MASSIVE SUBPLEURAL HEMORRHAGE ASSOCIATED WITH AORTIC DISSECTION

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Abstract:

Introduction: Aortic dissection is defined as a serious condition with tearing of the inner layer of the large blood vessel branching form the heart with subsequent blood surge through the tear and separation of the inner and middle layers of the aorta. This condition is fatal in cases where the blood-filled channel ruptures through the outside aortic wall. Materials and methods: full forensic autopsy. Case presentation: We present a case of a 58-year-old man with a history of long-term arterial hypertension who sought urgent medical help after having prolong "burning" chest pain for more than 12 hours. The medical team observed the following symptoms: paleness, abundant sweating and decreased blood pressure with a difference between the measured values of the left and right hand of more than 25-30 mm Hg, accelerated pulse - around and above 115 beats per hour. The patient died during the transport in the ambulance despite the intensive resuscitation. Therefore, a forensic autopsy was appointed due to a suspicion of improper medical action by the emergency team. Results: During the autopsy of the cadaver and the separation of the cervical and thoracic complex, a massive sub pleural hematoma with a jelly-like consistency and a weight of about 2.5 - 2.6 kilograms was found on the left part of the chest. From the macroscopic examination of the chest complex of organs, it was evident that there was a pronounced concentric hypertrophy of the left ventricle and the aorta was of normal width for its compartments, with multiple scattered, dense, raised atherosclerotic plaques of the intima. In the area of the aortic arc, there was a ruptured atherosclerotic plaque, from which a detachment of the aortic intima started, reaching the renal arteries - DeBakey III, Stanford B type of aortic dissection. Conclusion: The authors discuss the clinical-morphological and forensic aspects of aortic dissections.

Key words: *Aortic dissection, subpleural haematoma*

Introduction:

Aortic dissection is defined as a serious condition with tearing of the inner layer of the large blood vessel branching form the heart with subsequent blood surge through the tear and separation of the inner and middle layers of the aorta [1]. This condition is fatal in cases where the blood-filled channel ruptures through the outside aortic wall [1,2]. According to the location of the dissection, there are three types of DeBakey [3]: DeBakey type - stratification covers ascending and descending aorta - 60%; DeBakey type II - stratification covers only ascending aorta - 10-15%; DeBakey type III - stratification covers only the descending aorta - 25-30% and two Stanford types of dissection: Stanford A - the sprain encompasses the ascending aorta and the aortic arc, which may also affect the aorta descending, including DeBakey type I, II and retrograde

in type III - [7]; requires surgical treatment; and Stanford B - stratification covers the aortic aorta, and can also cover the aortic arc after the brachiocephal trunk; includes DeBakey type III, with no retrograde aortic ascending aorta, drug treatment, and monitoring for complications.

Materials and methods:

A full forensic autopsy was performed in the Department of Forensic medicine and Deontology, Medical University of Sofia with subsequent analysis of the observed macroscopic changes.

Case presentation:

We present a case of a 58-year-old man with a history of long-term arterial hypertension and evidence of a sudden onset of burning chest pain lasting more than 12 hours in connection with which he sought emergency medical attention. The medical team observed paleness, abundant sweating, decreased blood pressure with a difference in the upper extremity of more than 25-30 when measuring both arms, accelerated pulse - about and above 115 per min. The patient died in the ambulance despite resuscitation. A forensic autopsy was appointed due to a suspicion of improper medical actions by the emergency team. During the autopsy of the cadaver after separation of the cervical complex, it was found that the left chest half beneath the pleura had a massive subpleural hematoma in the form of a clot with a jelly-like consistency and weighing about 2.5 - 2.6 kilograms.

Figure 1

Figure 2

Figure 3

Figure 4

From the macroscopic examination of the chest complex, it was evident that there was a pronounced concentric hypertrophy of the left ventricle, and the aorta was of normal width for its compartments, the intima had multiple scattered, dense, whitish and raised atherosclerotic plaques. In the area of its arc there was a ruptured plaque, from which started detachment of the intima that reached the renal arteries (DeBakey III; Stanford B - monitored by statistical data in 25-30% of all aortic dissections) [5, 6, 7]. In the lower part of the thoracic aorta, the adventitia on its left surface was transversally ruptured with a length of 1.5 cm, with abundant bleeding of the surrounding tissues.

