AMERICAN COLLEGE of CARDIOLOGY

Clinical Monitoring of Direct Acting Oral Anticoagulants

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The following are 10 key points from this review, which is intended to provide clinicians with a practical guide to monitoring patients receiving direct oral anticoagulants (DOACs):

1. Warfarin remains the most prescribed oral anticoagulant worldwide, yet several randomized controlled trials have demonstrated that DOACs cause significantly less bleeding than warfarin and are generally superior in efficacy.
2. Important monitoring limitations of DOACs include the inability to assess anticoagulant activity, the need to assess renal function before initiation and with ongoing therapy, and the required strict adherence to ensure complete efficacy due to their short duration of action.
3. The lack of a need for routine monitoring with DOACs is often seen as an advantage over warfarin; however, situations exist when having a reliable method to assess the presence of an anticoagulant effect would be useful (e.g., trauma, urgent surgery, or acute bleed).
4. Commonly used coagulation assays (e.g., activated partial thromboplastin time and prothrombin time) are available across all institutions and are easy to

patient.

5. Plasma drug concentrations, ecarin clotting time, dilute thrombin time, and anti-FXa levels appear more useful to assess DOAC intensity, but these are less commonly available, and the turnaround time is much slower. Furthermore, these assays are not standardized across laboratories and require calibration for each individual DOAC.
6. Renal dysfunction is a risk factor for bleeding, which is especially important given that each of the DOACs is renally eliminated. Despite limited evidence to support that routine renal function monitoring prevents adverse events, the authors of this review recommend assessing renal function at least every 6 months.
7. Each of the DOACs, except dabigatran, is metabolized by the liver. As such, routine liver function monitoring (every 6-12 months) should be considered in patients with, or at risk for, hepatic dysfunction.
8. Non-adherence to any anticoagulant therapy is an undesirable outcome, but this is particularly important for the DOACs given their short half-life. As such, twice-daily DOACs (e.g., apixaban) may actually be more forgiving than once-daily agents (e.g., rivaroxaban). Adherence should be assessed at every visit by completing a thorough patient interview at every encounter, conducting manual pill counts, and monitoring prescription refill records.
9. Although DOACs clearly have fewer significant drug-drug interactions compared with warfarin, DOACs are not benign. Each of the DOACs is a substrate for P-glycoprotein, and several are metabolized via CYP450 enzymes. Clinicians should consult the package insert and dose adjustments made in clinical trials for select drug-drug interactions involving the DOACs to ensure that the patient receives the appropriate dose.
10. Special groups, including the elderly and patients who are obese or underweight, are also at increased risk for adverse outcomes. Polypharmacy in the elderly can increase the risk of drug-drug interactions, DOAC exposure may increase in underweight patients, and the effectiveness and safety of DOAC use in obese patients remain unclear and warrant further study.

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