

Prophylactic coronary artery revascularisation before elective vascular surgery did not improve long term survival

McFalls EO, Ward HB, Moritz TE, *et al.* Coronary-artery revascularization before elective major vascular surgery. *N Engl J Med* 2004;**351**:2795–804.

Clinical impact ratings GP/FP/Primary care ★★★★★☆ IM/Ambulatory care ★★★★★☆ Internal medicine ★★★★★☆ Cardiology ★★★★★☆

Q In patients with stable coronary artery disease (CAD) who are scheduled for elective major vascular surgery, does prophylactic coronary artery revascularisation reduce long term, all cause mortality?

METHODS

Design: randomised controlled trial (RCT) (Coronary Artery Revascularization Prophylaxis [CARP] trial).

Allocation: {concealed}†.

Blinding: blinded ({investigators}† and the endpoints committee that validated all outcomes).*

Follow up period: median 2.7 years.

Setting: 18 Veterans Affairs medical centres in the US.

Patients: 510 patients (mean age 66 y, 98% men) with stable CAD ($\geq 70\%$ stenosis in ≥ 1 major coronary artery suitable for revascularisation) who were scheduled for elective major vascular operation for an expanding abdominal aortic aneurysm or severe symptoms of arterial occlusive disease involving the legs. 65% (n=332) had ≥ 3 clinical factors for high surgical risk. 62% (n=312) received nuclear stress testing, and 44% (n=226) of the total population had moderate or severe defects. Exclusion criteria were a need for urgent or emergency surgery, severe comorbid conditions, or previous revascularisation without evidence of recurrent ischaemia.

Interventions: prophylactic preoperative coronary artery revascularisation (n=258) or no revascularisation (n=252). Local investigators decided whether to use percutaneous coronary intervention or coronary artery bypass grafting. At randomisation, stratification variables included hospital and the proposed vascular surgery.

Outcomes: 30 day rates of myocardial infarction (MI), stroke, limb loss, dialysis, and long term all cause mortality. The study had 90% power to detect a 10% difference in 3.5 year survival rates between groups.

Patient follow up: 100% (intention to treat analysis).

*See glossary.
†Information provided by author.

MAIN RESULTS

The groups did not differ for long term all cause mortality (table), 30 day rates of myocardial infarction, stroke, limb loss, or dialysis ($p>0.05$).

CONCLUSIONS

In patients with stable symptoms of coronary artery disease who are scheduled for elective major vascular surgery, prophylactic

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coronary artery revascularisation did not reduce long term all cause mortality.

Abstract and commentary also appear in *ACP Journal Club*.

Coronary artery revascularisation prophylaxis (CARP) v no CARP in patients with stable coronary artery disease before elective major vascular surgery*

Outcome at median 2.7 years	CARP	No CARP	RRR (95% CI)	NNT
All cause mortality	22%	23%	4% (-32 to 30)	Not significant

*Abbreviations defined in glossary; RRR, CI, and NNT calculated from data in article.

Commentary

Several observational studies have suggested that preoperative coronary revascularisation before non-cardiac surgery prevents death in patients with significant CAD.¹ McFalls *et al* have made an important contribution to perioperative medicine because they are the first to use an RCT design to evaluate whether preoperative coronary artery revascularisation before vascular surgery improves major outcomes.

Their results showing no long term mortality benefit of preoperative coronary artery revascularisation may come as a surprise to many physicians. Their results are, however, in keeping with evidence that most perioperative cardiovascular events probably originate in coronary arteries with non-haemodynamically significant stenoses (ie, $<70\%$).²

The CARP trial shows that patients receiving vascular surgery have a substantial risk of death and MI ≤ 30 days of surgery (10%) and for death (23%) during a median 2.7 years of follow up. These results highlight the need for large RCTs to identify effective interventions.

Unfortunately, strong evidence in support of prophylactic intervention (including β blocker therapy) for preventing major cardiovascular events in patients who are receiving noncardiac surgery does not exist.^{3,4} Investigators need to follow the lead of McFalls *et al* and initiate trials to further evaluate perioperative interventions.

Based on findings from the CARP trial, physicians should avoid preoperative coronary artery revascularisation in patients with stable CAD who are receiving vascular surgery, even if a haemodynamically significant stenosis is identified by angiography or suggested by nuclear studies.

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