

# Prevalence of Lung Lesions at Autopsy: A Histopathologic Study

ABDUL SAMAD<sup>1</sup>, AMIR BUX DETHO<sup>2</sup>, EJAZ AHMED AWAN<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>3</sup>Associate Professor & Chairman, Department of Forensic Medicine & Toxicology, <sup>2</sup>Assistant Professor of Pathology, Peoples University of Medical & Health Sciences for Women, Nawabshah, Shaheed Benazirabad, Sindh, Pakistan

Correspondence to: Dr. Ejaz Ahmed Awan, Email: forensicawan@outlook.com, Cell: 0300-3219531

## ABSTRACT

**Background:** The rate of autopsy has declined and has reached to less than 10%. The need for autopsy is still required in the 21<sup>st</sup> century despite the advancement of radiologic investigations to elaborate the immediate cause of death.

**Objective:** To analyze the findings on lung autopsy in patients who died of natural causes in hospital setting.

**Study Design:** Retrospective study.

**Place and Duration of Study:** Department of Pathology and Department of Forensic Medicine & Toxicology, Peoples University of Medical & Health Sciences for Women, Nawabshah Shaheed Benazirabad from 1st January 2016 to 31st December 2018.

**Patients and Methods:** Families of 103 patients consented to undergo lung autopsy. The inclusion criteria includes patient died in the hospital setting due to medical causes and those giving informed consent for autopsy. Patients dying of trauma, due to any surgical intervention and drug overdose were not included in the study. Patients were asked during their life if they wanted to participate in study. Families were also consented and when agreed were included. Patients who consented to participate but refused by the families were not included.

**Results:** There were 41 females while 62 were males. The mean age was 48±6.7 years. On lung autopsy, 43 had congestion and edema, 21 patients had interstitial changes, 5 patients had granulomatous inflammation, 7 patients had emphysematous changes, 2 patients had fungal colonies, and 15 patients had lung consolidation. Combination of old fibrosis and emphysematous changes were present in 10 patients (p=0.002).

**Conclusion:** The real reason behind patient's death which can help in diagnosis and management. In today's era, there are multiple diagnostic modalities available in the form of radiologic and biochemical form however certain conditions cannot be detected and is found on autopsy.

**Keywords:** Histopathologic, Lung lesions, Autopsy

## INTRODUCTION

In the modern world, the rate of autopsy has declined and has reached to less than 10%. There are multiple reasons for this decline.<sup>1</sup> In Pakistan the reasons for the extremely low percentage of people opting for autopsy are religious and cultural beliefs, high cost, and lack of awareness and risk of infection.<sup>2</sup>

The post-mortem report has ever been helpful to clinicians in guiding them the management and course of disease. Some clinicians have tried replacing post-mortem autopsy with post-mortem computed tomographic (CT) scans and magnetic resonance (MR) imaging. However many studies have proved that the real cause differs between CT scans, MRI scans and autopsy findings. These radiologic investigations also have some limitations such as failure to identify acute myocardial infarction, multi-organ failure and pulmonary embolus.<sup>3,4</sup>

The need for autopsy is still required in the 21<sup>st</sup> century despite the advancement of radiologic investigations to elaborate the immediate cause of death. The objective of this study is to analyze the findings on lung autopsy in patients who died of natural causes in hospital setting.

## PATIENTS AND METHODS

This retrospective study was carried out at Department of Pathology and Department of Forensic Medicine & Toxicology, Peoples University of Medical & Health Sciences for Women, Nawabshah Shaheed Benazirabad from 1st January 2016 to 31st December 2018. Families of 103 patients consented to undergo lung autopsy. The

inclusion criteria includes patient died in the hospital setting due to medical causes and those giving informed consent for autopsy. Patients dying of trauma, due to any surgical intervention and drug overdose were not included in the study. Patients were asked during their life if they wanted to participate in study. Families were also consented and when agreed were included in the study. Patients who consented to participate but refused by the families were not included in the study. Spouse, adult children and parents were reached for consent in the order as described. The doctor treating the patient was not involved in the study and in taking consent. However a separate group of physicians were involved and the study was explained in detail to the patient and his family. Forensic expert performed the examination. Biopsy was taken and stored in 10% formalin solution. Sample was then sent to pathologist along with brief summary of the patient. Histologic findings were obtained. Data was entered and analyzed through SPSS-20.

