

ASSESSMENT OF INCIDENTAL OBSTRUCTIVE LUNG DISEASE & PULMONARY VASCULATURE IN AUTOPSY SPECIMENS.

Histopathology

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ABSTRACT

Introduction: Chronic obstructive lung disease (COPD) is the second most common cause of noncommunicable disease-related deaths in India. However, it is a substantially underdiagnosed condition, as the diagnosis is generally missed or delayed till the disease is advanced. The aim of this study was to determine the frequency, age and sex distribution & vascular changes of obstructive lung disease in autopsy specimens. **Material and Method:** A retrospective study was done on non-autolysed lung specimens of 199 autopsies received during January to December, 2020. Gross specimens and H&E-stained sections were reassessed. **Result:** Obstructive pulmonary disease was identified in 9.0% autopsy specimens. Emphysema was noted in 7.5%, chronic bronchitis in 0.5%, small airway disease in 0.5% and asthma in 0.5% cases. All obstructive lung diseases were seen 2nd decade onwards with a predominance in 30-60 years. Males were affected more than females in the ratio of 5:1. Vascular changes were noted in 19% cases of all the obstructive lung disease. **Conclusion:** Incidental Obstructive lung disease and vascular changes suggestive of pulmonary arterial hypertension can be detected in autopsy.

KEYWORDS

Asthma, Chronic bronchitis, Emphysema, Obstructive lung disease, Small airway disease, Vascular changes in lung

INTRODUCTION

Chronic obstructive lung disease is currently the fourth leading cause of death in the world.^[1] In India, COPD is second most common cause of noncommunicable disease-related deaths in India.^[2] After the age of 30-year, prevalence of COPD rapidly increases which is more in men compared to women.^[3] However, it is a substantially underdiagnosed condition, as diagnosis is generally missed or delayed till disease is advanced. This appears to be first study on autopsy lung looking for incidental obstructive lung disease & pulmonary vasculature status.

The aim of the study was to determine the frequency, age and sex distribution & vascular changes of obstructive lung disease in autopsy specimens.

MATERIAL & METHOD

A retrospective hospital-based study of histomorphology of Obstructive Lung disease was done on autopsy specimens after approval from Ethical Committee. All consecutive non-autolysed samples that were received for autopsy during January 2020 to December 2020 were included in this study.

All specimens were reassessed for microscopic and gross examination. All specimens were photographed and available history notes were recorded. Microscopic features of all the specimens were assessed by a single senior pathologist who was blinded about the history.

RESULT

Total 199 specimens of lung were received during the study period. The age of the patients varied from 2 days to 85 years.

Table I: Proportion Of Obstructive Lung Disease In Autopsy Lung Specimen

Histopathological diagnosis	No. of cases	Percentage (%)
Emphysema (Fig:1)	15	7.5
Chronic bronchitis (Fig:2)	1	0.5
Small airway disease (Fig:3)	1	0.5
Asthma (Fig: 4)	1	0.5
Bronchiectasis	0	0
Total	18	9.0

The proportion of obstructive disease in the study of 199 specimens was hence 9.0%, emphysema being the most common identified lesion.

Table II: Age & Sex Wise Distribution Of Obstructive Lung

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Disease In Autopsy Lung Specimen

Histopatho-logical diagnosis	0-9 year (n= 5)	10-19 year (n= 12)	20-29 year (n= 28)	30-39 year (n= 34)	40-49 year (n= 42)	50-59 year (n= 47)	≥60 year (n= 31)	Male	Female
Emphysema	-	-	-	-	1	3	-	3	1
Compensatory Emphysema	-	-	1	2	2	1	5	10	1
Small airway disease	-	-	-	-	1	-	-	1	-
Asthma	-	-	-	1	-	-	-	-	1
Bronchiectasis	-	-	-	-	-	-	-	-	-
Total	-	-	1	3	4	5	5	15	3

Age wise Obstructive lung diseases were seen 2nd decade onwards with predominance in 30-60-year age group. Emphysema was seen over 30 years, chronic bronchitis, small airway disease and asthma were seen in 5th, 4th and 3rd decade respectively. Sex wise males were commonly affected in obstructive lung disease with ratio of 5:1. Out of all cases of emphysema, classical emphysema was seen in four cases. Compensatory emphysema (Fig:5) was seen in 11 cases. Compensatory emphysema was seen on microscopy, but not on macroscopic examination. These cases were associated with some other pathology.

Vascular changes were seen in 3 out of 18 cases (16.6%) of obstructive lung disease. All were associated with emphysema, one of which was classical emphysema and two were of compensatory emphysema.

