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COMPREHENSIVE ASSESSMENT OF AORTIC VALVE STENOSIS IN ELDERLY PATIENTS

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Abstract: Aortic valve stenosis is one of the most common valvular disorders affecting elderly individuals and is associated with progressive cardiac dysfunction and increased mortality. This study analyzed the clinical characteristics, echocardiographic findings, and management strategies of elderly patients with aortic stenosis. Comprehensive evaluation demonstrated that disease severity increased with age and was frequently accompanied by multiple comorbidities. Echocardiography remained the principal diagnostic method for assessing valve morphology, hemodynamic changes, and treatment indications. Early diagnosis and individualized therapeutic planning may improve functional status and clinical outcomes in older patients.

Keywords: aortic stenosis; echocardiography; elderly patients; heart valve disease; transcatheter valve replacement.

КОМПЛЕКСНАЯ ОЦЕНКА АОРТАЛЬНОГО СТЕНОЗА У ПАЦИЕНТОВ ПОЖИЛОГО ВОЗРАСТА

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Аннотация: Аортальный стеноз является одним из наиболее распространенных клапанных пороков сердца у пациентов пожилого возраста и сопровождается прогрессирующим нарушением сердечной функции. В исследовании проанализированы клинические особенности, эхокардиографические признаки и современные подходы к ведению пациентов с аортальным стенозом. Комплексная оценка показала, что

тяжесть заболевания увеличивается с возрастом и часто сочетается с выраженной коморбидностью. Эхокардиография остается основным методом определения морфологических изменений клапана, гемодинамических нарушений и показаний к лечению. Ранняя диагностика и индивидуальный выбор лечебной тактики способствуют улучшению прогноза и качества жизни пациентов пожилого возраста.

Ключевые слова: аортальный стеноз; эхокардиография; пожилой возраст; клапанные пороки сердца; транскатетерная имплантация аортального клапана.

Introduction: Aortic valve stenosis is the most frequently diagnosed valvular heart disease among elderly individuals and represents an important challenge in modern cardiovascular medicine. The prevalence of this condition increases steadily with advancing age because of progressive degenerative calcification of the aortic valve. As life expectancy continues to rise, the number of patients requiring specialized diagnostic evaluation and treatment is also increasing. The disease usually develops gradually, and many patients remain asymptomatic until significant obstruction of left ventricular outflow occurs. Once symptoms such as exertional dyspnea, angina, or syncope appear, the prognosis becomes considerably worse without appropriate intervention. Elderly patients commonly present with multiple chronic conditions, including hypertension, coronary artery disease, chronic kidney disease, and diabetes mellitus, making diagnosis and treatment decisions more complex. Transthoracic echocardiography remains the primary imaging technique for confirming the diagnosis, determining disease severity, and evaluating left ventricular function. Additional assessment of frailty, functional status, and comorbidity has become increasingly important when selecting the most appropriate therapeutic strategy. Recent advances in surgical and transcatheter aortic valve replacement have expanded treatment opportunities for older patients who were previously considered unsuitable for intervention. A

multidisciplinary approach is therefore essential for improving clinical outcomes and optimizing individualized patient care.

Aim of the study: To evaluate the clinical and echocardiographic characteristics of aortic valve stenosis in elderly patients and to assess the importance of comprehensive diagnostic evaluation for selecting the optimal treatment strategy.

Materials and methods. A prospective observational study included 102 elderly patients with confirmed aortic valve stenosis who were referred to a specialized cardiology center for comprehensive evaluation. The diagnosis was established according to current international recommendations using clinical examination and transthoracic echocardiography. All participants underwent detailed medical history assessment, physical examination, laboratory investigations, 12-lead electrocardiography, chest radiography, and comprehensive echocardiographic examination. Echocardiography included measurement of aortic valve area, peak transvalvular velocity, mean pressure gradient, left ventricular ejection fraction, left ventricular wall thickness, and left ventricular mass index. Doppler imaging was used to evaluate transvalvular blood flow and associated valvular regurgitation. Functional status was assessed according to the New York Heart Association classification, while frailty and comorbidity were evaluated using standard geriatric assessment methods. Additional imaging studies, including computed tomography or coronary angiography, were performed when clinically indicated before valve intervention. Patients were categorized according to the severity of aortic stenosis and treatment strategy, including conservative management, surgical aortic valve replacement, or transcatheter aortic valve implantation. Statistical analysis was performed using standard statistical software. Continuous variables were expressed as mean $\pm$ standard deviation, and categorical variables as frequencies and percentages. Differences were considered statistically significant at $p < 0.05$.

Results. Clinical evaluation demonstrated that severe aortic valve stenosis was predominantly observed among the oldest patients and was frequently associated

with multiple cardiovascular and non-cardiovascular comorbidities. The most common presenting symptoms included progressive exertional dyspnea, reduced physical activity, angina, and episodes of dizziness or syncope. Echocardiographic examination identified marked calcification and thickening of the aortic valve leaflets together with a significant reduction in valve opening area and elevation of transvalvular pressure gradients. Left ventricular hypertrophy was a common finding, reflecting chronic pressure overload caused by progressive obstruction of the left ventricular outflow tract. Although left ventricular ejection fraction remained preserved in many patients, diastolic dysfunction and increased myocardial stiffness were frequently detected. Frailty assessment demonstrated that reduced functional reserve and impaired mobility significantly influenced therapeutic decision-making in elderly individuals. Patients selected for transcatheter aortic valve implantation generally presented with greater surgical risk because of advanced age and associated comorbid conditions, whereas conventional surgical valve replacement was considered appropriate for patients with acceptable operative risk. Multidisciplinary evaluation improved patient selection and allowed individualized treatment planning based on clinical condition, echocardiographic findings, and expected procedural benefits. These results emphasize the importance of combining detailed imaging with comprehensive geriatric assessment to achieve better therapeutic outcomes in elderly patients with aortic valve stenosis.

Conclusions: Aortic valve stenosis in elderly patients is a progressive disease characterized by significant structural valve degeneration, left ventricular remodeling, and increasing functional impairment. Comprehensive clinical evaluation combined with echocardiography provides accurate assessment of disease severity and supports appropriate therapeutic decision-making. Consideration of frailty, comorbidities, and overall functional status is essential when selecting between conservative treatment, surgical valve replacement, and transcatheter intervention. A multidisciplinary approach enables individualized

management, reduces procedural risk, and contributes to improved quality of life and long-term prognosis in older patients with severe aortic valve stenosis.

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