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About the Diagnosis of Delaminating Aortic Aneurysms

Kodirova Sh. A.
Tashkent Medical Academy

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ABSTRACT

The problem of aortic dissection remains relevant to date due to the difficulty of diagnosis and poor prognosis-fatal outcome. In type II aortic dissection, the pain is usually localized behind the sternum and simulates an acute myocardial infarction. This situation is especially often observed in cases where the dissection actually extends to the root of the aorta and contributes to the compression of the coronary arteries, and according to H Borsi, the most common pain syndrome in type I aortic dissection according to De Bekey has to be differentiated from the process of dissection of coronary vessels and thus disorders of coronary circulation.

Relevance. Among diseases of the cardiovascular system of a dissecting aneurysm, aortic aneurysm is a common disease, but it is not always recognized. Although currently the possibilities of diagnosing a dissecting aortic aneurysm have expanded, but in real clinical practice, diagnostic errors remain high. The life expectancy of patients depends on the diameter of the aortic aneurysm. Patients with an aneurysm with a diameter of up to 6cm have a 75% chance of surviving without surgery for 1 year and 50% for 5 years, and an aortic aneurysm with a diameter of over 6cm have a 50% chance of surviving for a year and only 6% for 5 years [2,3,4].

Aortic dissection (dissection) or dissecting aortic aneurysm is the development of an intrahepatic hematoma due to the penetration of blood into a degeneratively altered layer of the aortic wall, followed by its dissection mainly in the distal direction. Aortic dissection occurs due to the destruction of the inner and middle membranes, in which blood penetrates through the defect into the gap between the inner and middle or between the middle and outer membranes, defending them one after another and forming an intrahepatic accumulation of blood that communicates with the lumen of the vessel.

Epidemiology: Aortic dissection is a very common disease of the cardiovascular system, occurring in 2-3.5 cases per 100,000 people per year (Hiratzka L.F. et al., 2010), which corresponds to 3000-5000 cases in the Russian Federation annually [2,5,6]. Data from the International Registry of Aortic Dissections (IRAD) indicate that patients of African descent are particularly at risk, that the average age of disease development is 63 years from P. [3,7,8]. Signs

of aortic dissection are found in 1-3% of all autopsies. The peak incidence occurs at the age of 50 to 65 years in the general population, for patients with hereditary connective tissue diseases - from 20 to 40 years (Marfan syndrome, Ehlers-Danlos syndrome) [1, 2, 9]. There are data that allow us to judge the annual increase in the frequency of cases of aortic dissection (Olsson C.et al., 2002). According to the literature, the disease is more common in men than in women in a ratio of 3:1 at the age of 50-60 years and in half of cases is not diagnosed. Every year in the USA, dissecting aortic aneurysms are detected in 2000 patients, and according to W Jamieson et al. In Canada, 35% of patients who died in hospitals from dissecting thoracoabdominal aneurysms had not been diagnosed during their lifetime. The prognosis is worse in women, as a result of atypical manifestations and late diagnosis, since their aortic dissection is limited to the coronary or carotid artery, especially in pregnant women or women who have given birth [1,2,10,11].

The most common risk factor associated with RA is hypertension, which is observed in 65-75% of individuals, mostly poorly controlled [2]. According to the IRAD registry, the average age of patients is 63 years; 65% are men. Other risk factors are pre-existing aortic or aortic valve diseases, a family history of aortic diseases, heart surgery, smoking, blunt chest injuries and the use of narcotic drugs (for example, cocaine and amphetamines)[12,13,14]. Mortality from dissection is 2-3 times higher than that of ruptured aortic aneurysms: 40% of patients die immediately after the development of dissection, 1% within an hour of the onset of the disease and from 5 to 20% – during or shortly after surgery (Meszaros I.et al., 2000, Clouse W.D. et al., 2004) [15,16].

The classification is based on the etiology, pathogenesis, localization, form, type and course of the disease, taking into account the presence or absence of aortic dissection. According to the Stanford Classification (1970), aortic dissections are divided into two types: A – with or without involvement of the ascending aorta and arch (proximal dissection), B-with aortic dissection distal to the left subclavian artery (distal dissection).

