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Antithrombotic Management After Transcatheter Aortic Valve Replacement: A Survey of Canadian Physicians

Seleman Reza, BSc,[a] Natalia Pinilla, MD, MSc,[a,b] Emilie P. Belley-Côté, MD, PhD,[a,b,c] Kevin J. Um, MD,[d] Serena Sibilio, MD,[e] Madhu K. Natarajan, MD, MSc,[a,b] and Richard P. Whitlock, MD, PhD[b,c,f]

[a] *Department of Medicine, McMaster University, Hamilton, Ontario, Canada*

[b] *Population Health Research Institute, Hamilton, Ontario, Canada*

[c] *Department of Health Research Methods, Evidence and Impact, McMaster University, Hamilton, Ontario, Canada*

[d] *Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Ontario, Canada*

[e] *Department of Cardiac Surgery, University of Milan, Milan, Italy*

[f] *Department of Surgery, McMaster University, Hamilton, Ontario, Canada*

ABSTRACT

Optimal postprocedural antithrombotic regimen is uncertain after transcatheter aortic valve replacement (TAVR). We developed an online questionnaire on post-TAVR antithrombotic management. After research ethics board approval, we distributed the survey to TAVR implanters across Canada. A total of 24 TAVR implanters from 17 centres responded to the survey for a response rate of 75%. Dual antiplatelet therapy for variable durations was the preferred initial treatment for patients in sinus rhythm after isolated TAVR, TAVR with a recent stent (≤ 1 month), and valve-in-valve procedures (71%, 96%, and 65%, respectively). Most respondents continued patients on acetylsalicylic acid indefinitely after these procedures (100%, 92%, 90%,

RÉSUMÉ

Le traitement antithrombotique postopératoire optimal après un remplacement valvuaire aortique par cathéter (RVAC) n'a pas encore été établi avec certitude. Nous avons mis au point un questionnaire en ligne portant sur le traitement antithrombotique à la suite d'un RVAC. Après avoir obtenu l'approbation du comité d'éthique de la recherche, nous avons distribué le sondage aux chirurgiens pratiquant le RVAC au Canada. Au total, 24 chirurgiens de 17 centres ont répondu au sondage, soit un taux de réponse de 75 %. La bithérapie antiplaquettaire de durée variable constituait le traitement initial de premier choix chez les patients en rythme sinusal après un RVAC isolé, un RVAC après mise en place récente d'une endoprothèse (≤ 1 mois), et une

The use of transcatheter aortic valve replacement (TAVR) is growing; however, questions remain regarding optimal postprocedural antithrombotic management. Early clinical trials have led to the adoption of practices from coronary stents[1] with limited supporting evidence.

For patients in sinus rhythm, the strategy recommended by the American College of Cardiology/American Heart Association consists of lifelong acetylsalicylic acid (ASA) possibly with clopidogrel for up to 6 months after TAVR (level of evidence: IIb Class C).[2] Recent evidence questions the benefit for dual antiplatelet therapy (DAPT) in this population. Patient comorbidities, such as previous stents and atrial fibrillation, increase thrombotic risk; many patients undergoing TAVR will have an indication for anticoagulation. However, advanced age and frailty predispose patients to bleeding. Clinicians' perception of the balance of these risks leads to variations in antithrombotic management after TAVR.

We developed a survey to ascertain antithrombotic management after TAVR. We also aimed to evaluate the factors influencing decisions using clinical scenarios.

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Corresponding author: Dr Richard P. Whitlock, 237 Barton Street East, Hamilton, Ontario L8L 2X2, Canada. Tel.: +1-905-527-4322 ext. 40306; fax: +1-905-577-8017.

E-mail: Richard.Whitlock@phri.ca

See page 1599 for disclosure information.

