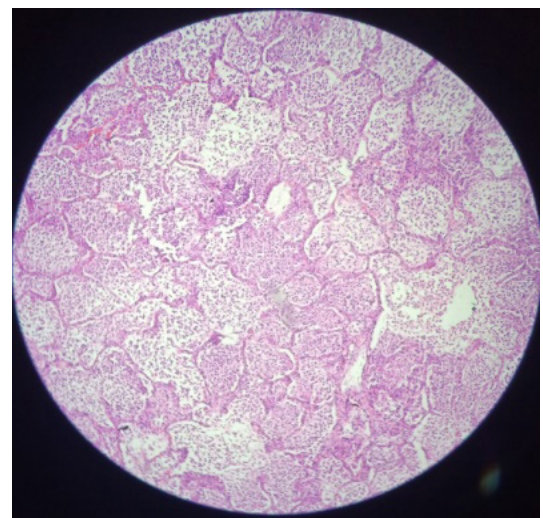
Histopathological findings	<1	1--10	11--20	21-30	31-40	41-50	51-60	61-70	>70	Total(%)
Pulmonary edema	1	2	14	55	53	45	37	10	1	218(48.87%)
Pneumonia			4	26	21	36	24	11	1	123(27.57%)
Alveolar hemorrhage	1	1	13	22	29	24	10	2		102(22.86%)
Chronic venous congestion				5	12	22	10	1	3	53(11.88%)
Tuberculosis		1		6	9	15	5	4		40(8.96%)
Diffuse alveolar damage (acute lung injury)	1		1	3	1	3	1			10(2.42%)
Thrombus in vessel				2	1		1	1		5(1.12%)
Atelectasis	1		2							3(0.67%)
Emphysema						1	1			2(0.44%)
Chronic interstitial lung disease						2				2(0.44%)
Marrow emboli				1				1		2(0.44%)
Squamous cell carcinoma						2				2(0.44%)
Hyaline membrane disease	1									1(0.22%)
Adenocarcinoma								1		1(0.22%)
B-cell non-hodgkin lymphoma						1				1(0.22%)

or miliary lesions noted in other organs like liver, spleen, kidney, brain and intestine in 19 cases(47.5%). Tuberculous pneumonia was found in 22 cases(55%).

- Diffuse alveolar damage or acute lung injury were noted in 10 cases. Other pathological lesions noted were thrombus in vessel, atelectasis, emphysema, chronic interstitial lung disease, marrow emboli, hyaline membrane disease and malignancy.
- One case of hyaline membrane disease was seen in a preterm baby having gestational age of 28-30 weeks.
- Four cases(0.89%) of malignant lesion were identified among which one case was of adenocarcinoma in 70 year male with metastasis in liver, two cases of squamous cell carcinoma and one case was of non-hodgkin's lymphoma(B-cell type) with history of multiple lymphadenopathy.

Table 2. Concomitant lesions observed with pneumonia

Histopathological findings	Number of cases
Pneumonia with tuberculous inflammation	22
Pneumonia with pulmonary edema	11
Pneumonia with diffuse alveolar damage	4
Pneumonia with alveolar hemorrhage	3
Pneumonia with abscess	1
Total	41


Figure 3. Microscopic picture of Pulmonary edema show alveoli filled with fluid. H & E (10 X)

Figure 4. Microscopic picture of Pneumonia show alveoli filled acute inflammatory infiltrates. H & E (10 X)

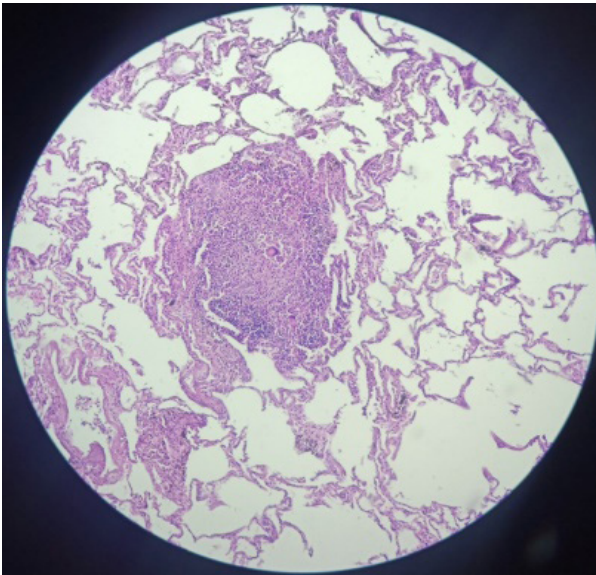


Figure 5. Microscopic picture of Pulmonary Tuberculosis shows granuloma formation with Langhans giant cell and caseous necrosis. H & E (10 X)

