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AORTAL STENOZU VƏ HİPERTROFİK OBSTRUKTİV KARDİOMİOPATİYASI OLAN AXIL YAŞLI PASİYENTDƏ ALKOHOLLA SEPTAL ABLASIYA VƏ AORTA QAPAĞININ TRANSKATETER İMPLANTASIYASI ÜZRƏ KLİNİK MÜŞAHİDƏ

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Xülasə. Son onilliklər ərzində ürək-damar cərrahiyyəsində azinvaziv müalicə metodlarının inkişaf etdirilməsinə və geniş tətbiqinə meyil edilir. Məqalədə təsvir edilən klinik müşahidə alkoholdan istifadə edilməklə aparılan septal ablasiya ilə aortal klapanın transkateter implantasiyasını əhatə edir. Xəstənin ikimərhələli müalicə taktikası sol mədəciyin çıxış yolunda təzyiç qradientini TAVİ əməliyyatından əvvəl mədəciklərarası çəpərin ablasiyası üsulu ilə əhəmiyyətli dərəcədə azaltmağa imkan verir. Digər müalicə metodlarının səmərəsiz olduğu hallarda aorta qapağının endoprotezləşdirilməsindən sonra alkoholla septal ablasiya üsulu ilə aparılan müalicə haqqında məlumat verilmişdir.

Müəlliflərin müşahidə etdikləri klinik hadisə obstruktiv hipertrofik kardiomiopatiya və aydın ifadəli aortal stenoz hallarında alkoholdan istifadə edilməklə ilk mərhələdə aparılan septal ablasiya vasitəsilə təzyiç qradientinin azaldılması xəstədə kəskin təxirəsalınmaz vəziyyət (kardiogen şok, “suisidal sol mədəcik” sindromu) yaranmasının qarşısını almağa imkan verə bilər.

Açar sözlər: hipertrofik kardiomiopatiya, aortal stenoz, alkoholla septal ablasiya, aortal klapanın transkateter implantasiyası

Ключевые слова: гипертрофическая кардиомиопатия, аортальный стеноз, алкогольная септальная абляция, транскатетерная имплантация аортального клапана

Key words: hypertrophic cardiomyopathy, aortic stenosis, alcohol septal ablation, transcatheter aortic valve implantation

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A CLINICAL CASE OF ALCOHOL SEPTAL ABLATION AND TRANSCATHETER AORTIC VALVE IMPLANTATION IN AN ELDERLY PATIENT WITH SEVERE AORTIC STENOSIS AND HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY

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Summary. The development and widespread use of minimally invasive treatment methods is the tendency of recent decades in cardiovascular surgery. In this clinical case, the experience of using a combination of alcohol septal ablation and transcatheter aortic valve implantation is described. The tactic of treating the patient in two stages made it possible to significantly reduce the pressure gradient on the left ventricular outflow tract by ablating the interventricular septum before performing TAVI and reduce the risk of acute subvalvular obstruction. Cases of alcohol septal ablation after aortic valve endoprosthesis are described as a lifesaving therapeutic tool when other treatment methods are ineffective. Our clinical case demonstrates the possibility of preventing the development of an acute emergency (cardiogenic shock, «suicidal left ventricle») by surgically reducing the pressure gradient using alcohol septal ablation as the first stage in a patient with obstructive HCM and severe aortic stenosis.

Hypertrophic cardiomyopathy (HCM) is a primary genetic myocardial disease that occurs in 1 in 500 adults in the general population, and with concomitant pathology [1-4]. The obstructive form of HCM is characterized by asymmetric hypertrophy of the interventricular septum, presystolic movement of the anterior leaflet of the mitral valve, and obstruction of the outflow tract of the left ventricle [1, 5]. These abnormalities lead to left ventricular diastolic dysfunction, mitral regurgitation, low cardiac output, which ultimately clinically causes dyspnea, chest pain, and syncope. Hypertrophic cardiomyopathy and aortic stenosis are characterized by an increased pressure gradient on the outflow tract of the left ventricle and/or aortic valve [6, 7]. A distinguishing feature between these two pathologies is that HCM usually leads to dynamic obstruction of the left ventricular outflow tract, while severe aortic stenosis leads to fixed obstruction as a result of calcific degeneration and narrowing of the aortic orifice [1]. This clinical case describes a variant of the combined minimally invasive treatment of the combined pathology – hypertrophic cardiomyopathy and severe aortic stenosis – in an elderly patient.

Clinical case. Patient B., 78 years old, was admitted to the clinic for the first time on September 15, 2020, with a diagnosis: non-

rheumatic severe aortic stenosis. Hypertrophic cardiomyopathy with the left ventricle outflow tract dynamic obstruction. Heart failure with preserved ejection fraction.

