

## CASE REPORT

## Pulmonary artery aneurysm rupture

Dilek Durak<sup>1</sup>, Bulent Eren<sup>2</sup>, Nursel Turkmen<sup>1</sup>, Recep Fedakar<sup>1</sup>

Uludag University Medical Faculty, Forensic Medicine Department, Görükle 16059, Bursa, Turkey.  
 bulenteren2000@yahoo.com

**Abstract:** Pulmonary artery dissection and aneurysms ruptures are rare events, occasionally reported as a cause of sudden death. We report a 27-year-old man who was admitted to the hospital with history of a loss of consciousness and died soon after resuscitation was performed. On autopsy macroscopic examination, 2500 ml partially coagulated blood was found upon opening the right part of chest, also aneurysmal dilatation and intimal rupture of pulmonary artery distal branch were observed. The aim of this case report is to contribute to a better understanding of the pulmonary artery aneurysm rupture as a cause of sudden death and to emphasise its medical and legal importance (Fig. 1, Ref. 11). Full Text (Free, PDF) [www.bmj.sk](http://www.bmj.sk).  
 Key words: pulmonary artery, aneurysm, rupture, autopsy.

Main pulmonary artery and its branches aneurysm dissection, is a very rare event, occasionally related with sudden death (1–4). Association between pulmonary hypertension and pulmonary artery dissection is reported in the literature (1, 2, 5). We describe a case of sudden death due to pulmonary artery aneurysm rupture. Detection of pulmonary artery pathologies in autopsies is important for the elucidation of sudden death cases related to these lesions and for the development of treatment approaches. The aim of this case report is to contribute to a better understanding of the pulmonary artery aneurysm rupture as a cause of sudden death and to emphasise its medical and legal importance.

## Case report

On June 19, in 2005, a 27-year-old man was admitted to the hospital with a history of a loss of consciousness on the sea beach. Cardio-pulmonary resuscitation was performed, but the resuscitation attempt was ineffective and he died soon after resuscitation was performed. Investigation of medical records revealed that the man was treated for primary pulmonary hypertension and tricuspid insufficiency for six year period. His family members claimed that he had been treated for his cardiac problem in a public and military hospital, where he was admitted with fatigue and shortness of breath complaints six years ago. There it was explained that the patient had cardiovascular disease, which represented a serious disease of the heart and vascular system and should be treated. According to the cardiology consultants council report of the military hospital electrocardiogram showed

<sup>1</sup>Uludag University Medical Faculty, Forensic Medicine Department, Görükle 16059, Bursa, Turkey, Council of Forensic Medicine of Turkey Bursa Morgue Department, Bursa, Turkey, and <sup>2</sup>Council of Forensic Medicine of Turkey Bursa Morgue Department, Bursa, Turkey

**Address for correspondence:** Bulent Eren, MD, Council of Forensic Medicine of Turkey, Bursa Morgue Department, 16010, Bursa, Turkey. Phone: +90.224.2220347, Fax: +90.224.2255170

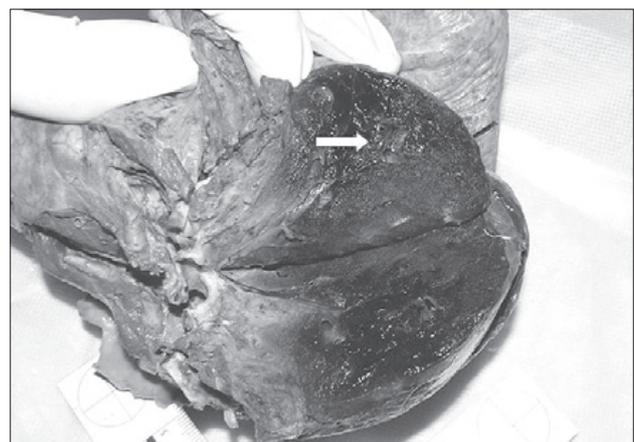


Fig. 1. Aneurysmatic dilatation of the pulmonary artery branch.

right axis deviation, right ventricular hypertrophy and strain pattern, besides echocardiography revealed enlarged right heart chambers, and grade II tricuspid valve insufficiency with end-diastolic volume (EDV): 112, end-systolic volume (ESV): 42.2, ejection fraction (EF): % 62 and fractional shortening (FS): 0.34. Right heart catheterization was also performed and exercise mean pulmonary pressure exceeded 50 mmHg. With diagnosis of pulmonary hypertension medical treatment, calcium channel blockers were administered to the patient.

The death was considered to be suspicious. Postmortem examination was requested by the prosecutor and Emergency Department physician. The victim was 165 cm in height and 60 kg in weight. External examination of the body revealed intense peripheral cyanosis. Approximately 2 500 ml partially coagulated blood was found upon opening of the right chest. Examination of the lung revealed 7x6 cm intraparenchymal hemorrhage in the subpleural area of the right lung upper lobe posterolateral part extending to the horizontal fissure, in the interlobar area there was a

subpleural clot filled cystic lesion 5x5 cm, dissection of which exposed 2x0.8 cm hemorrhagic irregular defect on the upper lobe basal surface and 1 cm in diameter peripheral aneurysmal dilatation of the pulmonary artery distal branch was observed (Fig. 1). When parenchymal and vessel examination was performed, aneurysmal dilatation and intimal rupture of pulmonary artery branch were found corresponding with the area of hemorrhage. The pericardium appeared normal and the heart weighted 350 g. Right ventricle wall thickness was 1.5 cm, left ventricle 1 cm, septum 1.5 cm, aortic valve circumference 6.7 cm, pulmonary valve circumference 8.7 cm, intimal surface of pulmonary artery was diffusely yellowish, and atherosclerotic plaques were found. Histopathologic investigation of the arterial wall at the site of intimal rupture was with the presence of intimal undulation, intimal and medial separation. The small intraparenchymal pulmonary arterial branches showed extensive modifications of the vessel wall, in particular, subintimal fibrosis and overall reduced lumen size, degenerative processes such as atherosclerosis were detected. Lung examination revealed extensively edematous parenchyma, diffuse intraalveolar hemorrhage of the lung parenchyma adjacent to the aneurysm. Heart muscle showed hypertrophic changes. The death was reported due to pulmonary aneurysm rupture and right haemothorax.

