

**Original Article****Spectrum of histopathological lesions in lung autopsy**

Gautam Chauhan\*, Madhuri Agrawal\*\*, Nirali Thakkar \*\*\*, Bharti Parghi\*\*\*\*

\*Associate Professor, \*\*Tutor, \*\*\*Resident, \*\*\*\*Assistant Professor, Deptt. of Pathology, Government Medical College, Bhavnagar, Gujarat, India

DOI: 10.5455/jrmds.2015323

**ABSTRACT**

**Background:** Hundreds of millions of people around the world suffer from preventable pulmonary diseases. The clinical and radiological findings in respiratory diseases are nonspecific and prompt pathology investigation and diagnosis is essential. Autopsy is an important complementary tool for identifying and understanding respiratory diseases and to find out the condition of internal organs.

**Aims & Objectives:** The objective of this study was to find out occurrence & frequencies of various lung pathologies by histomorphological examination of lung tissue received in autopsy specimens.

**Material & Methods:** The study done on 335 lung specimens from autopsy cases received in this department. Gross findings and microscopic features were recorded. The tissue specimens were fixed and processed. Paraffin sectioning was done followed by Haematoxylin and Eosin staining. The sections were then examined.

**Results:** During period from January 2013 to February 2015, total of 335 lungs from autopsy specimens were studied. Lung diseases are more common in males as compared to females. Most common lung pathological findings are of pneumonia (14.62%), emphysema (7.76%), tuberculosis (6.26%) & malignant lesions (2.08%) 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 for 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 of recent advances in diagnostic technology.

**Key words:** autopsy, tuberculosis, pneumonia, emphysema, smoking

**INTRODUCTION**

The lungs are involved in various kinds of inflammatory, neoplastic and other lesions, but they are secondarily involved in almost all form of terminal events due to cardio vascular causes [1]. Hundreds of millions of people around the world suffer from preventable chronic respiratory diseases [2]. A large number of conditions that involve the parenchyma of lung which may be associated with inflammation, fibrosis or granulomatous reactions [3]. The clinical and radiological findings in pulmonary diseases are nonspecific and prompt pathology 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]. Autopsy is an important and most useful way to find out the condition of internal organs, In which 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 [6]. In our study condition of the lungs studied grossly & histopathologically. Gross pathologic examination of autopsy lungs yields information regarding status of lung-collapsed or hyper inflated, presence of scarring, fibrosis, bullae, consolidation, nodules, infarction, secretions, edema, congestion, granuloma /abscess formation and also provides information regarding status of bronchi & pleura which may provide hint to the diagnosis. 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 co morbidities increase the risk of developing specific histopathological patterns.

## MATERIAL AND METHODS

**Sample size:** The present study was conducted on lung specimens of 335 routine autopsies received in the department of pathology, Autopsy section, government Medical College, Bhavnagar, Gujarat to find out the frequency of various pulmonary lesions at autopsy.

**Methods:** All the autopsy subjects irrespective of age, sex & 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, status of bronchi & pleura & findings are recorded [7]. Irrespective of the presence or absence of morphologically demonstrable lesions, a minimum of two sections

per lung were studied (total 4 sections per autopsy). After routine processing and paraffin embedding 4 micro meter section were taken. All the histological sections were stained in H & E stain & mounted. All the histological section was examined microscopically & findings are recorded [8].

**Ethical consideration:** Permission of institutional review board before conducting the study was taken.

## RESULTS

During a period from January 2013 to February 2015, a total of 335 specimens of lungs from autopsy subjects received from Bhavnagar and Amreli district were studied, at the Autopsy section of the Pathology department of Government Medical College, Bhavnagar.

Age wise distributions of these autopsy cases are shown in Table no. 1.

**Table 1: Age wise distribution of lung lesion (n = 335)**

Lesion	Age gp 0-9 yrs	Age gp 10-19 yrs	Age gp 20-29 yrs	Age gp 30-39 yrs	Age gp 40-49 yrs	Age gp 50-59 yrs	Age gp ≥60 yrs	Total (%)
<b>Pneumonias</b>	2 (0.59%)	5 (1.49%)	4 (1.19%)	6 (1.79%)	7 (2.08%)	14 (4.17%)	11 (3.28%)	49 (14.62%)
<b>Tuberculosis</b>	0 (0%)	2 (0.59%)	2 (0.59%)	7 (2.08%)	5 (1.49%)	3 (0.89%)	2 (0.59%)	21 (6.26%)
<b>Emphysema</b>	0 (0%)	1 (0.29%)	2 (0.59%)	7 (2.08%)	9 (2.68%)	3 (0.89%)	4 (1.19%)	26 (7.76%)
<b>Malignant</b>	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	0 (0%)	1 (0.29%)	5 (1.49%)	7 (2.08%)
<b>Terminal stages</b>	6 (1.79%)	10 (2.98%)	14 (4.17%)	29 (8.65%)	31 (9.25%)	40 (11.94%)	52 (15.52%)	182 (54.32%)
<b>Autolysed</b>	0 (0%)	0 (0%)	2 (0.59%)	1 (0.29%)	3 (0.89%)	1 (0.29%)	1 (0.29%)	8 (2.38%)
<b>Normal lung</b>	4 (1.19%)	6 (1.79%)	8 (2.38%)	9 (2.68%)	6 (1.79%)	4 (1.19%)	5 (1.49%)	42 (12.53%)
<b>Total</b>	12	24	33	59	61	66	80	335

