

Original Research

Assessment of diffuse Alveolar Damage of the Lungs in Forensic Autopsies: An observational study

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ABSTRACT:

Background: The present study was conducted for assessing diffuse Alveolar Damage of the Lungs in Forensic Autopsies. **Materials & methods:** A total of 100 reports with histopathological samples in 150 cases on which an autopsy was performed were investigated. 30 subjects >18 years of age who were diagnosed with diffuse alveolar damage (DAD) were included. Hematoxylin- and eosin-stained lung preparations were re-examined. Causes of death were classified. DAD phase assessment was done. The results were analysed using SPSS software. **Results:** Among the 30 cases, alveolar exudate was seen in 23 cases while alveolar acute inflammation, alveolar fibrin and histocyte desquamation were seen in 21 cases, 18 cases and 19 cases respectively. Alveolar epithelial cell desquamation and hyaline membrane were seen in 21 cases and 22 cases respectively. Significant results were obtained while correlating type of diffusion with staging (exudative and proliferative) among cases with alveolar exudate, Alveolar fibrin and histocyte desquamation. **Conclusion:** DAD exudative and proliferative lesions may be detected during forensic autopsies.

Keywords: Lung, Forensic, Alveolar

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INTRODUCTION

Classification of biopsy specimens from patients with a clinical picture of acute lung injury often presents a difficult diagnostic challenge. Diffuse alveolar damage (DAD) and bronchiolitis obliterans with organizing pneumonia (BOOP) are well-recognized histologic patterns associated with an acute or subacute clinical presentation, respectively. Both the DAD and BOOP patterns may be associated with known causes, such as collagen vascular diseases, or they may be idiopathic.¹⁻³ In a recently proposed multidisciplinary consensus classification sponsored jointly by the American Thoracic Society (ATS) and the European Respiratory Society (ERS), idiopathic DAD may be referred to as acute interstitial pneumonia and idiopathic BOOP may be referred to as cryptogenic organizing pneumonia (COP). This ATS/ERS statement also recommended using the term organizing pneumonia (OP) for the histologic pattern, rather than BOOP.² Eosinophilic pneumonia (EP)

may also present clinically as an acute or subacute illness in the form of acute EP and chronic EP, respectively.³⁻⁵ Hence; the present study was conducted for assessing diffuse Alveolar Damage of the Lungs in Forensic Autopsies.

MATERIALS & METHODS

The present study was conducted for assessing diffuse Alveolar Damage of the Lungs in Forensic Autopsies. A total of 100 reports with histopathological samples in 150 cases on which an autopsy was performed were investigated. 30 subjects >18 years of age who were diagnosed with diffuse alveolar damage (DAD) were included. Hematoxylin- and eosin-stained lung preparations were re-examined. Causes of death were classified. DAD phase assessment was done. The results were analysed using SPSS software. The p – value <0.05 were considered statistically significant.

RESULTS

Among the 30 cases, alveolar exudate was seen in 23 cases while alveolar acute inflammation, alveolar fibrin and histocyte desquamation were seen in 21 cases, 18 cases and 19 cases respectively. Alveolar epithelial cell desquamation and hyaline membrane were seen in 21 cases and 22 cases respectively. Significant results were obtained while correlating

type of diffusion with staging (exudative and proliferative) among cases with alveolar exudate, Alveolar fibrin and histocyte desquamation. In 34 percent and 30 percent of the cases of DAD, cause of death was physical trauma and fire respectively, while in 10 percent of the cases, the cause was traffic accident.

Table 1: Distribution of the diffusion intensity of histopathologic lesions according to diffuse alveolar damage (DAD) phase

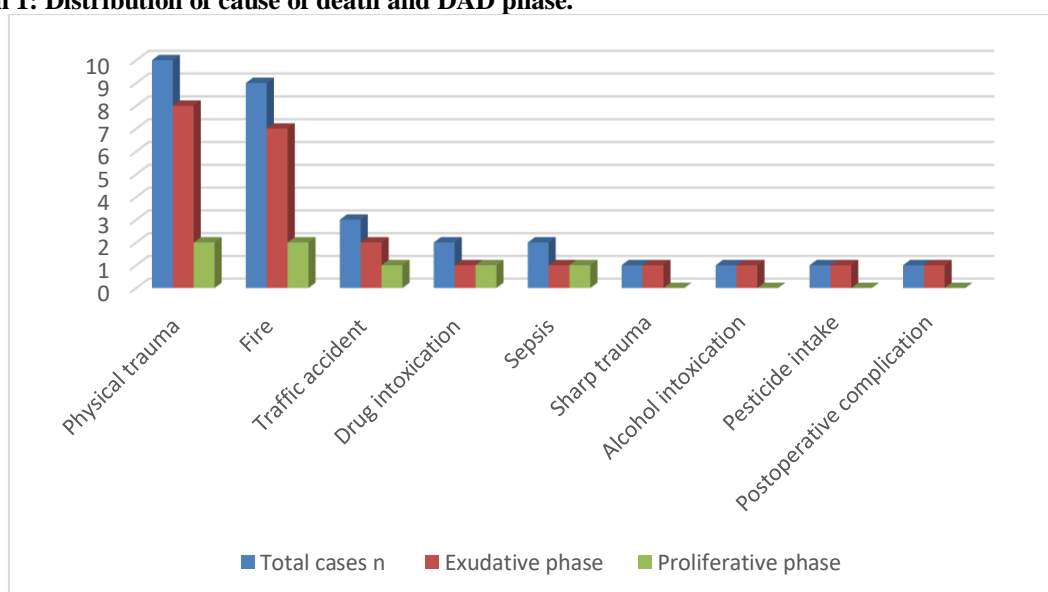
Histopathological lesion	Stage	Diffusion				p- value
		None	Mild	Medium	Intense	
Alveolar exudate (n=23)	Exudative	1	6	6	5	0.001*
	Proliferative	2	2	1	0	
Alveolar acute inflammation (n=21)	Exudative	5	6	1	1	0.328
	Proliferative	5	3	0	0	
Alveolar fibrin (n=18)	Exudative	6	5	3	2	0.000*
	Proliferative	0	1	1	0	
Histocyte desquamation (n=19)	Exudative	2	12	2	1	0.002*
	Proliferative	2	0	0	0	
Alveolar epithelial cell desquamation (n=21)	Exudative	1	11	3	2	0.755
	Proliferative	0	3	1	0	
Hyaline membrane (n=22)	Exudative	8	7	3	0	0.145
	Proliferative	1	2	1	0	

