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Case Report

A case report of lethal post-viral lymphocytic myocarditis with exclusive location in the right ventricle

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ABSTRACT

The inflammatory involvement of vital organs may represent a dangerous and life-threatening situation: in particular, the inflammation of the myocardial tissue of the heart may lead to severe consequences since the clinical history of the disease may be completely asymptomatic, any clinical sign may be lacking, thus preventing correct diagnosis and treatment. This may occur even in the case of myocarditis and may lead to unexpected death whose cause can be assessable only by means of a thorough histopathological examination. The article reports the case of 61-year old female who developed a flu-like syndrome with very few symptoms, followed by sudden death in three weeks. The autopsy and following histopathological investigations identified the cause of death in a post-viral lymphocytic myocarditis, probably related to the previous infectious disease, and alternative causes (as arrhythmic ventricular dysplasia, vasculitis, sarcoidosis and giant cell myocarditis) were excluded. The exclusive location in the right ventricle was a peculiar finding. The case highlights the importance of the myocardium of the right ventricle, a tissue which is often less considered even in histopathological surveys. The exclusive location of myocarditis in the right ventricle is a rare event but in this case fully responsible for death.

1. Introduction

Myocarditis is a disease characterized by an acute or chronic inflammation of the myocardial muscle [1], with a non-ischemic origin [2] and usually caused by different infective agents, autoimmune diseases or toxic substances. It is a topic mostly relevant to the field of "general" pathology, but diagnostic problems of sudden death due to diseases are definitely a crucial field of application of forensic medicine [3]. The prevalence of myocarditis is to our knowledge about 0.1–9% from unselected necroscopic series and even much greater – up to 20% – in sudden death series [4–9]. Myocarditis is currently classified in primary and secondary [10] according to etiology, in acute and chronic [11] according to the chronology, and in lymphocytic, neutrophils, eosinophils and giant cells [12] according to the type of inflammatory infiltrate detected within the myocardial fibers.

The diagnosis of myocarditis requires the "presence of an inflammatory infiltrate of the myocardium with necrosis and/or degeneration of adjacent myocytes, with a pattern not typical of ischemic damage associated with coronary artery disease" [13]. However, the different possible interpretations, the lack of prognostic value and the low sensitivity of the diagnostic criteria, may significantly lower feasibility and reliability of the same criteria [14]. Moreover, some forms of post-viral myocarditis may not always show positive results in the search for antigens. Clinical manifestations may be absent or present with moderate to severe chest pain. For what concerns the location of the infiltrate, the myocardial inflammation is more frequently represented throughout focal areas of the left ventricle, while the right ventricle is rarely involved, almost always as the result of an extension of a disease involving the left ventricle [15].

This article reports an unusual case of fatal myocarditis with exclusive location in the right ventricle. A crucial fact is highlighted through the analysis of this case: even the sole and exclusive right ventricular involvement in the myocardial inflammation process might produce lethal consequences, since symptoms may be non-specific or absent and diagnosis may be utterly tough.

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2. Case history

A 61-year-old female, with a clinical history of overweight without any systemic disease, developed over the three weeks prior to death, a flu-like syndrome with generic and non-specific symptoms and which was never specifically diagnosed since she was never addressed to a doctor or to the hospital. Therefore, the disease was treated only with non-specific symptomatic medicines (antipyretics like paracetamol and mucolytics) hired on her own, without any medical supervision.

The treatment initially yielded some benefit, although the course of the disease was marked by hypotension, dizziness, sweating and syncope. After about twenty days after the onset of the symptoms, the woman suddenly and unexpectedly went into cardio-circulatory arrest and respiratory failure while she was at home with her husband. He immediately called the paramedics who practiced cardiopulmonary resuscitation but despite any resuscitation effort, the woman was pronounced dead. Since for the prosecutor no alleged crimes were present, the autopsy was requested by the family doctor only to assess the causes of death, without being under Judicial Authority. It was performed two days after.

3. Materials and methods

A complete autopsy was performed and the full heart was sampled among with fragments of all other organs (brain, cerebellum, brainstem, lungs, liver, spleen, kidneys, pancreas, stomach wall) and fixed in buffered 10% formalin for following histopathological surveys. A wide-ranging sampling of the heart was performed on three levels at the proximal/middle/inferior third to both ventricular chambers and interventricular septum, for a total of 36 samples: 10 samples each from the anterior and posterior wall of left ventricle, 8 samples from the septum and 8 samples from the right ventricle. Moreover, body fluids (cardiac and peripheral blood, urine, bile) gastric content and viscera (brain, lungs, liver, kidneys, spleen) were sampled for toxicological investigations. Toxicological analyses were performed with Gas chromatography on the body fluids and organs and the search for substances (morphine, cocaine, benzodiazepines, methadone, barbiturates, amphetamines, cannabis, ecstasy, ketamine, LSD, buprenorphine, ethyl alcohol).