## RESULTS

There were 41 females while 62 were males (Table 1). The mean age was 48±6.7 years. The reasons for admission, recent stroke (n=36), decompensated heart failure (22), interstitial lung disease (n=21), diabetic ketoacidosis (n=10), exacerbation of asthma (n=7), chronic liver disease (n=5) and meningitis (n=2)[Table 2]. Thirty four patients had type II diabetes mellitus, 47 had hypertension, 15 had diabetes mellitus and hypertension, 7 patients had hepatitis C (Table 3). On lung autopsy, 43 had congestion and edema, 21 patients had interstitial changes, 5 patients had

granulomatous inflammation, 7 patients had emphysematous changes, 2 patients had fungal colonies, and 15 patients had lung consolidation (Table 4). Combination of old fibrosis and emphysematous changes were present in 10 patients ( $p=0.002$ ). There were sepsis in 52, arrhythmias in 25 and cardiopulmonary arrest in 26 patients having reasons for death (Table 5).

Table 1: Frequency of genders

Gender	No.	%
Male	62	61.2
Female	41	38.8

Table 2: Reasons for admission to the department of medicine

Reasons for admission	No.	%
Recent stroke	36	35.0
Decompensated heart failure	22	21.3
Interstitial lung disease	21	20.3
Diabetic ketoacidosis	10	9.7
Exacerbation of asthma	7	6.7
Chronic liver disease	5	4.8
Meningitis	2	1.9

Table 3: Frequency of co-morbid conditions

Co-morbid condition	No.	%
Hypertension	47	45.8
Type II diabetes mellitus	34	33.0
Type II diabetes mellitus & hypertension	15	14.5
Hepatitis C	7	6.7

Table 4: Lung autopsy findings

Lung autopsy	No.	%
Congestion and edema	43	41.7
Interstitial changes	21	20.3
Lung consolidation	15	14.5
Fibrosis & emphysematous changes	10	9.0
Emphysema	7	6.7
Granulomatous infection	5	4.8
Fungal colonies	2	1.9

Table 5: Frequency of causes of death

Cause of death	No.	%
Sepsis	52	50.4
Cardiopulmonary arrest	26	25.2
Arrhythmias	25	24.2

## DISCUSSION

The results of the present showed that lung autopsy findings which may account for their death. The most common finding was congestion and edema which was evident in 41.7% of patients. This could have contributed in cardiopulmonary arrest. Interstitial changes were also common found in 21 individuals. Two diabetic patients admitted with diabetic ketoacidosis were found to have incidental finding of fungal colonies on lung autopsy.

The relevance of clinical diagnosis can be assessed by autopsy. The practice of autopsy is falling in many countries because of multiple reasons. Some of the reasons include advancement in diagnosis due to development of various investigations, which confirm the presence of disease responsible for underlying condition of patient, affordability issues, and lack of consent from family. A rare reason which prevents clinicians from suggesting post mortem autopsy is the fear of litigation if

they have been treating the patient with wrong diagnosis.<sup>9</sup> Bobrowitz et al<sup>6</sup> study talks about 21 patients who died of tuberculosis but were diagnosed on autopsy.

Chan et al<sup>7</sup> reported that 68 cases of lung cancers discovered for the first time on autopsy among 5,812 autopsies. Suenet al<sup>8</sup> performed autopsies on 3,572 patients older than 65 years of age and lung cancer was detected in 47 of these patients. Mansaret al<sup>9</sup> reported 24,708 autopsies, 56% of these patients had death from natural causes and 167 (56%) patients had lung cancer.

Caunaet al<sup>10</sup> conducted autopsy of 100 subjects and found asbestos bodies in 41 of them. Two cases had significant interstitial fibrosis and 2 cases had lung carcinoma. Thompson et al<sup>11</sup> reported that the difference in autopsy findings of alcoholics and non-alcoholics. They concluded that alcoholics had greater number of subjects with pneumococcal infection whereas non-alcoholics had decreased number of them.

Puranick et al<sup>12</sup> concluded that post-mortem magnetic resonance imaging can provide accurate results in cases of sudden cardiac death where autopsy couldn't be performed due to cultural and religious beliefs. In his study, postmortem MR imaging was 100% sensitive. The findings in MR scans were similar to the findings in autopsy. Inaiet al<sup>13</sup> correctly identified 70% of cases with the correct cause of death when confirmed with post-mortem CT scans.

