Non-diagnosed primary malignant cardiac tumor as a cause of sudden death in a 52-year-old man. A case report with medico-legal implications

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Abstract: We describe the case of a malignant fibrous histiocytoma (MFH) of the heart, presenting with an obstinate cough and clinically misdiagnosed as adult respiratory distress syndrome, in a 52-year-old man. He was diagnosed as pulmonary tuberculosis four years ago. Although his tuberculosis was believed to have cured, he often went to hospital for cough and palpitation. Echocardiogram was conducted only once on the patient four years ago but no abnormalities were found. During the day his condition deteriorated. He went to the emergency department, where he was given intravenous drugs against cough and was sent home. On the way back, his condition deteriorated dramatically so that his son drove back to the emergency room, where he collapsed and sustained cardiac arrest; resuscitation efforts were unsuccessful. Autopsy revealed a large tumor located in the left atrium. Histological and immunohistochemical investigations of the mass established the diagnosis of primary cardiac MFH. Sudden cardiac death, caused by the MFH was ascertained as the cause of death. The morphological and pathological findings are presented, the difficulty to diagnose primary cardiac MFH and the medico-legal implications are discussed.

Key Words: Forensic science, Forensic pathology, Primary cardiac tumor, Malignant fibrous histiocytoma

Primary cardiac tumors are a rare entity. They have an autopsy frequency of 0.001%–0.28% [1]. Approximately three-quarters of primary heart tumors are benign with atrial myxomas comprising three-quarters of those. Of the 25% of primary cardiac tumors that are malignant, approximately three-quarters are sarcomas [2]. We report the case of a 52-year-old patient with malignant fibrous histiocytoma (MFH) of the heart diagnosed at autopsy, presenting with the symptom of obstinate cough, which were erroneously diagnosed as adult respiratory distress syndrome. As a matter of fact, the tumor was not diagnosed until autopsy.

In the literature, there are only a few case reports concerning MFH as an unexpected cause of death and as far as we know no other articles focused on the medico-legal implications of such case. Primary cardiac sarcomas are extremely rare. They are thought to derive from an undifferentiated mesenchymal cell, presumably located in the endocardium, and their histological types do not differ from those found in extracardiac soft tissue [3,4]. Most sarcomas of the heart protrude into the left atrium as endophytic masses and are often misdiagnosed as the far more common benign myxomas on the basis of twodimensional echocardiography [4–6]. The distinction between a benign and a malignant lesion is also extremely difficult on a clinical basis, as

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symptoms are strictly dependent on the location rather than on the microscopic appearance of the tumor [2,4-8]. The clinical diagnosis of MFH is of high importance because it can cause sudden cardiac death. This case report recalls the clinical presentation of a MFH and demonstrates once more the overall.

Case report
A 52-year-old man with medical history of obsolete pulmonary tuberculosis had been complaining about cough and palpitation since one week. One morning after breakfast, about 8:00 a.m., he felt palpitations and complained about cough and phlegm as well as splitting chest pain. During the course of the day, he was usually felt heart palpitations. At about 10:00 a.m., he was brought to the emergency department of a hospital by his son. He received intravenous drugs (azithromycin) against cough and electrolyte infusions for fluid substitution. His son reported that in contrast to his usual behavior, he was markedly restless and agitated; furthermore, he additionally complained of palpitation and chest pain. A single blood pressure measurement revealed a systolic pressure of 140 mmHg. After this, he was discharged without any further therapy. On the way back, his son noticed an accelerated physical deterioration. He decided to return to the emergency room immediately, where they arrived again at 1:00 p.m. While a blood sample was taken, the patient suddenly collapsed. Cardiopulmonary resuscitation was initiated immediately, but was terminated after 30 min. Medicolegal autopsy was ordered by the prosecutor due to complaints of medical negligence.

Autopsy findings
External examination revealed an asthenic habitus (body weight 55 kg, height 170 cm). External examination of the body did not show any evidence of significant trauma. The findings regarding internal organs were according to the age of the patient except of the heart and lungs. The heart reached the critical weight of 450 g. A yellowish gray firm mass filled the left atrium. It was broadly adherent to the interatrial septum and measured 4.5×2×1.5 cm. (Fig. 1A).