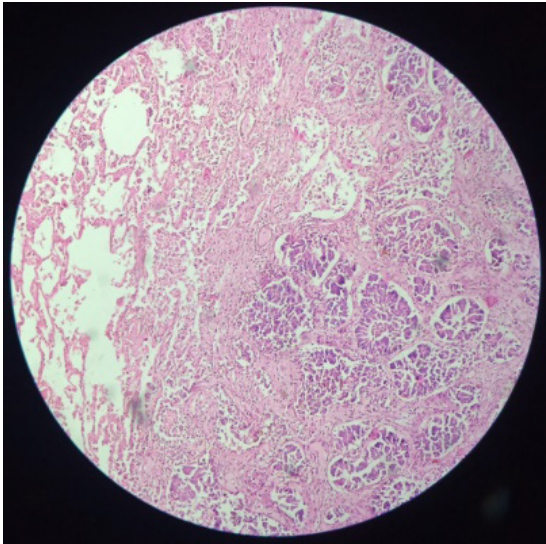


Figure 6. Microscopic picture of Adenocarcinoma. H & E (10 X)

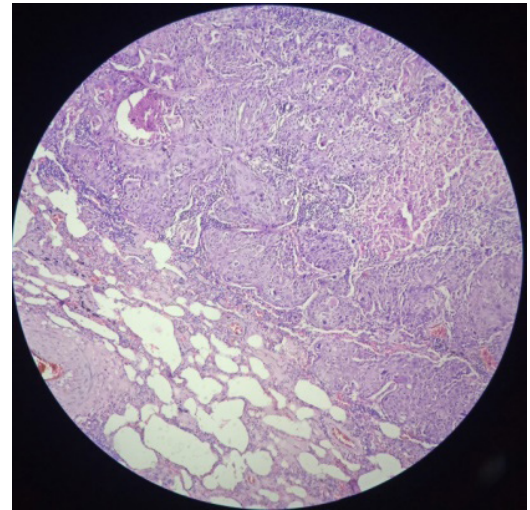


Figure 7. Microscopic picture of Squamous Cell Carcinoma. H & E (10X)

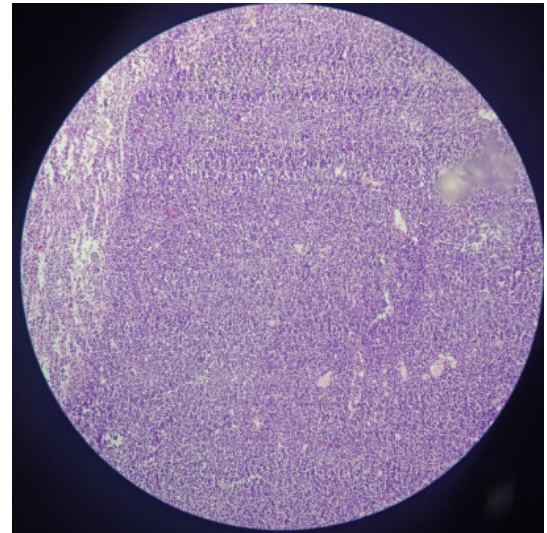


Figure 8. Microscopic picture of Non Hodgkin Lymphoma. H & E (10X)

- In present study male (88%) were more commonly affected than female which was comparable with study done by Sweta et al and Amin NS et al.[3,5]

Table 3. Comparison of distribution of lesions with various other studies

	Present study	Bal MD et al[8]	Chauhan G et al[2]	Mangal K et al [9]	Sumaya et al[1]
Non neoplastic	55.38%	78%	82.9%	90%	92.2%
Neoplastic	0.50%	2%	2.08%	0.41%	0.87%

DISCUSSION

- In present study, age wise distribution of pulmonary disease showed the maximum number of cases in 41-50 years age group (25.33%) followed by 31-40 years age group (22.64%) which is comparable to study done by Sumaya et al, Selvambigai G et al and Chauhan G et al.[1,4,2]
- In present study out of total 798 cases, various pulmonary lesions were identified in 446(55.88%) cases while in 352 cases(44.11%) no significant pathology was seen.

- In the study done by Khare Pet al carried out on 86 cases, out of which 56 cases(65.1%) showed pathological lesions.[6] Kour B et al conducted study on 250 lung specimens, pathological lesions were seen in 169 cases(67.6%).[7] Findings of our study are in concordance with Khare P et al and Kour B et al.[6,7]
- Out of 446 cases where pathological findings were observed in lung, 442(55.38%) cases showed non neoplastic lesions and 4(0.50%) cases showed neoplastic lesions which are comparable with study done by Bal et al, Chauhan et al, Mangal et al and

Sumaya et al.[8,2,9,1] Table.3 show comparison of distribution of lesions with various other study.