Materials and Methods

Survey development

TAVR and methods experts designed a 20-item questionnaire (Supplemental Appendix S1) on antithrombotic

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respectively). In patients with atrial fibrillation, the CHA_2DS_2-VAS_C score was the preferred stroke risk score for 57% of respondents, the $CHADS_2$ score was the preferred stroke risk score for 22% of respondents, and the CHADS65 score was the preferred stroke risk score for 17% of respondents. To determine the risk of bleeding, the HASBLED score was most often used (52%), but 48% of respondents indicated that they did not use a bleeding risk score. In the presence of atrial fibrillation, antithrombotic therapy choice varied widely. Our survey shows that dual antiplatelet therapy is the most common discharge regimen after TAVR in current practice. However, the choice and duration of antithrombotic regimen vary in patients requiring anticoagulation.

implantation dites valve-in-valve (71 %, 96 % et 65 %, respectivement). La plupart des répondants maintiennent le traitement par l'acide acétylsalicylique pendant une période indéterminée après ces interventions (100 %, 92 % et 90 %, respectivement). Chez les patients atteints de fibrillation auriculaire, le score CHA_2DS_2-VAS_C constituait le score de risque d'AVC privilégié de 57 % des répondants, le score $CHADS_2$, celui de 22 % des répondants, et le score CHADS65, celui de 17 % des répondants. Le score HASBLED était le plus souvent utilisé pour évaluer le risque d'hémorragie (52 %), mais 48 % des répondants ont toutefois indiqué ne pas utiliser de score de risque d'hémorragie. Le choix du traitement antithrombotique varie considérablement en présence d'une fibrillation auriculaire. Notre sondage montre que la bithérapie antiplaquettaire est le traitement le plus couramment administré à l'heure actuelle après le congé de l'hôpital à la suite d'un RVAC. Le choix et la durée du traitement antithrombotique varient toutefois chez les patients nécessitant un anticoagulant.

management post-TAVR to describe practices and preferences. We used an iterative process to improve question clarity and ensure internal validity. A group of 4 TAVR implanters piloted the initial form.

Participant identification

The target population of the survey included Canadian interventional cardiologists and cardiac surgeons performing TAVR. We contacted Edwards Lifesciences (Irvine, CA) to obtain a list of Canadian TAVR implanters.

Survey administration

We aimed for responses from 2 implanters and 1 cardiac surgeon from each centre. After obtaining Research Ethics Board approval, potential respondents were contacted by email with a hyperlink to an electronic version of the survey using Research Electronic Data Capture software. Participants were given 2 weeks to complete the survey, followed by 2 follow-up emails at 2-week intervals to nonresponders. No incentive for survey participation was provided.

Statistical analyses

We used nonparametric descriptive statistics (counts with percentages and medians with interquartile range [IQR]) to summarize the characteristics of survey respondents and their antithrombotic management. Some individual responses were not reported because of the small sample size.

Results

We surveyed 32 participants in 17 Canadian centres; our response rate was 75%. Most respondents practised as interventional cardiologists (75%, n = 18), and the remaining were cardiac surgeons (25%, n = 6).

Respondent characteristics

Survey respondents had been in practice for a median of 12 years (interquartile range [IQR], 7.5-17). TAVR had been performed at their centres for a median of 8 years (IQR, 5.0-10.25). These implanters performed a median of 75 TAVRs in 2016 and 2017 (IQR, 50-110).

Risk calculation and management

Of respondents, 96% used a stroke risk score to guide their anticoagulation decisions for patients with atrial fibrillation. CHA_2DS_2VASC, CHADS2, and CHADS65 were used in 57%, 22%, and 17% of cases, respectively. In contrast, 52% of respondents indicated that they used a bleeding risk score; 100% preferred to use the HASBLED risk score. For patients taking a vitamin K antagonist (VKA), 8% of respondents used low-molecular-weight heparin as an anticoagulant until the international normalized ratio was in the therapeutic range; a stroke risk score of 2 was preferred as the cutoff.

Clinical scenario evaluations

We evaluated 5 different postprocedure scenarios consisting of patients in sinus rhythm, sinus rhythm with recent percutaneous coronary intervention (PCI) (<1 month), valve-in-valve, atrial fibrillation, and atrial fibrillation with recent PCI (<1 month). The results are displayed in Figure 1 and presented next.

For patients in sinus rhythm, 71% of respondents preferred DAPT for 3 months (21%) or 6 months (50%) followed by ASA for an indefinite duration (100%). Twenty-five percent of respondents prescribed ASA monotherapy immediately after TAVR. For patients with a recent stent (< 1 month), 96% prescribed DAPT for durations of 6 months (17%) or 12 months (67%) and used ASA indefinitely at follow-up (100%). For valve-in-valve TAVR, 65% of respondents prescribed DAPT for 3 months (22%), 6 months (35%), or 12 months (9%). Twenty-two percent of valve-in-valve responses consisted of anticoagulant regimens such as VKA monotherapy (9%), VKA + ASA (4%), or direct oral anticoagulant (DOAC) monotherapy (9%), with 90% of respondents following up their initial therapies with indefinite ASA.