Figure 5

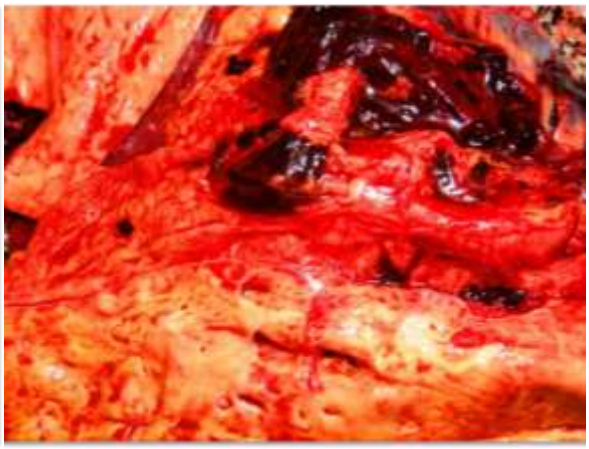

Figure 6

Because the aorta is a large artery of elastic type, such rupture of the posterior wall creates communication between the "new lumen" of the aorta caused by the dissection and the space under the pleura with the formation of the subpleural hematoma on the left.

DISCUSION AND CONCLUSION:

Acute aortic dissection is a dramatic disease and the leading cause of death in patients with aortic pathology - up to 50% in the first two days [1]. It begins abruptly as the blood leaves the normal aortic lumen through the discrete entrance of the intima, progressively strains the inner from the outer sheet of the media, both in the proximal and distal directions, covering various

segments of the aorta, involving a different number of the vessels, and is fatal in a large percentage of cases, especially if medical care is not provided on time - surgical treatment. There are many factors involved in the etiology of dissection. The most significant and most common is arterial hypertension - about 70-75% of aortic dissection patients have a history of chronic hypertension, and 90% of cases with dissection have left ventricular hypertrophy as an autopsy finding. This difference in percentages can be explained by the fact that in some people with arterial hypertension dissection is the first symptom of the disease, and in others it causes death before reaching medical attention [1, 2]. Arterial hypertension is a serious risk factor since it helps to increase the deposition of atherosclerotic plaques in aortic intima and also causes pathological abnormalities in the aortic media (extinction of the Erdheim lacunar muscle cells, breakage of the elastic fibers, fibrosis of the media and the formation of perivascular rust around vasa vasorum, reducing elasticity of the aortic wall, facilitating its tearing in another hypertensive crisis) [4]. Many cases of aortic dissection are diagnosed after death. Making prompt diagnosis and treatment should be a priority in this condition.

References:

1. Проф.д-р мед. Александър Чирков, 2002г.: Сърдечно-съдова хирургия и интервенционална кардиология Том1; стр.450-456;
2. Roberts WC, 1981: The spectrum of cardiovascular diseases in the Marfan's s-m, 101:195-214
3. Alpert MA Aortic Dissection AFP, vol#5
4.Nakashima Y:Alteration of elastic architecture in human aortic dissecting aneurism. Lab.Jvvest.1990 Juni 62 (6):751-760;
5. DeBakey ME, Henly WS, Cooley DA, Morris GC Jr, Crawford ES, Beall AC Jr (Jan 1965). "Surgical management of dissecting aneurysms of the aorta". J Thorac Cardiovasc Surg. 49: 130–49. PMID 14261867.
6. Daily PO, Trueblood HW, Stinson EB, Wuerflein RD, Shumway NE (Sep 1970). "Management of acute aortic dissections". Ann Thorac Surg. 10 (3): 237–47. doi:10.1016/S0003-4975(10)65594-4. PMID 5458238.
7. Sueshiro Masafumi, Hayashi Saiho, Kobayashi Hironori (2006). "Antero-Lateral Thoracotomy with Partial Sternotomy for Retrograde DeBakey III Type Closing Aortic Dissection". Japanese Journal of Cardiovascular Surgery 35 (1): 21–24. ISSN 0285-1474