- In present study, pulmonary edema was found in 218(48.87%) cases which was comparable with study of Udayashankar SK et al and Khare et al who found 54.54% and 42.85% of cases respectively.[10,6]
- Pneumonia was found in 123(27.57%) cases which was comparable with study of Udayashankar SK et al, Chauhan G et al, Amin NS et al and Kurawar et al who found 31.81%, 14.62%, 20% and 19.16% of cases respectively, however Mangal K et al and Tahir TM et al have lesser number of cases 7.99%, 4% respectively and Selvambigai G SK et al found higher number of cases (40%).[10,2,4,11,9,12,5] This difference may be due to difference in study population or geographic variation and environmental factors.
- In present study there were 40(8.96%)cases of pulmonary tuberculosis and 19 cases (47.5%) also showed milliary tuberculosis involving various organs like liver, spleen, kidney, brain and intestine. These findings are comparable with the study of Sumaya et al (6.5%), Bal MS et al (8.7%), Chauhan G et al (6.26%) and Garg M et al (8.7%).[1,8,2,13]
- 4(0.89%) cases of malignant lesion were identified among which 1case was of adenocarcinoma and two cases of squamous cell carcinoma and one case was of non-hodgkin's lymphoma(B-cell type), which is comparable with study done by Mangal K et al Chauhan G et al, Bal MS et al and Amin NS et al which showed 0.41%, 2.08%, 2% and 1.7% malignant lesions respectively.[9,8,4]

CONCLUSION

- The study shows the wide spectrum of lung lesions in the autopsy specimens received at a tertiary healthcare hospital in south gujarat.
- Non neoplastic lesions were common in the present study. Among non neoplastic lesion, pulmonary edema was the most common followed by pneumonia, alveolar hemorrhage, chronic venous congestion and tuberculosis.
- More than one histomorphological change was seen in majority of the Cases.
- Pneumonia and pulmonary tuberculosis are more commonly observed pathology in our set up which suggest infectious disease are still remaining to be the common cause of mortality. Despite the availability of effective treatment for most cases, tuberculosis is still a cause of death in our environment because of failure

of timely diagnosis and treatment. Public awareness of these disease, timely diagnosis and proper treatment are valuable for reducing preventable cause of death, considering increasing incidence of extra-pulmonary tuberculosis.

References

1. Sumaya, Aruna S, Gurudut KS, Kittur SK. Histomorphological pattern analysis of lung autopsies in a tertiary care hospital. *Indian J PatholOncol* 2020;7(2):279-284.
2. Chauhan G, Agrawal M, Thakkar N, Parghi B. Spectrum of histopathological lesions in lung autopsy. *J Res Med Den Sci* 2015;3(2):109-12.
3. Shweta, Mahajan D, Mahajan V, Angmo P. Histopathological pattern in lung autopsy in government medical college Jammu. *J Evolut Medic Dent Sci*. 2015;4(91):15694-6.
4. Selvambigai G, Amudhavalli S, Chakravarthi DCD, Ravi S. Histopathological study of lung in autopsy cases: a prospective study. *Int J Res Med Sci* 2016;4:4816-9.
5. Amin NS, Shah PY, Patel RG, Khant VS, Prajapati SG. Histopathological alterations in lung tissue received as autopsy specimens- a study of 410 cases. *Int J Med Sci Public Health* 2017;6:327-330
6. Khare P, Gupta R, Ahuja M, Khare N, Agarwal S, Bansal D. Prevalence of lung lesions at autopsy: A histopathological study. *J Clin Diagnostic Res*. 2017;11(5):13-6.
7. Kour B, Singh K, Kaur A. Histopathological spectrum of lesions in lung autopsy- a one year retrospective study. *International Journal of Research and Review*. 2019; 6(8):168-171.
8. Bal MS, Sethi PS, Suri AK, Bodal VK, Kaur G. Histopathological pattern in lung autopsies. *JPAFMAT*. 2008;8(2):29-31.
9. Mangal K, Dhakar P, Yadav A, Gupta K, Gandhi S. Magnitude of pulmonary diseases - Incidentally diagnosed on autopsy-At largest hospital &Medical college of Rajasthan. *Int J Cur Res Rev*. 2016;8(8):37-43.
10. Udayashankar SK, Shashikala P, Kavita GU, Pruthvi D. Histomorphological pattern of lung in medicolegal autopsies. *Internat J Sci Res*. 2015;4(7):1937-9.
11. Kurawar RR, Vasaikar MS. Spectrum of Histomorphological Changes in Lungs at Autopsy: A 5 Year Study. *Annals of PatholLaborat Medic*. 2017;4(1):A106-A112.
12. Tahir TM, Rehmna F, Anwar S, Kamal F. Pattern of pulmonary morphological lesions seen at autopsy. *Biomedica*. 2013;29:64-8.
13. Garg M, Aggarwal AD, Singh S, Kataria SP. Tuberculous lesions at autopsy. *J Indian AcadForensic Med*. 2011;33(2):116-9.

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