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Aortic stenosis (AS) is a progressive disease that reduces the mobility of the aortic valve leaflets, making it difficult for blood to flow out of the left ventricle. Significant aortic stenosis is a disease with a high prevalence, ranking third in the list of the most common heart conditions and affecting over 5% of people over the age of 75.

There are currently two methods of treating severe AS – Surgical Aortic Valve Replacement (SAVR) and Transcatheter Aortic Valve Implantation (TAVI). These medical procedures aim to extend patients' lives and improve their quality of life.

As a result of the analysis of current literature on new surgical methods and related procedures in the postoperative period, a present need to analyze the costs and effectiveness of two methods of aortic valve surgery – SAVR and TAVI – in Polish conditions was determined.

The aim of the study was to evaluate the results of aortic stenosis treatment by surgical (SAVR) or transcatheter (TAVI) implantation of a biological aortic valve prosthesis, with particular emphasis on the cost-effectiveness of both procedures.

A retrospective study was conducted at the Department of Cardiac Surgery, University Hospital, Medical University of Białystok, Poland. The study was conducted as a clinical registry and included 276 consecutive patients operated on in the years 2016-2018 due to aortic stenosis. The basic inclusion criterion was the eligibility for implantation of a biological aortic valve. Several subgroups were distinguished, dividing patients into those who underwent isolated SAVR and TAVI procedures, and those who underwent additional accompanying procedures. There was also a subgroup of patients in whom SAVR was performed via lateral mini-thoracotomy or hemi-sternotomy.

Correlations between various factors influencing the effectiveness and cost consumption of TAVI and SAVR procedures were searched for. For this purpose, mortality and the risk of death in the studied groups and selected subgroups were analyzed. Further analysis encompassed such parameters as: the level of operational risk (measured with the EuroSCORE II scale), the presence of postoperative complications, duration of hospitalization, duration of the procedure and the dependence of these parameters in relation to the amounts of reimbursement by the Polish National Health Fund (NFZ) for medical

services performed. The quality of life was also assessed in the period immediately after surgery, using the following determinants: length of stay in the postoperative ward, assessment of postoperative pain through the use of drugs in the intensive care unit (ICU). The profitability ratio of the SAVR and TAVI procedures was analyzed, taking into account the subgroups under study.

The obtained results allowed for the conclusion that the method of surgical replacement of the biological aortic valve (SAVR) is more cost-effective than the method of transcatheter aortic valve implantation (TAVI). It has been shown that the presence of accompanying procedures reduces the differences between the SAVR and TAVI groups in terms of the profitability ratio. It was noticed that the main factor influencing the higher NFZ reimbursement for TAVI patients compared to SAVR patients is the payment for the procedure itself, because hospitalization and other services are significantly cheaper in the case of TAVI patients, and the difference in payment for the procedure is primarily related to the significantly higher cost of transcatheter valve implants versus surgical valve implants. There was a clearly higher mortality of men in relation to women in the group of patients undergoing the TAVI procedure. It was found that the occurrence of complications significantly increases the amount of reimbursement in both studied groups, with the highest costs of complications in the SAVR group – in this group the complications were of greater impact. It has been noticed that SAVR procedures in the vast majority of cases involve additional accompanying procedures, while in the TAVI group most cases are isolated procedures. It was found that isolated SAVR procedures show advantages over both the TAVI procedures and SAVR interventions performed simultaneously with accompanying procedures, providing the best results in terms of long-term survival, ICU stay time and profitability ratio. Moreover, it has been shown that the quality of life in the days immediately following the surgery, measured by such determinants as the level of pain (calculated via the consumption of painkillers, in particular opioids) and the length of stay in the postoperative ward, is better in TAVI patients than in SAVR patients.