## Discussion

Pulmonary artery dissection and aneurysms ruptures are rare events, occasionally reported as a cause of sudden death (1–4). It is slightly more frequent in females. Age of onset is variable, ranging from 17 to 85 years. The dissection more often involves the main pulmonary artery or its major branches or both (1, 2, 6). In the great majority of cases there is an association between pulmonary (primary or secondary) hypertension and dissection as in our case (1, 2, 5). Other causes of pulmonary artery dissection include invasive procedures such as right heart catheterization and pulmonary artery angiography (6). Pulmonary artery dissection complicating lung transplantation for primary pulmonary hypertension was also reported in the literature (7). Some cases of pulmonary artery dissection and rupture remain unexplained (8). Inayama et al (6) stated that pulmonary artery dissection is a rare event which usually occurs in patients with underlying pulmonary hypertension and indicated that idiopathic and inflammation-related pulmonary artery dissection is extremely unusual. Noncardiac causes of pulmonary hypertension may be present in various forms such as idiopathic form, veno-occlusive pulmonary disease, primitive medial hypertrophy and pulmonary vasculitis (9). We describe a case of sudden death due to abrupt distal pulmonary artery dissection. An intimal tear was identified at the initial site of aneurysmal dilatation, which is rarely reported in pulmonary artery dissection (6). The patient had a diagnosis of pulmonary hypertension, and the findings at pathology are strongly suggestive of a primary pulmonary hypertensive condition and therefore support the link between pulmonary hypertension and pulmonary artery dissection. In particular, the presence of highly hypertrophied adventitial vasculature and the absence of degenerative disease in the pulmonary

artery wall support this hypothesis, as also reported in the literature (4). Arena et al (1) stated that fibrillar disarray and the presence of adipose tissue in the pulmonary artery may suggest the presence of a locus minoris resistentiae within the wall, which may have been relevant to the occurrence of the dissection. Masuda et al (10) stated that marked medial degeneration and fragmentation of the elastic laminae in the true pulmonary artery aneurysm is the evidence of increased pulmonary arterial pressure. Diagnosis of a pulmonary artery dissection frequently occurs postmortem, as many of these patients experience sudden death (1, 2). Pulmonary artery dissection has been diagnosed in living patients using different radiological tests, and angiography (11).

## Conclusions

Physicians should consider the diagnosis of pulmonary artery aneurysm dissection in patients presenting with either retrosternal chest pain, dyspnea on exertion, central cyanosis, or sudden hemodynamic decompensation and who have a past medical history of pulmonary hypertension.

## References

1. Arena V, De Giorgio F, Abbate A, Capelli A, De Mercurio D, Carbone A. Fatal pulmonary arterial dissection and sudden death as initial manifestation of primary pulmonary hypertension: a case report. *Cardiovasc Pathol* 2004; 13 (4): 230–232.
2. Walley VM, Virmani R, Silver MD. Pulmonary arterial dissections and ruptures: to be considered in patients with pulmonary arterial hypertension presenting with cardiogenic shock or sudden death. *Pathology* 1990; 22 (1): 1–4.
3. Luchtrath H. Dissecting aneurysm of the pulmonary artery. *Virchows Arch A Pathol Anat Histol* 1981; 391 (2): 241–247.
4. Ackermann DM, Edwards WD. Sudden death as the initial manifestation of primary pulmonary hypertension. *Amer J Forensic Med Pathol* 1987; 8 (2): 97–102.
5. Butto F, Lucas RV Jr, Edwards JE. Pulmonary arterial aneurysm. A pathologic study of five cases. *Chest* 1987; 91 (2): 237–41.
6. Inayama Y, Nakatani Y, Kitamura H. Pulmonary artery dissection in patients without underlying pulmonary hypertension. *Histopathology* 2001; 38 (5): 435–442.
7. Sakamaki Y, Minami M, Ohta M, Takahashi T, Matsumiya G, Miyoshi S, Matsuda H. Pulmonary artery dissection complicating lung transplantation for primary pulmonary hypertension. *Ann Thorac Surg* 2006; 81 (1): 360–362.
8. Steingrub J, Detore A, Teres D. Spontaneous rupture of pulmonary artery. *Crit Care Med* 1987; 15 (3): 270–271.
9. Brown DL, Wetli CV, Davis JH. Sudden unexpected death from primary pulmonary hypertension. *J Forensic Sci* 1981; 26 (2): 381–386.
10. Masuda S, Ishii T, Asuwa N et al. Concurrent pulmonary arterial dissection and saccular aneurysm associated with primary pulmonary hypertension. *Arch Pathol Lab Med* 1996; 120: 309–1211.
11. Song EK, Kolecki P. A case of pulmonary artery dissection diagnosed in the Emergency Department. *J Emerg Med* 2002; 23: 155–159.

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