According to the classification of M. De Bakey (1982) aortic dissection is divided into three types: type I (50%) - from the ascending aorta to the abdominal aorta bifurcation; type II (35%) - only the ascending aorta; type III (15%) - captures the entire descending thoracic aorta, and type III - descending and the abdominal aorta. In 2000, Yu.V.Belov supplemented the classification of M. De Bakey with type IV, when the aortic dissection begins from the level of the diaphragm or below it in the abdominal region.

Currently, the classification of aortic dissection on localization is used:

1. Proximal - rupture of intima in the ascending aorta with the possible spread of the dissection to the descending aorta.
2. Distal - only the descending thoracic aorta is involved. The rupture of the aortic aneurysm is most often located in the descending section

The process of stratification can have three forms of flow: acute (up to 2 days), subacute (up to 2-4 weeks), chronic (months and even years).. Chronic RA can be either uncomplicated with a stable course of the disease, or complicated by visceral or peripheral [1,2,17]. Of all aortic aneurysms, high mortality is characteristic of acute aortic dissection.

Clinic: According to the literature, three relatively constant symptoms prevail in the clinical picture of acute aortic dissection: pain, hypertension and tachycardia. Aortic dissection in 90% of cases is accompanied by pain, the pain is so intense that it is often compared to a "dagger blow", and it is usually partially stopped only by the use of narcotic analgesics. Most often, patients indicate the occurrence of pain syndrome during physical activity. The most common localization of pain is the chest (80%), while back or abdominal pain occurs in 40% and 25% of cases [2]. Acute aortic dissection most often occurs against the background of arterial

hypertension. Arterial hypertension is one of the risk factors for the development of aneurysms and aortic dissection, especially in the presence of degenerative connective tissue diseases and atherosclerosis. In the anamnesis, either at the time of examination, patients have high blood pressure, or at the time of the appearance of a sharp pain attack. Aortic dissection with severe pain syndrome is often accompanied by a high level of catecholamines in the blood. According to most authors, a potential risk factor for aneurysm rupture is the presence of the following signs below: diastolic blood pressure above 100 mmHg, anterior-posterior aortic size greater than 5 cm against the background of severe chronic obstructive pulmonary diseases[2].

Dissection in the proximal aorta is accompanied by pain in the anterior chest, neck, and with distal dissection of the aorta, pain is localized in the interscapular region. With type I aortic dissection, the pain moves to the interscapular region, and then gradually descends along the spine to the lumbar region. In type II aortic dissection, the pain is usually localized behind the sternum and simulates an acute myocardial infarction. This situation is especially often observed in cases where the dissection actually extends to the aortic root and contributes to the compression of the coronary arteries.

According to H Borsi, the most common pain syndrome in De Bekey type I aortic dissection has to be differentiated from myocardial infarction due to involvement in the process of dissection of coronary vessels and thus disorders of coronary circulation.

The differential diagnosis of aortic dissection and myocardial infarction is presented in the table

Diagnostic sign	Aortic dissection	Myocardial infarction
Anamnesis	Hereditary syndrome, traumatic injury of the chest	Angina attacks, risk factors for coronary heart disease.
The onset of the disease	Acute, sudden, immediately in severe form	Gradual, often with prodromal symptoms
Pain	Very strong, tearing, in the chest (dissection in the proximal part), in the interscapular region (dissection in the distal part) with irradiation to both shoulders, neck, occiput, spine, migrating nature of pain.	Pressing or compressing the chest, often with irradiation into the shoulder and arm.
Shock	Precedes pain	Usually comes after the pain
Syncopal state	Sudden loss of consciousness, fainting	Not typical. It may occur with rhythm and conduction disorders.
Неврологические расстройства	Ischemic paraparesis, paralysis, paraplegia, acute cerebrovascular accident	Absent
Tachycardia	Often	Often
II tone	Weakening or disappearing	Normal
Diastolic noise	The intensity appears or increases at the Botkin point and on the aorta	Absent
Systolic noise	As much as possible, in the second-third intercostal space	At the top or at the Botkin point
Blood pressure	High	Increases slightly in the first hours, and then the usual or decreases
Breath	Sharp weakening in the left half of the chest when bleeding into the pleural cavity	Rarely broken