There was wide variability when directly dealing with cases involving atrial fibrillation. Sixty-four percent chose a regimen that contained a DOAC as opposed to warfarin (32%). Of the DOAC regimens, 41% consisted of DOAC monotherapy, and 23% preferred DOAC + ASA. Respondents who preferred warfarin prescribed it alone (43%) or with ASA (57%). All therapies were followed by anticoagulant monotherapy indefinitely.

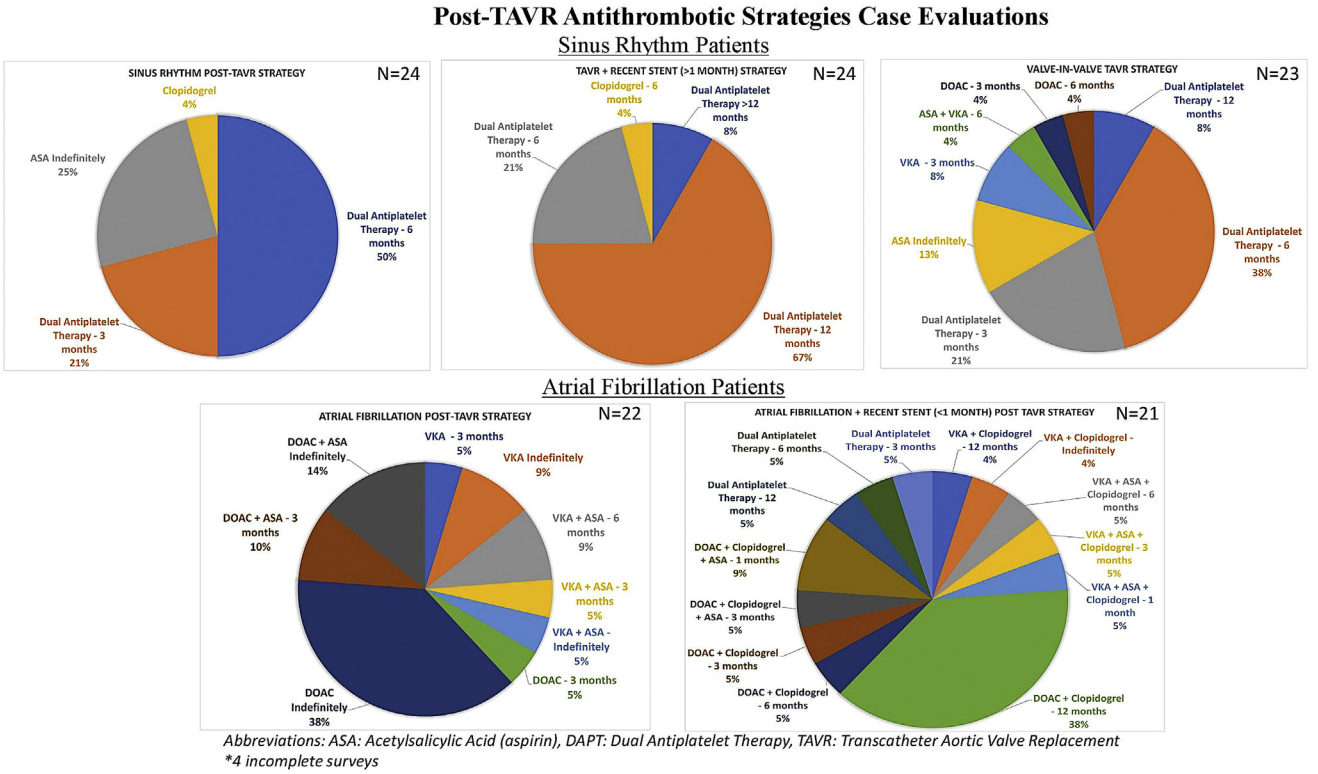

Figure 1. Each graph provides an overview of what physicians prefer for antithrombotic therapy for a given set of patient profiles listed in the title of the graph. ASA, acetylsalicylic acid; DAPT, dual antiplatelet therapy; DOAC, direct oral anticoagulant; TAVR, transcatheter aortic valve replacement; VKA, vitamin K antagonist.