At the time of admission, the patient complained of general weakness, shortness of breath and a feeling of palpitations, which appear and increase during physical exertion for the last 6 months, blood pressure fluctuations. The patient denies loss of consciousness, paroxysmal nocturnal shortness of breath and swelling of the lower extremities. Objectively, blood pressure 90/60 mm Hg. art., heart rate 55 beats per minute. A history of hypothyroidism as a concomitant pathology and a transferred gastric resection according to Billrot-I. A rough systolic murmur was heard auscultatively over all points with the epicenter in the II intercostal space on the right edge of the sternum. Before hospitalization, the patient received treatment: losartan 50 mg, hypothiazide 12.5 mg, L-thyroxine 175 mcg per day

The necessary laboratory and instrumental examinations were performed at admission. Indicators of general clinical, biochemical blood tests, general urine analysis within normal limits. According to electrocardiography, the rhythm is sinusoidal, regular, the heart rate is 53 beats per minute, signs of the left ventricle hypertrophy with systolic overload (fig. 1).

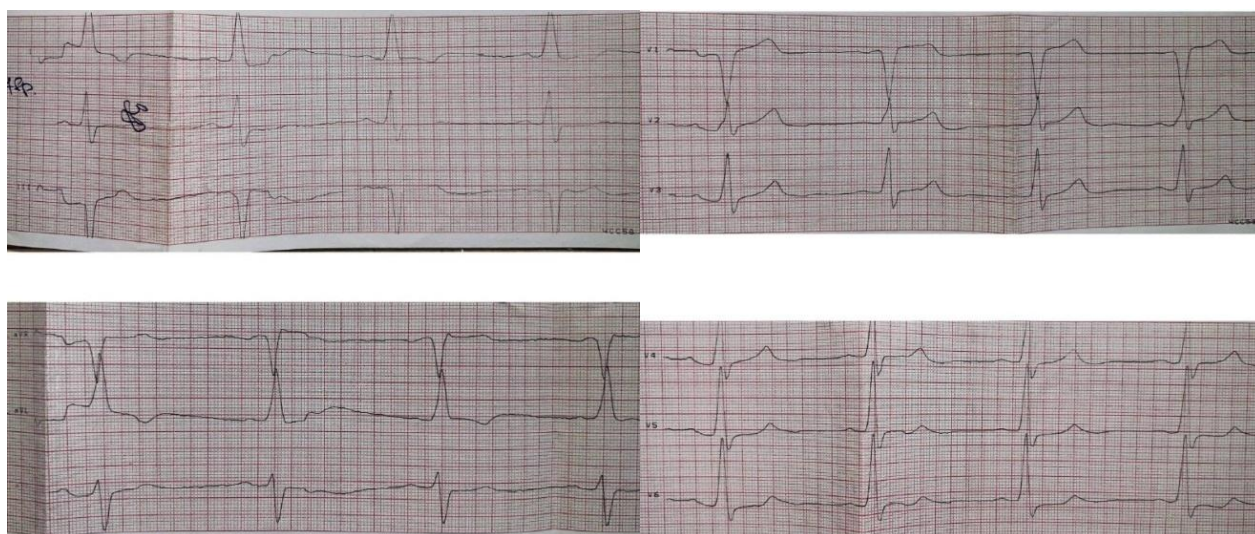


Figure 1. Electrocardiography of patient: signs of the left ventricle hypertrophy with systolic overload

During the echocardiographic examination, detected stenosis and calcification of the aortic valve leaflets with a planimetric hole area of 0.9 cm². Moderate aortic valve insufficiency and a maximum pressure gradient on the aortic valve of 100 mm Hg were revealed. The average gradient was 66 mm Hg, pronounced left atrium dilatation, significant asymmetric LV walls hypertrophy (interventricular septum – 2.1 cm; LV posterior wall – 1.1 cm) with the maximum pressure gradient on the left ventricular outflow tract – 49 mm. Hg, pre-systolic tightening of the front leaflet of the mitral valve, slight pulmonary hypertension. Transthoracic echocardiogram data were confirmed by transesophageal echocardiogram results. For the purpose of additional examination, MSCT of the aorta with intravenous contrast was performed. According to the data of this investigation CT signs of pronounced atherosclerotic changes of the aortic valve, aorta and its branches were revealed. According to the results of coronary ventriculography, no pathology of the coronary arteries was detected. Left ventricle outflow tract PG – 60 mm Hg, 70 mm Hg after the Valsalva test.

