7%. THV thrombosis often remains subclinical. However, Ghanem et al. (4) reported that subacute subclinical brain infarctions after TAVR occur in 61% of patients and are associated with impaired long-term cognitive function. Unfortunately, THV thrombosis was not assessed in the ARTE trial. Chakravarty et al. (5) recently reported in an observational analysis that oral anticoagulation is superior as compared with antiplatelet medication in reducing the incidence of THV thrombosis. Currently, randomized controlled trials such as GALILEO (Global Study Comparing a rivAroxaban-based Antithrombotic Strategy to an antipLatelet-based Strategy After Transcatheter aortIc vaLve to Optimize Clinical Outcomes) (NCT02556203) and ATLANTIS (Anti-Thrombotic Strategy After Trans-Aortic Valve Implantation for Aortic Stenosis) (NCT02664649) investigate a dual antiplatelet therapy versus an anticoagulation-based regimen in TAVR patients.

Based on currently available data, additional clopidogrel treatment after TAVR seems highly questionable. Still, further trials investigating the optimal antithrombotic regime after TAVR are needed.

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REPLY: Aspirin Versus Aspirin Plus Clopidogrel as Antithrombotic Treatment Following Transcatheter Aortic Valve Replacement With a Balloon-Expandable Valve

We have read with interest the letter from Dr. Piayda and colleagues on the recently published ARTE trial (1). We agree with the authors on the importance of adding evidence-based data to the complex field of antithrombotic therapy following transcatheter aortic valve replacement (TAVR). We think that the results of the ARTE trial showing both the lack of benefit for ischemic events and the harmful effects for bleeding complications of dual (vs. single) antiplatelet therapy represent an important step forward in the field (1).

Dr. Piayda and colleagues referred to the variability of platelet reactivity to clopidogrel among TAVR candidates, with up to two-thirds of the patients exhibiting high on-treatment platelet reactivity. However, other authors failed to replicate such results and reported a much lower (~40%) incidence of high on-treatment platelet reactivity among TAVR patients (2). Also, Watanabe et al. (3) showed that about one-third of patients undergoing TAVR presented a hyperresponse to clopidogrel therapy leading to very low platelet reactivity, and this was associated with an increased rate of severe bleeding events. This reflects the high variability of platelet reactivity according to different TAVR populations and tests used for its measurement, and diminishes the potential value of these tests in the context of TAVR. In fact, the principle of individualized antiplatelet treatment based on platelet reactivity tests has already failed in the coronary field (4), and the possibility of implementing such tests in the TAVR arena and obtaining clinically meaningful results is extremely slim.

Another aspect pointed out by Dr. Piayda and colleagues relates to subclinical valve thrombosis post-TAVR. The occurrence of subclinical valve

thrombosis (as determined by computed tomography) in about 10% of TAVR patients has generated a lot of recent interest (5). Of note, dual antiplatelet therapy does not seem to protect patients from this phenomenon (5), and the question is therefore whether systemic anticoagulation rather than single antiplatelet therapy should be the preferred antithrombotic treatment post-TAVR. Although anticoagulation therapy seems to be an appealing option for protection against subclinical valve thrombosis, it is important to note the lack of definite clinical data correlating subclinical valve thrombosis with thromboembolic events (5). In fact, the stroke rate in TAVR patients after the periprocedural period is low and unlikely to be reduced by anticoagulation therapy in patients with no atrial arrhythmias. Also, the systematic use of anticoagulation therapy in the elderly and frail TAVR population would probably be associated with an increase in bleeding events. It remains to be proven whether the potential benefits of anticoagulation therapy on a (mainly) subclinical issue, such as valve thrombosis, will outweigh its probable increase in hemorrhagic complications. In fact, one of the main advantages of bioprosthesic valves (vs. mechanical valves) is the avoidance of systemic anticoagulation.

In the era where TAVR is moving toward the treatment of lower risk patients with a minimalist approach, the need for anticoagulation following the procedure may seem to represent a step back in the overall management of these patients. A tailored approach with serial echocardiographic follow-up and anticoagulation therapy only in the rare cases of clinically relevant valve thrombosis could be a reasonable option. In any case, we are living in exciting times in TAVR, and the multiplicity of ongoing trials on antithrombotic therapy post-TAVR will definitely enlighten the field in the near future. However, we should be cautious with the overtreatment of patients and never forget the Hippocratic principle of "first, do not harm." The results of the ARTE trial provide a good example in this direction.

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Clinical Significance of Intravascular Ultrasound-Detected Vascular Injury Following Chronic Total Occlusion Recanalization With Intraplaque Versus Subintimal Tracking Techniques

We read with interest the article by Song et al. (1), who provided procedural intravascular ultrasound (IVUS) data on 219 patients undergoing successful chronic total occlusion (CTO) percutaneous coronary intervention (PCI) according to intraplaque versus subintimal tracking (ST). ST was detected in 52.1% of