**Table 2: Sex wise distribution of lung lesions**

Lesion	Male (%)	Female (%)	Total Number of cases (%)
<b>Pneumonias</b>	31(9.25%)	18 (5.37%)	49 (14.62%)
<b>Tuberculosis</b>	14 (4.17%)	7 (2.08%)	21 (6.26%)
<b>Emphysema</b>	18 (5.37%)	8 (2.38%)	26 (7.76%)
<b>Malignant</b>	6 (1.79%)	1 (0.29%)	7 (2.08%)
<b>Terminal stages</b>	141 (42.08%)	41 (12.23%)	182 (54.32%)
<b>Autolysed</b>	5 (1.49%)	3 (0.89%)	8 (2.38%)
<b>Normal lung</b>	25 (7.46%)	17(5.07%)	42 (12.53%)
<b>Total</b>	240 (71.64%)	95 (28.36%)	335 (100%)

Table-2 shows the sex wise distribution of lung lesions. Out of the 335 autopsy study of lungs, 248 (74%) were males and 87 (26%) were females.

Pneumonia is seen in 49(14.62%) out of 335 cases. Among which 31(9.25%) are males & 18(5.37%) are females. Majority cases (7.45% cases) were in 6th & 7th decade of life.

Granulomatous (Tuberculous) lesions are seen in 21(6.26%) out of 335 cases. Among these cases, 14 males affected (4.17%) as compared to 7 females (2.08%). Granulomatous lesions found more commonly in 4th & 5th decade of life (3.57% cases).

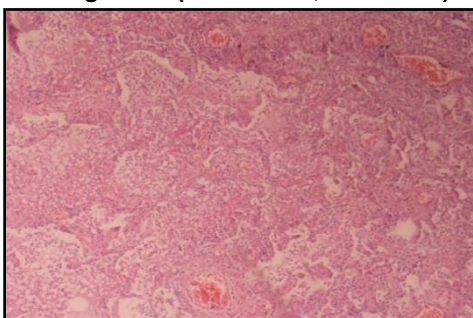
Emphysematous lesions are seen in 26(7.76%) cases. It was found more commonly in age group of 30-49 years (4.76% cases). 18(5.37%) males affected out of 335 cases & 8 (2.38%) females affected out of 335 cases.

There were 7 cases of malignant lesion, among which 6 (1.79%) cases were in male above 50 year of age. Among malignant lesion, there were 3 cases of small cell carcinoma, 1 case of squamous cell carcinoma, 1 case of adenocarcinoma, 1 case of poorly differentiated large cell carcinoma & 1 case of metastatic carcinoma probably arising from primary choriocarcinoma.

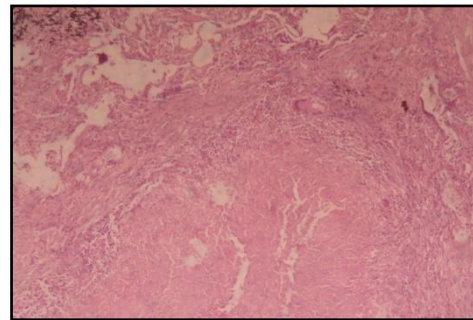
## DISCUSSION

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 49 (14.62%) cases of Pneumonia out of 335. Males (9.25%) are more commonly affected than females (5.37%). History of smoking is present in 23 % of cases. This result is comparable to the findings of Fang et al (2004) study which shows 15% of cases of pneumonia. 40% of cases of pneumonia have history of smoking. [9].

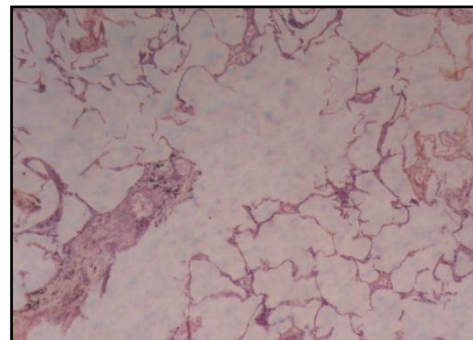
**Figure 1: Shows abundant acute inflammatory cell infiltrate, focal areas of oedema & congestion (Pneumonia, H&E Stain)**



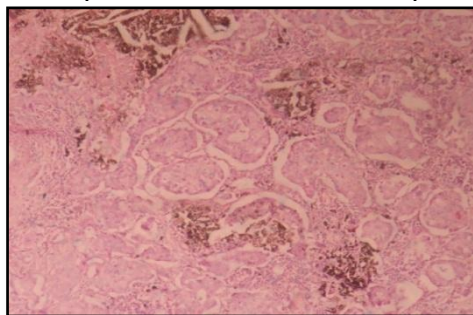
**Figure 2: Shows granuloma formation with central area of caseation, Langhans' giant cell at periphery (Tuberculosis, H&E Stain)**



