

Novel oral anticoagulants, diagnostic catheterization, and coronary intervention: another step forward towards the optimal strategy



Nuevos anticoagulantes orales, cateterismo diagnóstico e intervencionismo coronario: otro paso hacia la estrategia óptima

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The optimal management of chronic anticoagulation is still controversial to this day both in clinical cardiology and particularly in interventional cardiology. The progressive aging of the population has increased exponentially the percentage of patients with an indication for chronic oral anticoagulation who undergo percutaneous invasive procedures to up to 5%-10% of the total. Also, most of them suffer from atrial fibrillation.¹

Until the arrival of new direct-acting oral anticoagulants (DOAC), most of these patients were anticoagulated with vitamin K antagonists (VKA). Invasive procedures used to be performed after withdrawing oral anticoagulation and using bridging anticoagulation with low molecular weight heparin.² We believe that this widely used strategy in our setting should be put into question though. In the first place, the prothrombotic rebound effect has been reported as associated with the withdraw and reset of VKA.³ Secondly, the interaction of anticoagulants with a different mechanism of action used in patients on bridging therapy can have pro-hemorrhagic and procoagulant consequences. As a matter of fact, the actual clinical guidelines recommend avoiding the concomitant use of unfractionated heparin in patients undergoing percutaneous coronary interventions (PCI).⁴ Also, more hemorrhagic complications associated with bridging therapy have been confirmed in patients treated with invasive or surgical procedures (1.3% vs 3.2%),⁵ in patients undergoing PCI (8.3% vs 1.7% and 6.8% vs 1.6%⁷), and in one meta-analysis (odds ratio, 5.40; 95% confidence interval, 3.00-9.74).⁸ Overall, none of these studies revealed more thromboembolic events associated with the absence of bridging therapy.⁵⁻⁸ With the actual evidence available today, we should ask ourselves why many clinical practice protocols in our setting recommend the use of bridging therapy with VKA and low molecular weight heparin in patients on chronic anticoagulation

There is little evidence from the studies published so far that specifically compare uninterrupted strategies with anticoagulation and interrupted strategies without bridging therapy. We could argue that vascular access is safer if used in uncoagulated patients. However, the PCI is a low-risk of bleeding procedure⁹ when performed through the access of choice which is the radial access^{1,4} (used in Spain in up to 90% of the cases).¹⁰ Also, yet despite the

doubts of many interventional cardiologists, therapeutic warfarin treatment seems to provide sufficient anticoagulation for PCI, and additional heparins are not needed and may increase access site complications.¹¹ Actually this is what the clinical guidelines establish when the international normalized ratio (INR) is above 2.5⁴. In any case, we always have this possibility of adding heparin during the PCI, always bearing in mind that when choosing radial access, the incidence of bleeding is low, and the chances of radial occlusion or thrombosis of the materials drop.

Yet despite the growing use of DOACs in the clinical practice, the evidence available today for its use during the procedure is scarce in patients undergoing PCI. This contrasts with the benefit shown with the use of VKA in revascularized patients who need antiplatelet therapy¹² or even as adjuvant therapy for the management of acute coronary syndrome.⁴ In an article published on *REC: Interventional Cardiology*, Ramírez Guijarro et al.¹³ talk about their own initial experience with same-day diagnostic catheterizations without DOAC withdrawal in patients on chronic anticoagulation. It is interesting that no differences were seen in the incidence of hemorrhages or radial occlusions compared to patients without prior antiplatelet therapy or with uninterrupted therapy with VKA. The way we see it, this is a pioneering strategy in our setting which, although it does not validate its use in PCIs with stent implantation, it provides evidence in the right direction. In our opinion, the uninterrupted strategy of anticoagulation when using the radial access has 2 main advantages. The first advantage is the simplification of the procedure for doctors and patients alike especially in outpatient same-day procedures. The benefit of this simplification is potentially higher in patients treated with DOACs since the monitoring of the INR is not necessary at admission and the complexity of withdrawal protocols is avoided based on the half-life of DOACs and renal function. The second advantage is the safety shown with its use since it reduces bleeding complications without improving thromboembolic complications.

In sum, with the evidence available today we know that: a) we should avoid prescribing systematic bridging therapy with low molecular weight heparin in patients undergoing catheterizations/PCI. When dealing with a procedure where there is a high risk

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Table 1. Summary of actual anticoagulation recommendations in patients who are going to undergo invasive procedures

Group	Recommendations for patients treated with VKA	Recommendations for patients treated with DOAC
ACC 2012 Consensus Document on standards at the cath lab ²	- Withdraw - INR < 2.2 for radial access	- Always withdraw dabigatran
ESC 2015 Guidelines on the management of NSTEMI ⁴	- Uninterrupted strategy - Without parenteral anticoagulation when INR > 2.5 - Additional dose of parenteral anticoagulation when INR < 2.5	- Uninterrupted strategy - Always administer additional dose of parenteral anticoagulation (60 IU/kg of UFH)
ESC 2017 Guidelines on the management of STEMI ¹⁴	- Uninterrupted strategy - Always administer additional parenteral anticoagulation	- Uninterrupted strategy - Always administer additional parenteral anticoagulation
ACC 2017 Consensus Document on the management of anticoagulation during the procedure in patients with non-valvular atrial fibrillation ⁹	- Uninterrupted strategy without bridging therapy	- Withdraw for 24-96 h - No bridging therapy
AHA Position Statement on DOAC therapies ¹⁵		- Withdraw for 12-48 h - Consider bridging therapy with heparin in the presence of high embolic risk - Add heparin during the procedure
European EHRA, EAPCI, ACCA Consensus Document 2018 on anticoagulation in patients undergoing interventional procedures ¹	- Uninterrupted strategy - Administer 30-50 IU/kg of UFH	- Withdraw for 12-48 h without bridging therapy with elective percutaneous coronary interventions - Administer 70-100 IU/kg of UFH

ACC, American College of Cardiology; ACCA, European Association of Acute Cardiac Care; AHA: American Heart Association; DOAC, direct-acting oral anticoagulants; EAPCI, European Association of Percutaneous Cardiovascular Interventions; EHRA: European Heart Rhythm Association; ESC, European Society of Cardiology; INR, international normalized ratio; NSTEMI, non-ST-segment elevation acute coronary syndrome; STEMI, ST-elevation acute myocardial infarction; UFH, unfractionated heparin; VKA, vitamin K antagonists.

of bleeding, the best thing to do is to withdraw anticoagulation without using bridging therapy in patients with non-valvular atrial fibrillation; b) we should keep VKAs during catheterizations/PCIs performed through radial access; c) stent implantation seems safe with VKA, but heparin can also be prescribed based on the INR and experience; d) diagnostic catheterizations on DOAC therapy seem safe.

In sum, we still need more evidence on this ongoing debate. Studies like the one conducted by Ramírez Guijarro et al.¹³ are extremely useful but future randomized trials should elucidate what the best antithrombotic strategy is for stent implantation in patients treated with DOAC or VKA. Similarly, clinical guidelines should come to terms on the actual recommendations based on the evidence available today since they do not agree on many issues as table 1 shows. The ultimate goal should be finding the optimal strategy which should be easy to implement, effective, and safe for our patients.

CONFLICTS OF INTEREST

None reported.

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