Taking into account the objective examination data, the results of instrumental and laboratory research methods, the patient's age and concomitant pathology, it was decided to conduct minimally invasive treatment in two stages. The first stage was alcohol septal ablation. Before the procedure, a temporary endocardial electrode was installed. Alcohol septal ablation was performed via right transradial approach according to the standard technique. LAD catheterization was performed. 0.5 ml of 96% ethyl alcohol was injected into the 1st septal branch, 2.5 ml of 96% ethyl alcohol was injected into the 2nd septal branch (*Fig.2*). At the end of the procedure, the LVOT PG decreased to 14 mm Hg. The end result is good. According to echocardiography data, after the procedure, LVOT PG was 19 mm Hg, after the Valsalva test – 27 mm Hg. The patient was discharged after 6 days in a good condition.

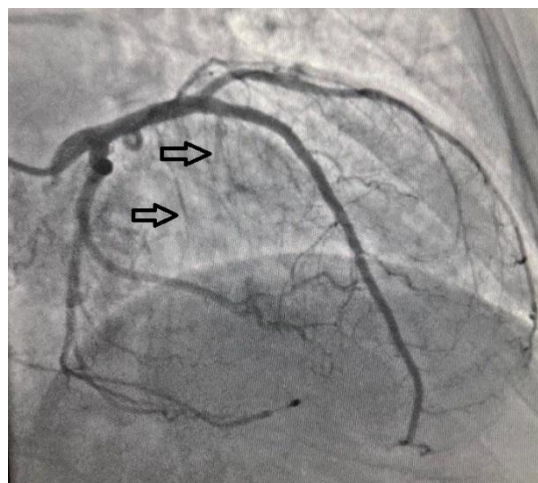


Figure 2. Angiography after 1st and 2nd septal branches ASA (Alcohol septal ablation)

In 1 month, the patient was readmitted. The planned aortic valve transcatheter implantation was performed after preoperative preparation: left ventricle catheterization was performed through the right transfemoral approach. Aortic valve pressure gradient was 70 mm Hg at rest (*Fig.3*).

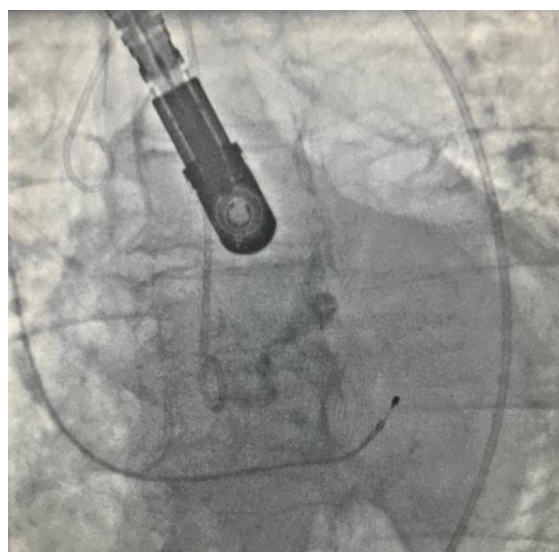


Figure 3. Calcified native aortic valve. Pigtail catheter in non-coronary cusp

Predilation of the aortic valve with a balloon was performed as a next step. It was implanted an Evolute PRO aortic valve with a diameter of 29 mm (*Fig.4*) and postdilatation with a high-pressure balloon was performed. The post-procedural PG on the prosthetic valve – 10 mm Hg. (*Fig.5*). According to transesophageal echocardiogram, paraprosthetic insufficiency is minimal. The end result is good.



Figure 4. The percutaneous valve aortic prosthesis Evolute PRO Medtronic 29



Figure 5. Balloon postdilatation of valve aortic prosthesis

On the 3rd postoperative day, the patient was transferred from the ICU to the inpatient unit for further treatment and rehabilitation. According to the echocardiogram data, on the 4th day after TAVI, a maximum GP on the prosthetic valve is 30 mm Hg, average PG – 15 mm Hg, the backflow is small; the residual pressure gradient on the LVOT at rest is 70 mm Hg, which clinically did not manifest as worsening of the patient's condition. He was discharged on the 9th day under the cardiologist's supervision.

In 8 months of the surgical intervention, the patient went to the clinic for a check-up. A repeat echocardiographic examination was performed. The maximum PG on the prosthetic valve is 28 mm Hg, average – 16 mm Hg. The maximum LVOT PG at rest is 21 mm Hg. No data were found for dysfunction of the prosthetic aortic valve. A decrease in heart failure by one functional class was noted.

Discussion. Alcohol septal ablation was developed as a less invasive treatment method to reduce left ventricular outflow tract obstruction by inducing basal septal infarction with scar formation and left ventricular remodeling [8-12].

