

Comparative Characteristics of Fatal and Nonfatal Pulmonary Embolism Based on Autopsy Materials

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Abstract

Pulmonary embolism (PE) remains a leading cause of in-hospital mortality despite modern prophylactic strategies, warranting detailed postmortem analysis to identify risk patterns. This study aimed to compare clinical and morphological features of fatal versus non-fatal PE using autopsy data. A retrospective review was conducted of 1,090 autopsy-confirmed PE cases from in-hospital deaths at the I.I. Dzhanlidze Research Institute in Saint Petersburg between 2020 and 2024, with statistical significance set at $p < 0.05$. Among the deceased, PE was the immediate cause of death in 721 patients (66.1%; fatal cohort) and a contributing complication in 369 (33.9%; non-fatal cohort). Patients with fatal PE were significantly older (73.6 ± 1.5 vs. 70.6 ± 1.8 years) and more frequently female (66.4% vs. 55.6%). Hospital stay was notably shorter in the fatal group (7.8 ± 1.4 days), with 34.8% of deaths occurring within the first 24 hours compared to 18.7% in the non-fatal group (11.3 ± 0.8 days). Occlusion of main pulmonary artery branches was markedly more frequent in fatal cases (28.3% vs. 5.1%), as was recurrent PE (10% vs. 5.4%). Thrombi originating from the inferior vena cava system predominated in fatal PE (72.5% vs. 29.5%), whereas the embolic source remained unspecified more often in non-fatal cases (64.8% vs. 21.2%). Notably, antemortem clinical diagnosis of PE was absent or uncertain in approximately 40% of cases across both cohorts. These findings indicate that fatal PE is strongly associated with advanced age, female sex, early in-hospital occurrence, central artery involvement, and recurrence. The persistently low rate of timely clinical diagnosis in both groups underscores the need for heightened clinical vigilance and improved diagnostic protocols for PE among hospitalized patients.

Keywords

Pulmonary Embolism, Fatal Outcome, Autopsy, Risk Factors, Clinical Diagnosis, Venous Thromboembolism, Hospital Mortality