SCIENTIFIC EDITORIAL

Self-control of long-term oral anticoagulation using a point-of-care device

Automesure de l’anticoagulation à domicile

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The coumarins or vitamin K antagonists, have been the mainstay of oral anticoagulant therapy for more than 60 years. Their effectiveness has been established by well-designed clinical trials for both the primary and secondary prevention of venous thromboembolism, for the prevention of systemic embolism in patients with prosthetic heart valves or atrial fibrillation, as an adjunct in the prophylaxis of systemic embolism after myocardial infarction, and for reducing the risk of recurrent myocardial infarction. Oral anticoagulants (OAC) are challenging to use in clinical practice for the following reasons:

• they have a narrow therapeutic window;
• they exhibit considerable variability in dose response among patients due to genetic and other factors;
• they are subject to interactions with drugs and diet;
• their laboratory control is difficult to standardize;
• maintenance of a therapeutic level of anticoagulation requires a good understanding of the pharmacokinetics;
• pharmacodynamics of OAC plus good patient communication.

Indications for oral anticoagulation have increased in recent years. OAC require frequent monitoring for the international normalized ratio (INR) and prothrombin time (PT) to keep the intensity within the therapeutic range and to minimize the risk for bleeding complications. Approaches to improve anticoagulant control include the use of anticoagulation clinics to manage therapy, point-of-care (POC) of INR testing and computer software programs to aid dose adjustment.

KEYWORDS
Self-control of oral anticoagulant; Point-of-care monitor; Anticoagulant

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POC monitors measure a thromboplastin-mediated clotting time from a fingerstick sample of capillary whole blood. The results are then converted to a plasma-PT equivalent by a microprocessor and are expressed as a PT or INR. Each manufacturer typically establishes a conversion formula by simultaneously comparing fingerstick results with an established laboratory method. Good agreement between the plasma reference laboratory method and new generation devices have been demonstrated (0.86 to 0.98). Furthermore, within-day precision for normal or abnormal control plasma have been reported with a coefficient of variation ranging from 3.5 to 5%. Some limitations do exist, however, such as the tendency to underestimate elevated INR and the inadequacy of the method in cases of anaemia, fever or inflammatory syndrome. Furthermore, some devices may be influenced by heparin residues.

A recent consensus statement for the anticoagulation forum underlined that long-term use of OAC can be optimized by a systematic evidence-based approach to therapy including patient education, selection and supervision. Patients’ self-control and self-management have been found to improve significantly the quality of OAC treatment [1].

Two recent meta-analyses [2,3] highlighted the fact that self-management of OAC improves the quality of oral anticoagulation. Patients capable of self-monitoring and/or self-adjusting therapy have fewer thrombotic events and lower mortality. Self-monitoring is not feasible for all patients, however, and requires the identification and education of suitable candidates.

Guidelines from the American College of Chest Physician [4] recommend that physicians, who manage oral anticoagulation therapy do so in a systematic and coordinated fashion, incorporating patient education, systematic INR testing, tracking, follow-up, and good patient communication of results and dose adjustments (Grade 1B). In patients who are suitably selected and trained, patient self-testing or patient self-management of dosing are effective alternative treatment models that result in improved quality of anticoagulation management, with greater time in the therapeutic range and fewer adverse events. Patient self-monitoring or self-management, however, is a choice made by patients and physicians that depends on many factors. We suggest that such therapeutic management can be implemented where suitable (Grade 2B).

Such POC devices are currently commercially available in numerous countries in Europe and America. These devices also became available and are reimbursed in France in June of this year, but only for children who need long-term anticoagulant therapy.

The present study presented by Dauphin et al. [5] reports the preliminary results of a single-centre, open, randomized study that compared monthly laboratory monitoring (group A) with weekly self-monitoring (group B) of INR in patients undergoing single or multiple mechanical valve replacements either alone or in combination with coronary revascularization. The primary aim of the study was to improve INR stability within the target range; the secondary aim was to reduce the number of adverse events. At the start of the study, the aim was to enroll 100 patients divided equally into two groups. The authors reported the results of the intermediate analysis on the first 67 patients enrolled. This is the first study to evaluate INR self-monitoring in France. It shows that this method yields better stability of the INR within the target range, and decreases the number of serious haemorrhages (11.8% in group A versus 0% in group B).

The 4A study “‘Apport d’un Appareil d’Automesure de l’Anticoagulation’” is currently being conducted in France in a population of patients recently fitted with a mechanical heart valve. It is a nationwide, multicentre (24 sites), randomized, blinded trial with two study groups:

- conventional follow-up of anticoagulation: at least monthly checks and adjustment of the INR by the family doctor (n = 350 patients);
- self-measurement of anticoagulation by patients at home, and weekly measurement and adjustment of the INR by the family doctor (n = 700 patients).

The main objective is to evaluate the economic impact of a self-measurement strategy. The secondary objectives are the impact on complications (bleeding, thromboembolic events and death), the proportion of monthly INR values within the target range, the evaluation of patients’ learning about the procedure, and patients’ compliance and satisfaction with the procedure. Inclusion into the study began in May 2007, with each patient participating for 12 months. The final results will become available in 2010.

Finally, self-monitoring of glycaemia in diabetic patients is both essential and indispensable nowadays. Undoubtedly, self-monitoring of OAC allows the INR to be checked more frequently, always using the same machine (which is correlated with an improvement in anticoagulation). Furthermore, this method allows patients to manage their treatment better, which in turn leads to improved compliance with therapy. We think that POC devices for INR control will in the future improve significantly the safety of long-term OAC therapy.

References