Complications of alcohol septal ablation occur in the early postoperative period and include left coronary artery dissection, coronary artery spasm, cardiac tamponade, cardiogenic shock, pulmonary embolism and stroke. Ventricular arrhythmias are most often observed in the first 12 hours after ablation.

Temporary or permanent conduction disturbances are also observed: first-degree atrio-ventricular block develops in 53% of patients, right bundle branch block in 46%, and complete AV block requiring implantation of a permanent pacemaker in 10.5% of patients. Interestingly, complete AV block is a transient phenomenon in 10–46% of patients with recovery within the first 24 hours, much less often persisting for nine days after ASA [13]. In this case, a temporary endocardial electrode was installed on the patient before the ablation procedure, which would allow to avoid life-threatening disturbances of conduction and rhythm in the event of periprocedural complications from the conduction system of the heart. In the postoperative period, no conduction and rhythm disturbances were recorded in this patient.

A sudden decrease in afterload due to aortic valve endoprosthesis aggravated subvalvular obstruction, especially in patients with a high pressure gradient on the left ventricular outflow tract ("suicide left ventricle") was described previously [14, 15]. In this clinical case, before carrying out the second stage of treatment – transcatheter implantation of the aortic valve, it was possible to achieve a significant decrease on the LVOT PG, thereby reducing the risks of hemodynamic collapse with the development of cardiogenic shock after aortic valve endoprosthesis (TAVI) [16]. The surgical interventions were carried out under the

control of transthoracic and transesophageal echocardiographic studies. Thus, it was possible to clearly follow the dynamics of the pressure gradient change on the LV, aortic valve, and also on the bioprosthesis after its implantation. The patient had a repeated increase in the gradient on the LVOT after aortic valve transcatheter implantation. However, such changes were reversible and did not worsen the clinical picture, the pressure gradient indicator gradually decreased to acceptable values, which was confirmed by a control echocardiographic examination.

Conclusions. The golden standard of treatment for patients with hypertrophic obstructive cardiomyopathy and severe aortic stenosis is considered to be surgical myectomy and aortic valve prosthetics, which is largely related to long experience of working with these methods. However, today there are alternative modern methods and they are increasingly used: alcohol septal ablation,

transcatheter aortic valve implantation [17]. Clinical experience of their use led to a significant simplification of the procedure.

Preprocedural planning and valve selection have been improved by standardized computed tomography (CT) imaging, which has become the optimal way to assess vascular access, annulus size, and valve morphology, as well as to predict potential complications [18, 19]. Surgical treatment is indicated mainly for young patients, with low risk and the absence of severe concomitant pathology [20-25]. For patients who have reached the age of 75 and older, with favorable coronary anatomy, the absence of mitral valve lesions, and high-risk patients, minimally invasive treatment methods are preferred [6, 19].

A combination of alcohol septal ablation and transcatheter aortic valve implantation is possible in elderly patients with hypertrophic obstructive cardiomyopathy and severe aortic stenosis.

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КЛИНИЧЕСКИЙ СЛУЧАЙ АЛКОГОЛЬНОЙ СЕПТАЛЬНОЙ АБЛАЦИИ И ТРАНСКАТЕТЕРНОЙ ИМПЛАНТАЦИИ АОРТАЛЬНОГО КЛАПАНА У ПОЖИЛОГО ПАЦИЕНТА С ВЫРАЖЕННЫМ АОРТАЛЬНЫМ СТЕНОЗОМ И ГИПЕРТРОФИЧЕСКОЙ ОБСТРУКТИВНОЙ КАРДИОМИОПАТИЕЙ

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Резюме. Развитие и широкое применение малоинвазивных методов лечения является тенденцией последних десятилетий в сердечно-сосудистой хирургии. В данном клиническом случае описан опыт применения комбинации алкогольной септальной абляции и транскатетерной имплантации аортального клапана. Тактика лечения больного в два этапа позволила значительно снизить градиент давления на выводном тракте левого желудочка за счет абляции межжелудочковой перегородки перед выполнением TAVI и снизить риск развития острой подклапанной обструкции. Описаны случаи алкогольной септальной абляции после эндопротезирования аортального клапана как спасительного терапевтического средства, когда другие методы лечения неэффективны. Клинический случай, наблюдаемый авторами демонстрирует возможность предотвращения развития острого неотложного состояния (кардиогенный шок, «суицидальный левый желудочек») путем хирургического снижения градиента давления с использованием алкогольной септальной абляции в

качестве первого этапа у больного с обструктивной гипертрофической кардиомиопатией и выраженным аортальным стенозом.

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