The collected samples of the viscera were prepared according to the common histopathological post-fixative methods. Several samplings of the heart were performed, dissecting the ventricular walls and the septum in the upper, middle and lower parts. Laminar 2μ-thick sections were then stained with hematoxylin–eosin and Masson's trichrome staining (specific for muscular and connective tissues). Sheets were observed by means of an optical microscope with transmitted light Leica DM and Microsystems (Wetzlar, Germany).

4. Results

4.1. Autopsy findings

At autopsy, the cadaver was 168 cm high for a weight of 78 kg (BMI = 27.64), in good state of nutrition and conservation with normal hypostasis in intensity and color. The external search for any sign of injuries was negative. Moreover, any sign of possible disease was lacking at the macroscopic examination of the skin. The dissection and macroscopic examination of the internal organs was completely unremarkable for any significant morpho-structural alteration and any sign of injury was lacking, even though the examination of thoracic organs enabled the detection of an increased volume of the heart (weight 450 g, longitudinal diameter 14 cm, transverse diameter 13 cm, anteroposterior diameter 5 cm) and several little hemorrhagic infiltrations were detected within the tricuspid valve leaflets. A macroscopic examination of the myocardium showed soft consistency with a general brownish color with some isolated reddish areas, but macroscopically lacking of any apparent sign of acute ischemic damage or previous myocardial infarctions. The whole coronary arteries showed no alterations and were regularly placed, with intact walls showing normal elasticity, without narrowing of the lumen. Both pleural cavities contained about 150 cc of reddish serous and limpid liquid, the weights of the lungs were 420 g the left and 480 g the right. The observation of the parenchyma showed only small amounts of edema, whereas only a slight congestion was detected within the parenchyma of the brain, lungs, liver and kidneys.

4.2. Histopathological findings

Crucial findings were detected in the myocardium, where the presence of inflammation was highlighted but with a peculiar and exclusive location. As a matter of fact, the microscopic evidence of inflammation was spread only within the myocardial fibers of the right ventricle, marked by a cellular infiltration mixture consisting mainly of lymphocytes and, to a lesser extent, by neutrophils and few eosinophils. Such inflammatory cells were infiltrating the muscle fibers of the wall and the epicardial adipose tissue (Figs. 1 and 2). However, these types of findings were completely lacking in the sections of myocardium of the left ventricle (anterior and posterior walls) as well as along the path of the vessels placed in left ventricle and interventricular septum.

This considerable infiltration appeared to dissociate the muscle fibers that showed, moreover, focal areas of coagulation necrosis (Fig. 3). The microscopic examination showed no hemorrhagic infiltrations in the adipose tissue and/or between the muscle fibers. The epicardium, whose thickness was normal, also showed multiple focal areas of perivascular lymphocyte infiltration (Fig. 4). The perivascular infiltration showed in Fig. 4, accompanied by a thickened wall of the vessel with perivascular fibrosis and partly including the wall of the vessel, was detected only as an isolated focus in the wall of the right ventricle, while the serial analysis of the course of the vessels appeared perfectly normal in all other areas of the heart. No pathologic findings were detected in the anterior and posterior walls of the left ventricle, as well as in the septum. Moreover, the search for pathological findings as giant cells was totally negative. For what concerned other organs, a slight pulmonary edema and blood stasis was detected, along with

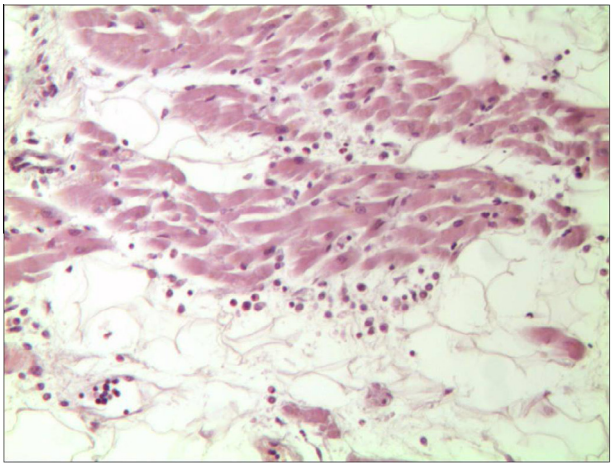

Fig. 1. Inflammatory infiltrate, present within the muscular fibers and spread into the epicardial fat tissue of the right ventricle, with evidence of eosinophilic granulocytes (HE 200×).