No cardiac testing for intermediate risk patients on β-blockers was noninferior to testing before major vascular surgery for preventing death and nonfatal MI

Poldermans D, Bax JJ, Schouten O, et al. **Should major vascular surgery be delayed because of preoperative cardiac testing in intermediate-risk patients receiving beta-blocker therapy with tight heart rate control? J Am Coll Cardiol.** 2006;48:964-9.

Clinical impact ratings: Hospitalists ★★★★★★☆ Cardiology ★★★★★★☆

QUESTION

In intermediate-risk patients receiving β-blocker therapy for tight control of heart rate, is a strategy of no cardiac testing noninferior to a strategy of testing before major vascular surgery for preventing cardiac death and nonfatal myocardial infarction (MI)?

METHODS

Design: Randomized controlled noninferiority trial.
Allocation: Concealed.*
Blinding: Blinded (outcome assessors).*
Follow-up period: Median 2 years.
Setting: 5 clinical centers in Europe and Brazil.
Patients: 770 patients (mean age 68 y, 75% men) scheduled for elective open abdominal aortic or infrainguinal arterial reconstruction who had intermediate cardiac risk defined as 1 or 2 of: age > 70 y, angina pectoris, previous MI, history of congestive heart failure, drug therapy for diabetes mellitus, serum creatinine > 160 μmol/L, and previous stroke or transient ischemic attack.
Intervention: No preoperative cardiac testing (n = 384) or dobutamine echocardiography or dipyridamole perfusion scintigraphy testing (n = 386). Patients with extensive ischemia were considered for revascularization preoperatively. Patients in both groups who were already taking β-blockers continued them; others started with bisoprolol 2.5 mg daily. Pre- and post-operatively the β-blocker dose was carefully adjusted to maintain a resting heart rate of 60 to 65 beats/min without bradycardia or hypotension.
Outcomes: Composite endpoint of cardiac death or nonfatal MI at 30 days after surgery. Secondary outcome was the composite endpoint at 2 years.
Patient follow-up: 100% at 30 days (intention-to-treat analysis).

MAIN RESULTS

In the testing group, 12 of 34 patients with extensive ischemia underwent revascularization (10 percutaneous coronary intervention, 2 bypass surgery) and 6 were successful. The strategy of no cardiac testing was noninferior to testing for preventing a composite endpoint of cardiac death or nonfatal MI at 30 days (Table). The groups did not differ forthe composite endpoint at 2 years (3.1% for the no-testing group vs 4.3% for the testing group, P = 0.3). The median duration of screening to vascular surgery was 34 days (range 7 to 88 d) in the no-testing group compared with 53 days (range 13 to 121 d) in the testing group (P < 0.001).

CONCLUSION

In intermediate-risk patients receiving β-blocker therapy for tight control of heart rate, a strategy of no cardiac testing was not inferior to a strategy of testing before major vascular surgery for preventing cardiac death and nonfatal myocardial infarction.

Source of funding: Not stated.

For correspondence: Dr. D. Poldermans, Erasmus Medical Center, Rotterdam, The Netherlands. E-mail d.poldermans@erasmusmc.nl.

*See Glossary.

No cardiac testing vs cardiac testing before major vascular surgery in intermediate-risk patients receiving β-blocker therapy at 30 days after surgery†

Outcome	No cardiac testing	Cardiac testing	Difference (1-sided upper 95% CI)
Composite endpoint‡	1.8% (7/384)	2.3% (9/386)	0.5% (1.2)§

†CI defined in Glossary; difference and CI calculated from odds ratio in article.
‡Cardiac death (0.5% vs 1.6%) or nonfatal myocardial infarction (1.3% vs 0.8%).
§Criteria for noninferiority were met because the difference was < prespecified value of 4%.

COMMENTARY

Cardiac death and nonfatal MI are common and serious events in the perioperative period, with rates up to 30% in high-risk patients (those with ≥ 3 risk factors based on the Revised Cardiac Risk Index [RCRI]) having vascular surgery (1). Observational studies (2) and some randomized trials (3) suggest that perioperative β-blocker therapy provides myocardial protection in intermediate-risk (RCRI score 1 to 2) and high-risk (RCRI score ≥ 3) patients.

As preoperative coronary revascularization has not been shown to be effective prophylaxis (4), and if it has already been decided that, in the absence of contraindications, β-blocker therapy is to be given aiming for tight heart rate control, is there any added value in subjecting intermediate-risk patients to further preoperative cardiac testing? The results of the randomized noninferiority trial by Poldermans and colleagues suggest not. In patients allocated to stress testing and coronary revascularization when appropriate (extensive inducible ischemia and nonurgent surgery), the numbers of cardiac events at 30 days did not differ from those not tested. Only 34 of 386 patients (8.8%) who received testing showed extensive ischemia, of whom 14.7% had a cardiac event, and coronary revascularization, achieved in 6 of 12 eligible patients, did not improve the overall outcome of the group. The upper limit of the 95% CI in favor of testing was 1.2% compared with a prespecified noninferiority boundary of 4%, which may seem liberal given an incidence of the primary endpoint of 5% in intermediate risk patients noted in an earlier study (5). However, the observed rates of events in the study by Polderman and colleagues were much lower than this, and one could also argue that the trial was underpowered to show a significant difference in outcomes due to test-instigated coronary revascularization.

Ian Scott, MD
Princess Alexandra Hospital
Brisbane, Queensland, Australia

References

1. **Lee TH, Marcantonio ER, Mangione CM, et al.** Derivation and prospective validation of a simple index for prediction of cardiac risk of major noncardiac surgery. Circulation. 1999;100:1043-9.
2. **Lindenauer PK, Pekow P, Wang K, et al.** Perioperative beta-blocker therapy and mortality after major noncardiac surgery. N Engl J Med. 2005;353:349-61.
3. **Devereaux PJ, Beattie WS, Choi PT, et al.** How strong is the evidence for the use of perioperative beta blockers in non-cardiac surgery? Systematic review and meta-analysis of randomised controlled trials. BMJ. 2005;331:313.
4. **McFalls EO, Ward HB, Moritz TE, et al.** Coronary-artery revascularization before elective major vascular surgery. N Engl J Med. 2004;351:2795-804.
5. **Boersma E, Poldermans D, Bax JJ, et al.** Predictors of cardiac events after major vascular surgery: Role of clinical characteristics, dobutamine echocardiography, and beta-blocker therapy. JAMA. 2001;285:1865-73.