When asked about managing a patient with atrial fibrillation and a recent stent, respondents preferred anticoagulants with a P2Y12, or triple therapy. Thirty-three percent reported using a DOAC with a P2Y12 for 12 months followed by indefinite DOAC monotherapy. Responses were split for the duration of triple therapy combining VKA + DAPT being 1 month (33%), 3 months (33%), or 12 months (33%). Meanwhile, respondents prescribed a regimen consisting of a DOAC + DAPT for 1 month (66%) or 3 months (33%) followed by a DOAC + P2Y12 indefinitely.

Trends in oral anticoagulants

In their practice, 91% of respondents used DOACs within the first 3 months post-TAVR when indicated. Fifty percent of respondents indicated that the choice was individualized to the patient, whereas 30% routinely preferred apixaban (rivaroxaban, 15%; dabigatran, 5%). If patients were taking a DOAC before the procedure, all respondents indicated they would continue this DOAC. If patients were taking a VKA, 77% of respondents maintained a VKA postprocedure.

Fifty-five percent of respondents indicated they based their antithrombotic regimens on published guidelines, and 65% of responses contained 2 or more published guidelines. The 2016 Canadian Cardiovascular Society position statement was used for reference by 55% of respondents. Although 90% of respondents reported that they discussed antibioprophylaxis for dental procedures, only 10% provided prescriptions for their patients.

Discussion

For patients in sinus rhythm, we found a strong preference for DAPT over single antiplatelet therapy after TAVR. After a stent, two-thirds of respondents mirrored the practice for PCI with 12 months of DAPT. Preferences for valve-in-valve procedures varied between DAPT and introducing an oral anticoagulant. We observed a slight preference for DOACs over VKAs when dealing with anticoagulation. For patients in atrial fibrillation, preferences were split between anticoagulant monotherapy and dual therapy with ASA. Practise remains highly variable for patients in atrial fibrillation with a recent stent, but dual therapy with a P2Y12 inhibitor is preferred over ASA.

Limitations of guidelines

The optimal type and duration of antithrombotic regimen post-TAVR are unknown. Current recommendations are heterogeneous and based on low quality of evidence. The American College of Cardiology/American Heart Association recommends DAPT may be reasonable for up to 6 months (level of recommendation: IIb; class C),[2] whereas the European Society of Cardiology calls for DAPT for 3 to 6 months (level of recommendation: IIa; class C).[3] These recommendations are based on experience in the **P**lacement of **Aor**tic **Tran**scathe**ter** Valves (PARTNER) trials in which DAPT for 6 months was followed by indefinite ASA,[1] an extrapolation from experience with intracoronary stents. In addition, these guidelines do not accurately depict clinical scenarios that clinicians encounter.

The TAVR population is at high risk for both thromboembolism and bleeding, complicating antithrombotic management. Knowing the lack of evidence to support recommendations, physicians may choose to base their decisions on a subjective assessment of the risk of thrombosis and bleeding. This would explain why half of all respondents reported not basing their antithrombotic management on guideline recommendations.

Recent findings of subclinical valve leaflet thrombosis after TAVR[4] may lead to oral anticoagulants assuming a larger role, as suggested by one-fifth of respondents preferring anticoagulants after valve-in-valve TAVR in patients in sinus rhythm. As a parallel, surgical guidelines for bioprosthetic valves suggest antiplatelet monotherapy along with a VKA at an international normalized ratio of 2.5 for 3 months after surgery (level of recommendation: IIb; Class b).[2] However, even in that population, this is based on low quality of evidence.[5]

Limitations

Although our study is the first to assess practice patterns of physicians for patients who have received prior stents or valves, it also has limitations. Our results may not be generalizable to all physicians involved in the field of TAVR. Stated practises in the survey and actual practise may differ.

Conclusion

DAPT is the favoured regimen for patients in whom anticoagulation is not indicated. For patients requiring anticoagulation, the practice around DOACs vs VKA varies. Higher-quality data would help inform the optimal antithrombotic management in this vulnerable population.

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Disclosures

The authors have no conflicts of interest to disclose.

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Supplementary Material

To access the supplementary material accompanying this article, visit the online version of the *Canadian Journal of Cardiology* at www.onlinecjc.ca and at https://doi.org/10.1016/j.cjca.2019.08.017.