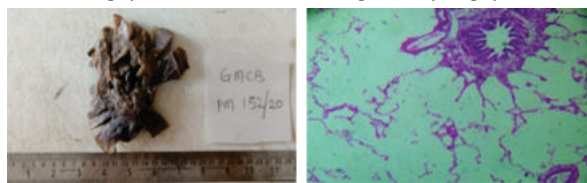


Figure1: Emphysema (classical). (A) Gross Appearance Showing Sub-pleural Bleb (arrow) (B) Shows Broken Septa Floating In Alveoli In Another Case (arrow) [H&E 4x]

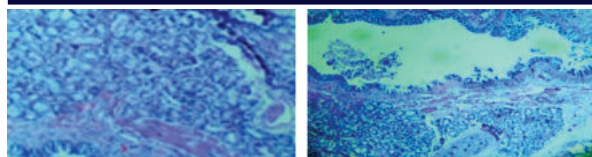


Figure 2: Chronic Bronchitis (A) Shows Increased Mucus Gland (arrow) And Inflammatory Infiltrate In Bronchi (arrowhead) [H&E 4x] (B) Inset Shows Shift From Seromucinous To Mucinous Gland. [H&E 10x]

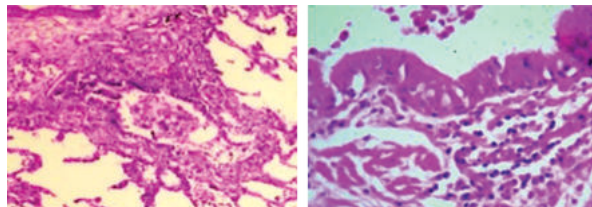


Figure 3: Small Airway Disease (A) Shows A Bronchiole Less Than 2mm Surrounded By Chronic Inflammation (arrow) And Lumen Containing Shed Epithelial Cells And Inflammatory Cells [H&E 10x] & (B) Shows High Power View Of Lymphocyte And Plasma Cell. [H&E 40x]

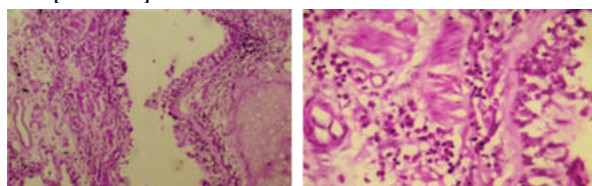


Figure 4: Asthma (A) Shows Sub-basement Membrane Thickening (arrow) & Inflammatory Infiltrate In Bronchi (arrowhead) Lumen Shows Shed Epithelial Cells, Mucus And Increased Goblet Cells. [H&E 10x] (B) Eosinophils (arrow) Plasma Cell (arrow Head) Infiltrate In Bronchi [H&E 40x]

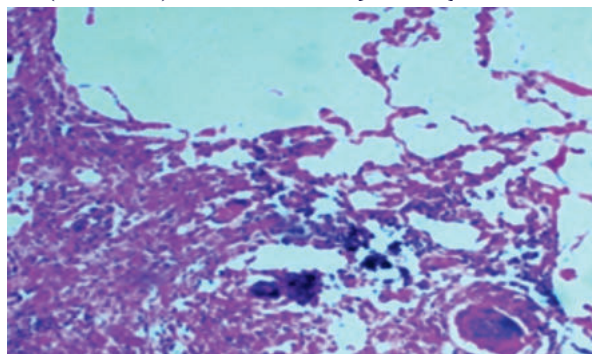


Figure 5: Compensatory Emphysema Shows Compensatory Dilatation In A Case Of Granulomatous Lung (arrow) [H&E 10x]

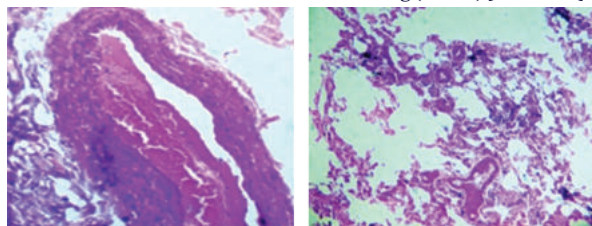


Figure 6: Pulmonary Vascular Changes (A) Show A Large Artery With Both Intimal And Medial Thickening (non-atherogenic) In Case Of Emphysema & (B) Shows Small Artery Proliferation And Thickening (arrow) Inside Alveolar Wall Which Is Easily Visible Even At 4x View In Case Of Emphysema.

DISCUSSION

Of all obstructive lung diseases, emphysema was the most common lesion identified. This result is comparable with Amin N et al. ^[4] (6.6%), Khare P et al. ^[5] (8.7%) and Gunja RS et al. ^[6] (10.3%).

Cases of emphysema showed dilated alveoli separated by thin alveolar septa, ruptured alveolar wall with many alveoli showing spurs of broken septa. The cases diagnosed as compensatory emphysema also showed dilated alveoli and broken spurs but were associated with an additional pathology like tuberculosis, intra- alveolar haemorrhage, inflammation or pulmonary oedema.

Table-3: Sex Wise Comparison Of Percentage Of Emphysema In Various Studies.

Sl. No.	Study	Male	Female
1	Patel D et al. [7]	2.3%	0.8%
2	Gunja R et al. [6]	6.8%	3.4%
3	Garg P et al. [8]	18%	5%
4	Guru A et al. [9]	2%	2%
5	Amin N et al. [4]	5.1%	1.5%
6	Present study	6.5%	1.0%

In present study, emphysema was more commonly seen in males & this male predominance is comparable with all studies. The reason could be due to smoking amongst males.