Pinto et al<sup>14</sup> reported that the modalities used for clinical diagnosis are 75-90% accurate in making diagnosis however they are not accurate in elaborating the immediate cause of death for which purpose autopsy comes into play.

We highlighted the findings in lungs of patients dying from natural causes. Complete forensic examination both gross and microscopic can help physicians analyze the multiple co-morbid conditions going on and underlying causes of death. An elaborated understanding of the immediate cause of death can help in providing details of the course of disease and more knowledge of its management.

In the developing world like Pakistan, people are hesitant to undergo invasive procedures such as autopsy due to religious beliefs. Another reason we observed in our study which accounts for the low percentage of people opting for autopsy includes the lack of guidance by their physicians. It therefore is the responsibility of physicians to guide them that autopsy can further elaborate the reasons for death and underlying pathology.

## CONCLUSION

The real reason behind patient's death was which can help in diagnosis and management. In today's era, there are multiple diagnostic modalities available in the form of radiologic and biochemical form however certain conditions cannot be detected and is found on autopsy.

## REFERENCES

1. Wichmann D, Obbelode F, Vogel H, Hoepker WW, Nierhaus A, Braune S, Sauter G, Pueschel K, Kluge S. Virtual autopsy as an alternative to traditional medical autopsy in the intensive care unit: a prospective cohort study. *Ann Intern Med* 2012; 156:123-30.
2. Arthurs OJ, van Rijn RR. Paediatric and perinatal postmortem imaging: mortuivivos docent. *Pediatr Radiol* 2015; 45:476-7.

3. Roberts IS, Benamore RE, Benbow EW, Lee SH, Harris JN, Jackson A, Mallett S, Patankar T, Peebles C, Roobottom C, Traill ZC. Post-mortem imaging as an alternative to autopsy in the diagnosis of adult deaths: a validation study. *Lancet* 2012; 379:136–42.
4. Westphal SE, Apitzsch J, Penzkofer T, Mahnken AH, Knuchel R. Virtual CT autopsy in clinical pathology: feasibility in clinical autopsies. *Virchows Arch* 2012; 461:211–9.
5. Lee PN. Comparison of autopsy, clinical and death certificate diagnosis with particular reference to lung cancer. A review of the published data. *APMIS Supplementum* 1994;45:1-42.
6. Bobrowitz ID. Active tuberculosis undiagnosed until autopsy. *Am J Med* 1982; 72(4):650-8.
7. Chan CK, Wells CK, McFarlane MJ, Feinstein AR. More lung cancer but better survival: implications of secular trends in “necropsy surprise” rates. *Chest* 1989;96(2):291-6.
8. Suen KC, Lau LL, Yermakov V. Cancer and old age. An autopsy study of 3,535 patients over 65 years old. *Cancer* 1974;33(4):1164-8.
9. Manser RL, Dodd M, Byrnes G, Irving LB, Campbell DA. Incidental lung cancers identified at coronial autopsy: implications for overdiagnosis of lung cancer by screening. *Resp Med* 2005;99(4):501-7.
10. Cauna D, Totten RS, Gross P. Asbestos bodies in human lungs at autopsy. *JAMA* 1965;192(5):371-3.
11. Thomsen JL, Søggaard P. Bacteria in lung tissue from an autopsy population of alcoholics. *Forensic Sci Int* 1999;99(1):53-9.
12. Puranik R, Gray B, Lackey H, Yeates L, Parker G, Dufloy J, Semsarian C. Comparison of conventional autopsy and magnetic resonance imaging in determining the cause of sudden death in the young. *J Cardiovasc Magn Reson* 2014;16(1):44.
13. Inai K, Noriki S, Kinoshita K, Sakai T, Kimura H, Nishijima A, Iwasaki H, Naiki H. Postmortem CT is more accurate than clinical diagnosis for identifying the immediate cause of death in hospitalized patients: a prospective autopsy-based study. *Virchows Arch* 2016;469(1):101-9.
14. Pinto CFL, Cordeiro JA, Cury PM. Clinical and pathological disagreement upon the cause of death in a teaching hospital: analysis of 100 autopsy cases in a prospective study. *Pathol Int* 2008; 58:568–71.