

## THERAPEUTICS

## Review: Self-monitoring increases the efficacy and safety of anticoagulant therapy

Heneghan C, Alonso-Coello P, Garcia-Alamino JM, et al. Self-monitoring of oral anticoagulation: a systematic review and meta-analysis. *Lancet*. 2006;367:404-11.

**Clinical impact ratings:** GIM/FP/GP ★★★★★☆☆ Hospitalists ★★★★★☆☆ Hematol/Thrombo ★★★★★☆☆

### QUESTION

In patients receiving oral anticoagulant therapy, how do the safety and efficacy of self-monitoring compare with management by health care professionals?

### METHODS

**Data sources:** MEDLINE, EMBASE/Excerpta Medica, and CINAHL (to 2005); Cochrane Central Register of Controlled Trials; Cochrane Library (issue 2, 2005); U.K. National Research Register; Trials Central; bibliographies of retrieved studies; manufacturers of home monitors; and experts in the field.

**Study selection and assessment:** Randomized controlled trials (RCTs) that compared self-testing (only) or self-management (testing and dose adjustment) with management by health care professionals (control group) in adults or children who were receiving oral anticoagulation therapy for any indication. 14 RCTs ( $n = 3049$ , mean age range 42 to 75 y) met the selection criteria. Quality assessment of individual trials included randomization, allocation concealment, blinding of outcome assessors, use of intention-to-treat analysis, and follow-up.

**Outcomes:** Thromboembolic events, major bleeding episodes, all-cause mortality, proportion of international normalized ratio

(INR) measurements within the target range, and frequency of testing.

### MAIN RESULTS

In the control group, management was provided by primary care physicians in 8 RCTs and by specialized anticoagulation clinics in 6 RCTs. Duration of the studies ranged from 2 to 24 months. Thromboembolic events, major bleeding episodes, and death occurred less frequently in the self-monitoring group than in the control group (Table). The self-monitoring group had a higher proportion of tests with mean INR within the target range in 7 of 11 RCTs and a greater proportion of time within the target range in 2 of 7 RCTs.

The self-monitoring group tested 2 to 5 times more frequently than the control group, with the ratio increasing in studies with longer duration.

### CONCLUSION

In patients receiving oral anticoagulant therapy, self-monitoring reduces risk for thromboembolism, major hemorrhage, and death compared with management by health care professionals.

*Source of funding:* No external funding.

*For correspondence:* Dr. C. Heneghan, University of Oxford, Oxford, England, UK. E-mail [carl.heneghan@dphpc.ox.ac.uk](mailto:carl.heneghan@dphpc.ox.ac.uk). ■

### Self-monitoring vs management by health care professionals (control) in patients receiving oral anticoagulant therapy at 2 to 24 months\*

Outcomes	Self-monitoring category	Number of trials (n)	Weighted event rates		RRR (95% CI)	NNT (CI)
			Self-monitoring	Control		
Thromboembolic event	Self-test	6 (1341)	3.8%	6.5%	41% (6.6 to 64)	38 (25 to 234)
	Self-manage	8 (1629)	0.8%	3.0%	72% (40 to 88)	46 (38 to 82)
	Both	14 (2970)	2.1%	4.6%	54% (31 to 69)	41 (32 to 71)
Major bleeding	Self-test	5 (1191)	4.0%	7.0%	42% (6.5 to 64)	34 (23 to 219)
	Self-manage	8 (1629)	1.3%	1.4%	6.9% (-102 to 58)	Not significant
	Both	13 (2820)	2.5%	3.7%	34% (1.0 to 57)	79 (47 to 2778)
Death	Self-test	4 (1028)	4.2%	5.1%	18% (-45 to 55)	Not significant
	Self-manage	6 (1374)	1.1%	3.0%	62% (15 to 84)	54 (40 to 227)
	Both	10 (2402)	2.4%	3.9%	38% (1.9 to 61)	68 (42 to 1329)

\*Abbreviations defined in Glossary; weighted event rates, RRR, NNT, and CI calculated from data in article using a fixed-effects model.

### COMMENTARY

Maintaining oral anticoagulation with vitamin K antagonists remains one of the more challenging aspects of medicine. To meet this challenge, the use of both anticoagulation clinics and point-of-care monitors by providers has clearly improved anticoagulation control. Just as diabetic patients have learned that self-monitoring can improve control of their disease, patients undergoing anticoagulation and their providers have learned that self-monitoring using point-of-care prothrombin time devices can improve anticoagulation control (1). Well over 100 000 Europeans and an increasing number of Americans are self-monitoring their oral anticoagulation.

Heneghan and colleagues reviewed 14 RCTs of self-monitoring compared with care provided by anticoagulation clinics or the patient's primary care physician. Self-monitoring resulted in increased time of INR in the therapeutic range, fewer bleeding and thromboembolic events, and lower mortality. Fewer complications occurred whether patients self-tested and physicians adjusted the dose, or the patients both self-tested and self-adjusted the dose. The favorable findings of self-monitoring were also evident in other reviews (2).

Despite these improved outcomes, challenges remain for the wide-scale adoption of self-monitoring. Suitable patients are those who require long-term anticoagulation, are well motivated, and have sufficient manual dexterity and adequate vision (3). Such patients should receive thorough training by a health care provider who has a clear understanding of the equipment and the pharmacokinetics of warfarin. Another challenge is reimbursement, which varies by country. Currently in the United States, Medicare only reimburses patients and physicians for anticoagulation monitoring associated with mechanical valves. Findings from the review by Heneghan and colleagues should improve the reimbursement outlook for patients who have other indications for long-term anticoagulation.

*John Spandorfer, MD  
Jefferson Medical College  
Philadelphia, Pennsylvania, USA*

### References

1. Ansell JE, Hughes R. *Am Heart J*. 1996;132:1095-100.
2. Siebenhofer A, Berghold A, Sawicki PT. *Thromb Haemost*. 2004;91:225-32.
3. Ansell J, Jacobson A, Levy J, Voller H, Hasenkam JM. *Int J Cardiol*. 2005;99:37-45.