**Figure 3: Shows abnormally large alveoli with focal destruction of alveoli separated by thin septa & few pigment laden macrophages (Emphysema, H&E Stain)**



**Figure 4: Shows acinar pattern of glandular proliferation with mucin production by tumor cells & few pigment laden foamy macrophages (Adenocarcinoma, H&E Stain)**



In our study, there were 21(6.26%) cases of tuberculosis out of 335 cases, among which 5 cases (23.80 %) are of miliary tuberculosis involving lung, liver, kidney & spleen. Granulomatous lesions are more common in males than females, occurring more commonly in 4th & 5th decade of life (3.87% cases). In our study, 14 male cases (4.17%) & 7 female cases (2.08%) 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 26 (7.76%) cases of emphysema out of 335 cases. Emphysema (Figure -3) affected 18 (5.37%) males & 8 (2.38%) females in their fourth & fifth decade of life (3.57% cases). Among which 43% 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].

In our study, we found 7(2.1%) cases of malignancy, most commonly occurring in male above the age of 50 years. Malignant lesions of were more common in males (1.79 %) as compared to female (0.29 %). Among malignant lesion, there were 3 cases of small cell carcinoma, 1 case of squamous cell carcinoma, 1 case of adenocarcinoma (Figure 4) and 1 case of poorly differentiated large cell carcinoma. We found 1 case of metastatic lung carcinoma most probably arising from choriocarcinoma present in female aged 26 year. Similar findings of malignancy found in Tanaka et al study, where the 3.3% cases are of primary lung malignancy.

In rest of cases, Majority were showing changes of terminal events like interstitial edema, congestion & changes due to cardiovascular causes. Majority of cases were of male (42.08%) & only 12.23% females, more common above the age of 50 years. These cases more commonly associated with cardiac pathology e.g. myocardial infarction. In 8 cases, lungs were autolysed and 42 cases showed morphology of normal lung.

## CONCLUSION

The study shows incidence of lung lesions in the population of Bhavnagar & Amreli district of Gujarat. Lung lesions are more common in males as compared to females. There is strong association of smoking with emphysema and malignancy which indicates some influence of environmental factors in their pathogenesis.

## REFERENCES

1. Manjit S Bal, P S Sethi, Anil K Suri, Vijay K Bodal, G Kaur. Histopathological pattern in lung autopsies. *jpafmat* 2008; 8(2):29-31.

2. Jhon E Hall. Guyton and Hall Textbook of Medical Physiology, 13th Edition, Elsevier: Saunders, 2015.
3. Kumar Abbas, Aster, Robbins, Cotran. Pathologic basis of disease. South Asia Ed. Vol 2, Elsevier:2014
4. Kasper, Fauci, Hauser, Longo, Jameson, Loscalzo. Harrison's principles of internal medicine, 19th ed. Vol 2, Mc Graw Hill; Indian edition:2015.
5. Ghosal R, Kloer P, Lewis KE. A review of novel biological tools used in screening for the early detection of lung cancer. *Postgraduate Medical Journal* 2009; 85: 358-63.
6. KS Narayan Reddy, OP Murty. The essentials of Forensic Medicine and Toxicology, 33rd edition. JayPee Brothers:2014.
7. S Kim Suvarna, Christopher Layton, Jhon D Bancroft. Bancroft's Theory and Practice of Histological Techniques, 7th Ed., New York: Churchill Livingstone:2013.
8. Rapheal, Briyant, Hyde, Inwood, Mellor, Spencer, Thomson. Lynch's Medical Laboratory Technology. 4th Ed. Philadelphia: Saunders:1983.
9. Fang F, Lin FR, Li HZ. Clinicopathologic analysis of organizing pneumonia in elderly Autopsies. *Zhonghua Bing li xue za zhi Chinese Journal of Pathology*. 2004;33(2):113-116.
10. Sanefuji H, Adachi H, Baba K, Oda S, Nakata H, Hayashi M et al. An autopsy case of miliary tuberculosis & review of autopsy cases in japan. *J UOEH*. 1984 Mar 1;6(1):75-86.
11. Hjorth L, Jensen HS, Noer H. Acute pulmonary infections at autopsy. A study of clinical and microscopic diagnoses at autopsy compared with microscopic autopsy findings. *Ugeskr Laeger*. 1995; 157(49): 6873-6.
12. Niazi S. Morphological study of Pulmonary Embolism in autopsy cases. [Thesis]. Lahore: University of the Punjab, 1989.

### Corresponding Author:

Dr Gautam Chauhan ,  
Plot No: 20/450,  
Sagwadi, Kaliyabid,  
Bhavnagar-364002  
Gujarat, India  
E-mail: dr\_gautamchauhan@yahoo.com

Date of Submission: 25/05/2015  
Date of Acceptance: 23/06/2015

**How to cite this article:** 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.

**Source of Support:** None  
**Conflict of Interest:** None declared