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Can TAVI patients receive aspirin monotherapy as patients after surgical aortic bioprosthesis implantation? Data from the Polish Registry — POL-TAVI

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ABSTRACT

Background: This observational analysis investigated in-hospital safety and efficacy of periprocedural antithrombotic/antiplatelet therapy used in TAVI patients included into the Polish Nationwide Cardiac Surgical and Cardiology Registry of Transcatheter Aortic Valve Implantation (POL-TAVI).

Methods and results: All patients who underwent TAVI in the participating centers between 2013 and 2014 were included. The primary endpoints were: severe bleeding, vascular complications, thromboembolic events, myocardial infarction, 30-days mortality, defined according to Valve Academic Research Consortium scale 2. A total of 827 patients were included; 35–93 years old (79.31 ± 7.53); 457 (55.29%) women. Endpoints noted: severe bleeding – 130 (15.72%) pts, vascular complications – 135 (16.32%) pts, thromboembolic events – 29 (3.5%) pts, myocardial infarction – 24 (2.90%) pts, deaths – 58 (7.01%) pts. Aspirin premedication, resulted in the least number of vascular complications (OR 0.56 95%CI [0.345–0.938]; p = 0.027). Aspirin after TAVI reduced the risk of vascular complications (OR 0.089 95%CI [0.0217–0.372]; p = 0.001) and bleeding (OR 0.138 95%CI [0.043–0.447]; p = 0.001) with no adverse impact on efficacy endpoints. Beneficial safety profile of postprocedural aspirin monotherapy remained significant in comparison to all other types of prophylaxis also in propensity score analysis: OR 0.068 95%CI [0.009–0.529]; p = 0.01 for vascular complications, OR 0.176 95%CI [0.049–0.627]; p = 0.007 for bleeding. NNT for vascular complications and bleeding with postprocedural aspirin prophylaxis was 5.5 and 6.42, respectively.

Conclusion: Aspirin after TAVI appears to be beneficial than currently recommended dual antiplatelet therapy; therefore, it might be considered as TAVI antithrombotic prophylaxis.

1. Introduction

The successful clinical introduction of Transcatheter Aortic Valve Implantation (TAVI) was a milestone in the treatment of severe aortic stenosis (AS) [1]. Currently, TAVI is a standard of care among inoperable, and mostly the first choice therapy in high-risk AS patients [1]. Given the vulnerability of this population – TAVI is still burdened with a substantial rate of vascular and bleeding complications, while stroke and other thromboembolic events are on the second close [1,2]. Both types of complications are devastating and often fatal [3]. Since many of their risk factors are not modifiable, proper antithrombotic therapy becomes an essential issue. The currently recommended antithrombotic prophylaxis after TAVI is based on the expert consensus and optimal periprocedural care in this field is unknown [4].

Therefore, the main aim of our study was to investigate the safety and effectiveness of periprocedural antithrombotic/antiplatelet therapy

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used in TAVI patients included into the Polish Nationwide Cardiac Surgical and Cardiology Registry of Transcatheter Aortic Valve Implantation (POL-TAVI).

2. Methods

This was a retrospective, observational analysis based on data form POL-TAVI registry. POL-TAVI is a Polish National Cardiac Surgical and Cardiology Registry of Transcatheter Aortic Valve Implantation funded by European Society of Cardiology and Polish Ministry of Health. This multicenter registry was founded in April 2013 to assess the legitimacy of the rules of the qualification to TAVI, short and long-term effectiveness and safety of the procedure in Poland. The steering Committee of POL-TAVI registry, based in the Silesian Center of Heart Disease (SCCS) in Zabrze, is responsible for conducting of the study as well as management and analysis of the data. Following information are provided by the treating centers and submitted with the electronic case report form to the main database: clinical characteristics, decision-making process, current medical treatment – including antithrombotic/antiplatelet therapy, perioperative, and follow-up outcomes (30 days, 6 and 12 months).

All Polish centers, which perform TAVI committed to report the procedural and follow-up data to the registry, on the basis of agreement (Annex No. 4 to the Regulation No. 31/2015/DSOZ President of the Polish National Health Fund). Data completeness is verified on the basis of the hospitals' reimbursement requests. A voluntary unit – medical-administrative team operating at SCCS, monitors the quality of data.

This study complies with the Declaration of Helsinki and was approved by the local Ethics Committee.

2.1. Patients selection and periprocedural antithrombotic therapy

All patients who underwent TAVI in the participating centers between 2013 and 2014 were included. Patients were qualified to TAVI by local heart teams at the participating sites in accordance to the current ESC practice guidelines [1]. Antithrombotic/antiplatelet therapy was individualized according to the current recommendations, taking into account concomitant comorbidities [1,4].