*: Significant

Table 2: Distribution of cause of death and DAD phase.

Cause of death	Total cases n (%)	Exudative phase (n)	Proliferative phase (n)
Physical trauma	10 (34)	8	2
Fire	9 (30)	7	2
Traffic accident	3 (10)	2	1
Drug intoxication	2 (7)	1	1
Sepsis	2 (7)	1	1
Sharp trauma	1 (3)	1	0
Alcohol intoxication	1 (3)	1	0
Pesticide intake	1 (3)	1	0
Postoperative complication	1 (3)	1	0

Graph 1: Distribution of cause of death and DAD phase.



DISCUSSION

The classification scheme of interstitial lung diseases has undergone numerous revisions. The criteria for distinguishing seven distinct subtypes of idiopathic interstitial pneumonias are now well defined by consensus in the recently published ATS/ERS classification of these lung diseases. In our present review the histological patterns of the different types are described and the differential diagnosis of idiopathic interstitial pneumonias is discussed. Surgical lung biopsy remains the gold standard for the diagnosis of interstitial pneumonias, and sampling from at least 2 sites is recommended.⁶⁻⁹ Hence; the present study was conducted for assessing diffuse Alveolar Damage of the Lungs in Forensic Autopsies. Among the 30 cases, alveolar exudate was seen in 23 cases while alveolar acute inflammation, alveolar fibrin and histocyte desquamation were seen in 21 cases, 18 cases and 19 cases respectively. Alveolar epithelial cell desquamation and hyaline membrane were seen in 21 cases and 22 cases respectively. Beasley MB et al investigated the clinical significance of the acute fibrinous and organizing pneumonia (AFOP) histologic pattern and to explore its possible relationship to other disorders. Open lung biopsy specimens and autopsy specimens were selected from the consultation files of the Armed Forces Institute of Pathology, which showed a dominant histologic pattern of intra-alveolar fibrin and organizing pneumonia. Varying amounts of organizing pneumonia, type 2 pneumocyte hyperplasia, edema, acute and chronic inflammation, and interstitial widening were seen. Seventeen patients (10 men, 7 women) with a mean age of 62 years (range, 33-78 years) had acute-onset symptoms of dyspnea (11), fever (6), cough (3), and hemoptysis (2). Associations believed to be clinically related to the lung disease included definitive or probable collagen vascular disease (3), amiodarone (1), sputum culture positive for *Haemophilus influenza* (1), lung culture positive for *Acinetobacter* sp. (1), lymphoma (1), hairspray (1), construction work (1), coal mining (1), and zoological work (1). Six patients had no identifiable origin or association. Follow-up revealed 2 clinical patterns of disease progression: a fulminate illness with rapid progression to death (n = 9; mean survival, 0.1 year) and a more subacute illness, with recovery (n = 8). Histologic analysis and initial symptoms did not correlate with eventual outcome, but 5 of the 5 patients who required mechanical ventilation died.¹⁰ Significant results were obtained while correlating type of diffusion with staging (exudative and proliferative) among cases with alveolar exudate, Alveolar fibrin and histocyte desquamation. In 34 percent and 30 percent of the cases of DAD, cause of death was physical trauma and fire respectively, while in 10 percent of the cases, the cause was traffic accident. Mochimaru H, et al investigated the histopathology of AEP in 2 surgical lung biopsy and 14 transbronchial lung biopsy cases. Additionally, we

determined the presence or absence of different phases of DAD by histopathology in these AEP cases. Characteristic histopathological findings of AEP consist of alveolar edema with infiltration of eosinophils and lymphocytes and edema of perivascular area and interlobular septa. The alveolar spaces showed fibrinous exudates. There were no hyaline membranes or massive intraluminal fibrosis. These histopathological findings of interstitial edema and fluid exudates are consistent with radiological findings of lung edema and can explain the rapid and complete improvement.¹¹

CONCLUSION

DAD exudative and proliferative lesions may be detected during forensic autopsies.

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