

## Diagnosis of sudden coronary death in forensic medical practice

Reznik A.G.

Volgograd regional bureau of forensic medicine, Volzsky, Russia.

e-mail alexsudmed@bk.ru

In forensic medical practice, the most common forms of sudden coronary death (SCD) are acute coronary insufficiency (I24.8) and acute myocardial infarction, including pre-necrotic stage (I21). The complexity of post-mortem diagnosis depends on the fact that on the background of complete well-being persons die in relatively young age. For the period 2010-2012, the average age of the deceased amounted to  $49.9 \pm 3.9$  years. The male to female ratio is of three to one. Two-thirds of all deaths occur at the prehospital stage for the first two hours of the onset of ischemic attack, visual assessment of macroscopic picture of the heart does not identify any specific changes. Risk factors of sudden coronary death are well studied [1]. It is a mature and advanced age (over 40 years), male gender, smoking, obesity, hypertension, hypercholesterolemia, psycho-emotional stress, lack of magnesium in drinking water and sudden changes of meteorological conditions.

In order to improve the evidence base of forensic investigations in cases of SCD is advisable to adhere to the following algorithm:

1. to take the material on the unified procedure - one sample of the heart of the five regions of the left ventricle of the heart - the interventricular septum, front, side, and back at the level of a circle passing through the middle of the distance between the apex and mitral valve, as well as from the apex [2]. This method of sampling takes into account all types of blood supply of the heart and allows you to explore all the departments of the left ventricle in the absence of macroscopic changes in the myocardium;

2. slices were stained: with hematoxylin and eosin, according to Van Gieson, according to Lie. Additionally prepare unpainted preparations for polarizing microscopy (Order of the Ministry of health and social development of the Russian Federation of May 12, 2010, № 346n, Moscow «On approval of the Procedure of

organizing and conducting forensic state forensic institutions of the Russian Federation», section VII «Peculiarities of the order of production of laboratory and instrumental research expert» paragraph 79. - 79.20);

3. in the study of stained micropreparations accentuate the presence of atherosclerotic process and spasm of the arteries, thickening, wavy deformation and fragmentation of cardiac muscle fibers, uneven increase in their nuclei; perivascular and intra-muscular edema, “plasma vessels”. The changes mentioned equally often occur in both acute coronary insufficiency, and in cases of acute myocardial infarction in pre-necrotic stage. Microscopy of unstained drugs in polarized light identify contractural cardiomyocytes damage of III degree, zones of lumpy decay and intracellular myocytolysis, relaxation, cracks and dissociation of cardiac muscle fibers. You must also specify the topography and the lesion of the left ventricle wall - subendocardial, intramural or subepicardial

In cases of acute coronary insufficiency should be presence of irreversible hypercontractility of cardiomyocytes in the form of contractures of the III degree (foci of acute ischemia). The process is dispersed: afflicts at least three regions of the left ventricle of the heart at different depths in the upper subendocardial, subepicardial and intramural departments [3]. In acute myocardial infarction in pre-necrotic stage [3, 4] contracture of the III degree combined with lumpy decay and intracellular myocytolysis of cardiac muscle fibers (combination of areas of irreversible hypercontractility - contracture of cardiomyocytes of III degree with pockets of the destruction of their contractile structures). Ischemic process is of a local nature and limited to one-two adjacent areas of the left ventricle. More often are revealed wall transmural lesion, but maybe subendocardial or subepicardial. In both forms of SCD equally often meet common areas of relaxation (relaxation) of cardiomyocytes and markers of ventricular fibrillation - cracks and dissociation of cardiac muscle fibers.

## References

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