



Research Letter

Spontaneous Cardiac Tamponade as a Cause of Sudden Unexpected Death With Focus on Coronary Aneurysms

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Coronary aneurysms, defined as the dilation of a coronary artery segment with at least 1.5 times the diameter of the adjacent normal segments, are documented in 0.35% of cardiac catheterization procedures¹ and in as many as 3.6% of patients presenting with acute coronary syndrome.² The most common etiology is coronary atherosclerosis, but they may also be congenital, and encountered in patients with vasculitis, connective tissue disease, or as a late complication of coronary angioplasty. Little is known of their tendency to rupture, although only a single case was documented in a multicenter registry among 1561 patients with at least 1 coronary aneurysm.¹ However, increasing interest toward prophylactic treatment of coronary artery aneurysms has been expressed.³ We aimed to quantify the incidence of coronary aneurysm rupture leading to fatal cardiac tamponade.

According to Finnish law, a medico-legal autopsy has to be performed for all victims of unexpected death, in addition to nonnatural causes, such as homicide, accident, or malpractice. During the recent decades, the rate of medico-legal autopsies has been around 15%-20% of all deaths in Finland. However, the autopsy rate of sudden, unexpected deaths has been estimated to be among the highest in the world. For the present analysis, all cases with either cardiac tamponade or coronary artery aneurysm as the immediate cause of death, diagnosed in medico-legal autopsies performed in the Finnish Institute for Health and Welfare, Oulu, Finland, and at the Department of Forensic Medicine, University of Oulu, Oulu, Finland during 1998-2017 were identified. Our background population covers the whole of Northern Finland and is constituted of approximately 480,000 inhabitants during the years 1998-2012, and 780,000 inhabitants during the years 2012-2017.

A total of 252 cases with an autopsy diagnosis of cardiac tamponade were found out of 20,060 autopsied subjects, with the etiologies of cardiac tamponade listed in Table 1. The mean age of the subjects was 67.8 years and 56.1% of the subjects were male. Of note, cardiac tamponade caused by complications in angioplasty procedures or surgery was not captured, as they are classified under separate

Table 1. Causes of cardiac tamponade among victims of unexpected death.

Cause of tamponade	n (%)
Aortic dissection	137 (54.4)
Rupture of ventricle due to myocardial infarction	106 (42.1)
Coronary artery aneurysm	1 (0.4)
Pericarditis	3 (1.2)
Other ^a	5 (2.0)

^a Left atrial rupture, postoperative complication, pacemaker lead perforation, pericardial hemorrhage of unknown origin, left ventricle aneurysm rupture (without recent myocardial infarction).

diagnoses as complications (T code in the International Classification of Diseases). In addition, in patients with fatal iatrogenic tamponade, the death certificate may be written without an autopsy, based on clinical data after consulting a forensic pathologist.

We found only 1 case of cardiac tamponade due to a spontaneous coronary artery aneurysm rupture. The subject was an 87-year-old woman with severe coronary artery disease. The branch of the right coronary artery supplying the anterior free wall of the right ventricle was torturous and included multiple dilatations less than 10 mm in diameter, in addition to atherosclerosis. A 2 mm rupture was identified on 1 of the dilatations as the site of pericardial hemorrhage.

Although coronary aneurysm ruptures were rare in this medico-legal autopsy population, one should bear in mind that rupture is not the only mechanism by which coronary aneurysms lead to adverse events. Indeed, thrombosis in the aneurysm and embolization may lead to myocardial infarction, and most of the coronary aneurysms are seen in subjects with extensive coronary artery disease.³ Of note, subjects with known severe coronary disease presenting with symptoms attributable to myocardial infarction or congestive heart failure, eventually leading to a hemodynamic collapse of fatal arrhythmia, are not routinely autopsied. Thus, our data does not allow for comprehensive identification of subjects with a fatal event attributable to a coronary aneurysm,

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even if the consequences have been fatal. However, the findings of the present study demonstrate that the risk of sudden unexpected death due to rupture of a coronary aneurysm is almost negligible. Thus, an intervention to reduce the risk of aneurysm rupture does not appear indicated in most cases.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethics statement and patient consent

The study was approved by the Ethics Committee of Northern Ostrobothnia Hospital District and was carried out in accordance with the Declaration of Helsinki. Consent from next of kin was waived by the ethics committee since according to Finnish law, medico-legal autopsy does not require consent.

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