Figure 1. Gross picture of the left atrial tumor (A) A 4.5×2×1.5 -cm mass was broadly adherent to the interatrial septum and occupied most of the left atrial cavity; the upper pole of the mass extending to the pulmonary vein and obstructing the venous drainage, while the lower pole not involving in mitral valve. (B) The cut surface of the tumor.
The cut surface of the tumour showed a grey to bright orange or yellow carcinose colour, with area of necrosis (Fig. 1B). The large arteries as well as the proximal coronary vessels presented no obvious exception. Furthermore, bilateral lungs presented bullae. The cut surface of both lungs demonstrates many motting calcification, such as the size of a grain of rice. Cerebral oedema was disclosed.

Numerous sections of the heart were examined. Histology revealed a highly cellular tumor composed of pleomorphic fibroblast- and histiocytelike cells arranged in a storiform pattern (Fig. 2A and B). Other cell types observed were scattered aggregates of lymphocytes, macrophages, and multinucleated giant cells. Necrosis was also present Immunohistochemical stains showed diffuse positivity for vimentin and focal positivity for CD68 and smooth muscle actin (Fig. 2C and D). Stains for cytokeratin, desmin, myoglobin, and S-100 protein were negative. The final diagnosis was low-grade MFH. Sections of the myocardium presented focal contraction band necrosis, but no evidence of myocytic hypertrophy, perivascular myocardial fibrosis or inflammatory cell aggregates. Histological signs of obsolete pulmonary tuberculosis with fibro-plastic proliferation, hyaline degeneration and motting calcification were observed, but no evidence of caseous necrosis or epithelioid cells. There was no evidence of any abnormalities in other organ systems. Postmortem toxicological analysis was negative for drugs and alcohol.

Discussion

Primary cardiac tumors may be asymptomatic with up to 12% of cases found incidentally during evaluation of an unrelated medical condition [9]. They often present in a subtle manner though dramatic presentations are sometimes encountered [1]. Primary malignant tumors of the heart are rarely encountered.

They constitute only 10% of all surgically resected primary cardiac neoplasms and are predominantly
sarcomas [3,4,6]. Some have no histological characteristics for further classification. A large group displays specific differentiation in subtypes, among which the most common are angiosarcoma and MFH, the former principally located in the right atrium, the latter in the left [5,7,8,10,11]. In the case of malignant disease there may be direct invasion of the myocardium, causing arrhythmias or heart block, or pericardial effusion which may progress to life-threatening tamponade [1]. They may also produce signs and symptoms of heart failure by causing progressive valvular regurgitation [12]. Pulmonary venous hypertension secondary to physical obstruction of a cardiac chamber filling may result in dyspnea or frank pulmonary edema [13].

Whatever the microscopic appearance, a cardiac tumor growing into the left atrial cavity may cause obstruction to the blood flow, resulting in pulmonary hypertension and/or in mitral valve disease [6]. In our case, the clinical manifestations were a cough, due to hemodynamic obstruction, and, subsequently, palpitation related to arrhythmias. During the past four years, he had been in hospital for three times.

However, echocardiogram was conducted only once on the patient four years ago. When he complained about cough and phlegm, doctor told these symptoms were related with medical history of pulmonary tuberculosis.

Although, clinical symptoms may have not led to the differential diagnosis cardiac tumors, echocardiogram should be conducted. If a tumor is suspected – especially in cases with hypertension of unknown origin – it can be diagnosed in most cases by modern methods of medical examination. Differential diagnostic considerations should have taken place in the period of time before the lethal emergency. It is important to stress that the specific symptoms of this entity is not always present, moreover, clinical symptoms can be very variable, so that clinicians should be aware of these unusual features, with regard to the diagnosis primary cardiac tumors. There are more and more tumor related medical disputes in China [14]. The legal implications of a medical treatment error in China are covered by general laws and mostly concern bodily injury caused by negligence. Although Tort Liability Law People’s Republic of China was issued and implemented in 2010, the term “medical treatment error” still lacks juridical definition, at least in China. However, medical malpractice is assumed when a physician acts against the common and established rules of medical diagnosis and treatment [14].

In conclusion, we presented an autopsy case of sudden unexpected death due to clinically unrecognized/missed cardiac MFH that arose from the left atrium. The diagnosis of the cardiac MFH was established by postmortem pathological examination. Forensic autopsy is further proved to be the gold standard to identify the cause of death in individuals who die suddenly and unexpectedly. Because cardiac MFH is potentially fatal and may cause sudden death, and because cardiac MFH is low grade malignant and surgical resection has favorable prognosis, thorough clinical investigation should be conducted in identifying this rare condition. In individuals who have obstinate cough with unexplained causes, an intracardiac tumor including MFH must be taken into consideration.

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References