The only case of chronic bronchitis of present study was seen in a 50-year-old male, which is comparable with Dhruw D et al. ^[10] who also had only a single case in their study of 474 specimens.

The case of chronic bronchitis showed increased mucus gland and inflammatory infiltrate in bronchi. The case in the present study was incidentally also associated with tuberculosis and focal bronchopneumonia.

There was one case of small airway disease in this study. It showed inflammation around small bronchioles (<2 mm in size) which comprised of lymphocytes and plasma cells & it was associated with narrowing of bronchioles.

Bronchial asthma was seen in one case. Microscopic picture showed eosinophils, lymphocytes and plasma cell infiltration in the wall of bronchi and mild sub-basement membrane thickening due to fibrosis. Lumen showed shed epithelial cells, mucus and increased goblet cells. In the lung parenchyma, it also showed secondary emphysematous changes and alveolar wall thickening in focal areas. No other study of autopsy of lungs have detected bronchial asthma.

Bronchiectasis was not detected in present study. It has not been detected in most other studies except in a 5-year study of Kurawar RR ^[11], where they detected bronchiectasis in 0.3% cases.

In this study, obstructive lung disease was seen in 9.0% of the total autopsy cases. Guru et al. ^[9] also found obstructive lung disease in 7% cases. However, Dhruw et al. ^[10] have reported less than 1% in their study. All 3 studies are autopsy studies.

Pulmonary vascular changes are usually noted in moderate to severe cases of obstructive pulmonary disease in the form of intimal fibrosis and fibromuscular hyperplasia. Some of them showed tortuous arteries. In present study severity of obstructive lung disease was not known as all cases except two were incidentally detected. Three cases showed non-atherogenic thickening of intimal and medial wall layers of large arteries and also thickening of vessels present inside alveolar wall such that they were easily visible at scanner view.

None of the obstructive lung disease or vascular changes were severe enough to have caused the death.

Limitation: The limitation of this study was that only a part of lung was received as autopsy specimen in most of the cases. Detection of obstructive lung disease would be more precise if whole lung was received as pathology of asthma, bronchiectasis and chronic bronchitis lies in bronchi.

CONCLUSION

Incidental Obstructive lung disease are detected in autopsy specimen, including pulmonary arterial hypertension and vascular abnormalities which is a sign of developing pulmonary arterial hypertension. It gives a rough estimate about the undetected cases of obstructive lung disease.

REFERENCES

1. Kumar V, Abbas AK, Aster JC. Robbins & COTRAN pathologic basis of disease. 10th

- ed. Vol.1. Amsterdam: Elsevier; 2020. Page no. 678-688.
2. Gudi N, Mahmood A, Roy MP, Nayak P, Verma A. Burden of COPD among population above 30 years in India: protocol for a systematic review and proposed meta-analysis. Canadian Journal of Respiratory Therapy: CJRT= Revue Canadienne de la Thérapie Respiratoire: RCTR. 2021;57:14.
3. Van Schayck OC, D'Urzo A, Invernizzi G, Román M, Stållberg B, Urbina C. Early detection of chronic obstructive pulmonary disease (COPD): the role of spirometry as a diagnostic tool in primary care. Primary Care Respiratory Journal. 2003 Sep;12(3):903.
4. 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.
5. Khare P, Gupta R, Ahuja M, Khare N, Agarwal S, Bansal D. Prevalence of lung lesions at autopsy: a histopathological study. Journal of clinical and diagnostic research: JCDR. 2017 May;11(5):EC13.
6. Gunja RS, Kambala GM, Natta BR. "Histopathological spectrum of lung lesions in autopsy." IOSR-Journal of Dental and Medical Sciences. 2019;18(2):16-20.
7. Patel D, Jani H, Goswami H. Spectrum of Pulmonary lesions in Autopsy cases. Int J Contemp Patho 2020 Jan-June;6(1).
8. Garg P, Sharma A, Kundal RK. Spectrum of pulmonary histopathological lesions: A study of 100 autopsy cases. Journal of medical science & clinical research. 2017;5(12):31304-08.
9. Guru A, Meena H, Dharmalingam S, Singh N, Sutrarak SK. Study of histopathological spectrum of non-neoplastic lesions of the lung in autopsy specimen. Asian Journal of Medical Sciences. 2022 Nov 1;13(11):260-4.
10. Dhruw D, Chikhlikar K, Nayak K, Thakur N, Singh B, Meshram A. Histopathological Spectrum of Lesions in Lungs on Post-mortem Specimen in a Tertiary Centre of Bastar Region-A Retrospective Study. Journal of Clinical & Diagnostic Research. 2020 Sep 1;14(9).
11. Kurawar RR, Vasaikar MS. Spectrum of histomorphological changes in lungs at autopsy: A 5-year study. Annals Pathol Lab Med. 2017 Jan; 5:31304-8.