2.2. Study endpoints

The primary endpoint was defined as the single, in-hospital safety and efficacy events such as: severe bleeding, vascular complications, thromboembolic events, myocardial infarction and 30-day, all-cause mortality. The secondary endpoint composed of all primary ones. All endpoints were defined according to Valve Academic Research Consortium scale 2 (VARC-2) and were investigated during the hospital stay starting from the procedure [5]. Severe bleeding composed of major and life-threatening/disabling events. Major and minor vascular complications were assessed in total. Thromboembolic events were defined as stroke, transient ischemic attack (TIA), valve thrombosis and peripheral embolism.

2.3. Statistical methods

Categorical data were expressed as numbers and percentages; continuous data were presented as means ± SDs. Comparisons were made with the chi^2 or the two-sided Fisher exact test for categorical variables. Continuous variables were tested for normal distribution using the Shapiro – Wilk test. Normally distributed values were compared using Student's *t*-test and one-way analysis of variance; otherwise, the nonparametric Wilcoxon test was used.

The correlation of periprocedural anticoagulation with adopted endpoints was performed with logistic regression analysis with estimated odds ratio (OR) and a 95% confidence interval (CI). The impact of predictors on mortality was assessed with the use of Cox regression analysis with hazard ration (HR) and a 95% confidence interval (CI). Additionally, the log-rank test was performed.

The impact of anticoagulation on end-points was adjusted for risk factors resulting from patients' clinical characteristics. The confounding variables were selected by multivariable logistic regression analysis. Propensity-matched cohorts were created to reduce the potential bias of nonrandom assignment of the patients to the type of postprocedural antithrombotic/antiplatelet prophylaxis: aspirin vs. all other types of anticoagulation. Nearest neighbor 1-to-1 matching with similar propensity scores was applied as the most popular methods. The propensity scores were estimated using non-parsimonious logistic regression models incorporating various patient characteristics including: age, sex, logistic EuroSCORE, STS score, previous myocardial infarction, percutaneous coronary intervention (PCI) within 6 months before TAVI, atrial fibrillation (AF), diabetes, hypertension, renal failure, previous stroke/TIA, and body mass index (BMI). This analysis resulted in 102 matched pairs. The difference in safety endpoints between these two groups was estimated.

Absolute and relative risk reduction (ARR/RRR) were estimated to measure the differences in risk of endpoints with various therapies. Number needed to treat (NNT)/number need to harm (NNH) was estimated to measure effectiveness and the risk associated with selected therapies. A p-value < 0.05 was considered significant for entrance in all analyzes. The statistical analyses were conducted using the MedCalc 11.2.1 (MedCalc Software, Belgium) and SAS systems.

3. Results

A total of 827 patients who underwent TAVI between 2013 and 2014 in 21 Polish cardiac centers were included. The subjects were 35–93 years old (mean 79.31 ± 7.53), 457 (55.29%) were women. The baseline characteristic of study population is presented in Table 1. The procedure was accomplished with success in 791 (95.64%) patients. The Edwards-Sapien/Sapien XT prostheses were implanted in 325 (39.29%) patients, while 445 (53.8%) received CoreValve prostheses. In the case of 57 (6.89%) subjects other prostheses were used. The transfemoral approach was preferable, and was used in 584 (70.61%) of the procedures. The procedural outcomes are presented in Table 2.

3.1. In-hospital complications

The in-hospital bleeding occurred in 130 (15.72%) subjects. Vascular complications were noted in 135 (16.32%) of the subjects and were the main cause of bleeding ($p = 0.001$). There were 96 (73.84%) incidents of access site bleedings, of which 71 (73.95%) were in patients with vascular access and 25 (26.04%) were in transapically treated subjects. A total of 12 (9.23%) bleedings were unrelated to the route of bioprosthesis implantation: 2-broncho-alveolar bleeding, 3-hematuria, 2-related to central line, 2-epistaxis, 3-gastrointestinal bleeding. In the case of 22 (16.92%) events the bleeding were classified as procedure related with periprocedural hemoglobin drop ≥ 3 g/dl and blood transfusion.

The efficacy endpoints were found in 6.4% of our patients: thromboembolic events – 29 (3.5%) pts, myocardial infarction – 24 (2.90%) pts.

Fifty-eight (7.01%) patients died, the in-hospital deaths occurred during the procedure or within 12.32 ± 19.42 days of hospitalization. Eight (13.79%) subjects experienced severe bleeding: 3.left ventricle perforation, 1.haemorhagic stroke, 1.subclavian artery dissection, 1.pleural bleeding, 1.retroperitoneal bleeding, 1.gastrointestinal bleeding. Thromboembolic events were noted in 4 (6.89%) deaths: 3.ischemic stroke, 1.mesenteric arterial embolism. Myocardial infarction was noted in 3 (5.17%) of those who died.

The combined endpoint was noted in 376 (45.46%) of subjects.

In-hospital outcomes are presented in Table 2.

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