Hemopericardium	Often	Rarely
Шум трения перикарда	Often	May be
Leukocytosis	Have	Have
Anemia	Increasing anemia	Not typical
Serum transaminase levels	Normal, little changes	Promoted
Hyperbilirubinemia	There is due to hemolysis	Not typical
Radiograph	Limited or diffuse swelling of the aortic shadow and pulsation of its wall	Normal or with signs of early congestion in the lungs
Electrocardiogram	Hypertrophy and overload of the left ventricle	ECG signs of myocardial infarction are detected

When the process of dissection spreads to the abdominal part of the aorta with type I and III aneurysms, pain appears in the epigastrium, hypogastrium or is localized in the lumbar region. With retrograde dissection of type III aneurysms, the pain may be of a retrosternal infarct-like nature and radiate into the neck, which is due to the dissection of the aortic arch.

Much less often, aortic dissection occurs with low-intensity pain. In a number of patients, aortic dissection is almost asymptomatic and the first signs of the disease are symptoms of ischemia of the brain or spinal cord, aortic insufficiency, ischemia of the kidneys, digestive organs and lower extremities. Dissection of the branches of the aortic arch and the descending thoracic and abdominal parts of the aorta may be accompanied by: 1) acute and then chronic ischemia of the brain or spinal cord; 2) acute ischemia of the digestive organs; 3) stable vasorenal hypertension or kidney infarction; 4) acute ischemia of the lower extremities.

Diagnosis: The most accurate and timely diagnosis of aortic dissection is possible when comparing the clinical picture of the disease with the data of instrumental studies, such as transthoracic and transesophageal echocardiography, computer and magnetic resonance imaging of the aorta with contrast, aortography. At the X-ray examination, almost all patients show an expansion of the shadow of the upper mediastinum. The expansion of its shadow is observed in 50% of patients with type I dissection and in 100% of patients with type III dissection. Radiologically, fluid can also be detected in the pericardial cavity and in the pleural cavity, and even in the chronic stage of the process.

The results of electrocardiography serve mainly two purposes: to establish or exclude acute myocardial infarction (this diagnosis is made in almost 90% of patients with aortic dissection). If there are signs of acute myocardial infarction, ECG data must necessarily be compared with chest X-ray data, since the expansion of the shadow of the ascending part of the aorta suggests in the patient since the expansion of the shadow of the ascending part of the aorta suggests in the patient a delaminating aneurysm of type I-II involving the mouths of the coronary arteries. Echocardiography makes it possible to clearly record the double lumen of the ascending aorta, as well as the condition of the aortic valve and the presence of pericardial effusion with a threatening rupture of the aorta.

Computer tomography with simultaneous administration of radiopaque substance has high informative capabilities in the diagnosis of delaminating aortic aneurysms. With the natural course of dissecting aneurysms of the thoracic part of the aorta, a third of patients die within the first day, only 10% survive up to 3 months from the onset of the disease. 80% of patients who have survived the acute and subacute stages of the disease remain alive for 1-3 years.

These research methods not only make it possible to establish the correct diagnosis, but also the

volume and nature of the aortic lesion, and, accordingly, the management tactics of such patients – in most cases, surgical treatment, since conservative therapy using intravenous administration of nitroglycerin, beta–blockers, ACE inhibitors with a decrease in blood pressure allows only temporary improvement - stabilization of the condition, but does not determine the fate of the patient in any way. Constant monitoring of blood pressure, diuresis, ECG monitoring is necessary.

Surgical treatment is more effective in patients with type I-II aortic dissection, conservative in type III [1]. With conservative management: the main cause of death in patients with type I-II aortic dissection is cardiac tamponade, a less frequent cause is occlusion of the main branches of the aorta.

These data indicate the objective difficulty of making this diagnosis, but at the same time – the need for early clinical and instrumental diagnosis of aortic aneurysms and their dissection, which significantly affects the reduction of mortality in these patients.

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