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REVIEW TOPIC OF THE WEEK

Management of Periprocedural Anticoagulation

A Survey of Contemporary Practice

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ABSTRACT

Interruption of oral anticoagulation (AC) for surgery or an invasive procedure is a complicated process. Practice guidelines provide only general recommendations, and care of such patients occurs across multiple specialties. The availability of direct oral anticoagulants further complicates decision making and guidance here is limited. To evaluate current practice patterns in the United States for bridging AC, a survey was developed by the American College of Cardiology Anticoagulation Work Group. The goal of the survey was to assess how general and subspecialty cardiologists, internists, gastroenterologists, and orthopedic surgeons currently manage patients who receive AC and undergo surgery or an invasive procedure. The survey was completed by 945 physicians involved in the periprocedural management of AC. The results provide a template for educational and research projects geared toward the development of clinical pathways and point-of-care tools to improve this area of health care. (J Am Coll Cardiol 2016;68:217–26) © 2016 by the American College of Cardiology Foundation.

Annually, 10% to 15% of patients who receive oral anticoagulation (AC) therapy require treatment interruption for surgery or an invasive procedure (1,2). Parenteral AC, typically with unfractionated heparin or low molecular weight heparin, is thought to prevent thromboembolic events (TE) during the time when patients do not receive oral AC. The safety and efficacy of this practice of "bridging anticoagulation" has been called into question with several developments in AC therapy.

First, it has been difficult to show that bridging AC prevents TE. A systematic review and meta-analysis in patients who required interruption of vitamin K antagonist (VKA) therapy showed no significant differences in TE between those patients who received parenteral AC and those who did not. A significant excess of major bleeding was noted in those receiving parenteral AC (3). In the recently published, randomized, double-blind BRIDGE (Bridging Anticoagulation in Patients who Require Temporary Interruption of Warfarin Therapy for an Elective Procedure or Surgery) study, patients receiving VKAs for atrial fibrillation, who were at moderate risk for TE and who were undergoing surgery, were randomized to dalteparin or placebo. A low rate of TE, not significantly different between placebo and dalteparin, was noted. Significantly higher rates of major bleeding occurred with dalteparin (4).

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ABBREVIATIONS AND ACRONYMS

AC = anticoagulation

ACC = American College of Cardiology

b.i.d. = twice daily

DOAC = direct-acting oral anticoagulant

INR = international normalized ratio

TE = thromboembolic event

VKA = vitamin K antagonist

Second, a number of surgical procedures with a lower risk for bleeding can be performed with brief or no interruption of warfarin. These include pacemaker and implantable cardioverter-defibrillator implantation, dental extraction, and cataract surgery (5-9). The ability to perform procedures at lower risk of bleeding without interruption of oral AC reduces the need for parenteral AC and the additional risk of bleeding.

Third, direct-acting oral anticoagulants (DOACs) have been incorporated into clinical practice. Unlike warfarin, which inhibits the synthesis of several clotting factors, DOACs directly inhibit selected components of the clotting cascade and have a much more rapid onset and offset of action than VKAs. On the basis of these pharmacological properties, many have questioned the need for the administration of parenteral AC when DOACs are interrupted. However, an increased frequency of stroke after cessation of DOACs has been reported (10-13), leading to the inclusion of a Food and Drug Administration recommendation in the prescribing information, stating that coverage with another AC should be considered if dabigatran, rivaroxaban, apixaban, or edoxaban are discontinued. In point of fact, this recommendation arose from the observation of excess stroke rates at the end of pivotal clinical trials, when patients were transitioned from a DOAC back to warfarin. This was not meant to endorse bridging when patients were taken off a DOAC for a procedure, but the impact of this recommendation in clinical practice is uncertain.

Finally, there is the realization that management of AC in a patient requiring surgery or an invasive procedure is complex. The interruption and reinstitution of oral AC, and the initiation and discontinuation of parenteral AC requires coordination between a number of health care providers (14).

Because of these developments, and to better understand current practice patterns for patients requiring interruption of AC therapy, a survey was developed by members of the American College of Cardiology (ACC) Anticoagulation Initiative Work Group and completed by a variety of health care providers in the United States who care for patients receiving AC.

METHODS

The ACC's Anticoagulation Initiative Work Group was formed in 2013 to improve the delivery of AC care. Members of this work group developed a survey, approved by the ACC, which was sent to physicians who care for patients on AC who undergo a procedure. Initially, the online survey was distributed to 9,165 members of the ACC who agreed to participate. General cardiologists (n = 158, response rate 6.5%), interventional cardiologists (n = 161, response rate 3.3%), and electrophysiologists (n = 163, response rate 8.8%) completed the survey.

Internal medicine primary care physicians, gastroenterologists, and orthopedic surgeons were identified through the Medical Panel of Research Now, Inc. The proprietary Research Now Medical panel is actively managed and updated with weekly verification. The Research Now Medical panel uses a "by invitation only" methodology, including online recruitment, as well as a direct mail enrollment campaign. The Research Now Medical panel is American Medical Association verified to ensure that all members enrolled in the panel are physicians, and therefore provides accurate targeting across all medical specialties. The survey was distributed to 3,054 physicians and was completed by internists (n = 152, response rate 13.9%), gastroenterologists (n = 160, response rate 13.0%), and orthopedic surgeons (n = 153, response rate 21.0%). For participation in this survey, each panelist from the Research Now Medical panel received $35.

The ACC provided financial support to Research Now, which conducted the survey for the noncardiologists. The survey was performed between July 22, 2015, and August 27, 2015. The complete survey is available in the Online Appendix. The respondents represented both private and academic practices across the United States. Of the cardiologists surveyed, 85% had primary board certification in internal medicine and 99% were board certified in cardiovascular diseases. Detailed profile information about the respondents is also available in the Online Appendix.

RESULTS

WHO MANAGES PERIPROCEDURAL AC? When asked who manages AC during and after surgical or invasive procedures, the survey respondents said that cardiologists are extensively involved in decision-making processes, more commonly than the physician performing the procedure (**Figure 1**). A number of other health care professionals, including primary care physicians, pharmacists, and nurses, are involved in the periprocedural management of the patient who receives oral AC.