before operation, in comparison with those in whom AIIA were discontinued on the day before operation.

Mekontso-Dessap et al. [5] in a 2:1 case-control study, comparing 36 patients undergoing CABG who developed vasoplegia with 72 control patients without vasoplegia, and Carrel et al. [6] in a large prospective cohort study of 800 consecutive CABG patients, in which 115 patients developed a mild vasoplegia, and 60 patients suffered from severe vasoplegia, showed by logistic regression analysis that preoperative use of ACEI was an independent predictor for postoperative low SVR.

Pigott et al. [7] in their RCT, randomizing 40 patients with good left ventricular function to omit or continue ACEI before surgery, showed that there was no difference in hypotension on induction of anaesthesia or in the use of vasoconstrictors after CPB. Similar findings were reported by Webb et al. [9] in their double-blind RCT randomising 96 CABG patients to receive 20 mg minapril or placebo administered for six weeks preoperatively, with the final day of treatment being the morning of surgery.

On the other hand, Boeken et al. [8] in their study of 240 patients undergoing CABG or valve surgery, divided into three matched groups (group A: pre- and postoperative ACEI; group B: ACEI only pre-, not postoperatively; group C: no ACEI), reported that there were significant differences in the intra- and postoperative need for catecholamines in groups A and B compared to C (intraop. A: 35%, B: 35%, C: 15%; postop. A: 21.2%, B: 16.2%, C: 10%) (P < 0.05). In the ACEI groups (A and B) there were nine patients with a postoperative low SVR, only two cases in group C.

Deakin et al. [10] in their case-control study of 62 CABG patients also showed that preoperative ACEI therapy decreased SVR during the re-warming phase of CPB (P = 0.006) and increased post-bypass vasoactive drug requirements (P < 0.01).

Licker et al. [11] in their case-control study of 41 patients failed to show alteration in haemodynamic stability during cardiac surgery in patients on ACEI therapy. However, the pressor and constrictor effects of norepinephrine infusion were attenuated markedly in the ACEI group.

Tuman et al. [12] in their case-control study of 4301 patients showed that more patients on ACEI therapy exhibited low values of SVR (P = 0.0002) and required at least two vasoconstrictor infusions (phenylephrine, norepinephrine, or dopamine) (P = 0.0001) postoperatively.

7. Clinical bottom line

We conclude that preoperative administration of ACEI/ AIIA in patients undergoing cardiac surgery contributes to lowering of SVR/vasoplegia postoperatively thereby making omission of ACEI/AIIA before cardiac surgery a rational strategy to avoid postoperative vasodilation. However, the current available evidence to support this strategy is weak.

References


eComment: ACE inhibitors as antifibrotic agents in atrial fibrillation: potential relevance in cardiac surgery

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Regarding the omission of ACE inhibitors or angiotensin II receptor antagonists before cardiac surgery [1] one should consider the potential beneficial effect of ACE inhibitors as an antifibrotic agent. Postoperative atrial fibrillation (POAF) complicates up to 8% of all non-cardiac surgeries, between 3% and 30% of non-cardiac thoracic surgeries, and between 16% and 46% of cardiac surgeries. POAF has been associated with increased morbidity, mortality, and longer, more costly hospital stays [2].

Given the fact that atrial fibrillation is the most frequent complication following cardiac surgery, recent studies have been reported that ACE inhibitors and angiotensin II receptor blockers are emerging drugs for the prevention of atrial fibrillation by modification of the renin-angiotensin-aldosterone system (RAAS) [3]. A meta-analysis of 11 randomized, controlled, parallel-design clinical trials evaluating effect of ACEIs or ARBs on the development of AF revealed that treatment with ACEIs or ARBs reduced the relative risk (RR) of AF in patients with hypertension by 23% and by 11% in patients after myocardial infarction. Reduction in AF was greatest in patients after electrical cardioversion and in patients with heart failure. Overall, inhibition of the RAAS reduced the RR of AF by 19% (RR 0.810, 95% CI 0.759–0.865). However, the effect of ACE inhibitors/angiotensin II receptor blockers on the postoperative rate of atrial fibrillation is underdetermined as of yet.

The combination of a renin angiotensin system inhibitors (RAS-I) and bepridil might be even superior for the maintenance of sinus rhythm after conversion from persistent atrial fibrillation [4].
Based on these reports the omission of ACE inhibitors or angiotensin II receptor antagonists before cardiac surgery might have an effect on the postoperative rate of atrial fibrillation, which has to be determined in further perspective trials.

References


eResponse: ACE inhibitors as antifibrotic agents in atrial fibrillation: potential relevance in cardiac surgery

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Knobloch et al. have raised an interesting issue related to our BET [1] regarding omission of angiotensin converting enzyme inhibitors (ACEIs)/angiotensin II receptor antagonists (ARBs) before cardiac surgery. They highlight the potential impact of omission of ACEIs or ARBs on increased incidence of postoperative atrial fibrillation (POAF) after cardiac surgery.

There is no doubt that increasing evidence is emerging to suggest that ACEIs or ARBs have the potential to prevent POAF, possibly due to their ability to decrease left atrial stretching (secondary to afterload reduction and stroke volume increases), preserve serum potassium concentrations or reduce pathogenic atrial remodelling [2, 3]. However, it is important to understand that despite the publication of several meta-analyses [3, 4], none of which includes cardiac surgery patients, the evidence for this potential benefit of ACEIs or ARBs for cardiac surgical patients is extremely weak. To date the only significant study by White et al. [5] failed to show a statistically significant association between the preoperative ACEI or ARB use and reduction in the odds of developing POAF. The results of this study are relevant as it was a prospective cohort evaluation of the 338 patients undergoing coronary artery bypass grafting and/or valvular surgery from the AFIST II and III randomized controlled trials (RCTs).

Failure of White et al. [5] to replicate the results reported by the various other RCTs in non-cardiac surgical patients is perhaps due to the fact that population of cardiac surgery patients already has a high background utilization of both beta-blockers and prophylactic amiodarone, both of which are highly efficacious drugs in preventing POAF following cardiac surgery. Whether, an ACEI or ARB when administered alone would exert a larger or statistically significant effect is not known. Hence, the final part of the concluding statement of Knobloch et al. assumes more importance relative to the rest of their comment. There is no doubt that an RCT recruiting approximately 600 subjects, as suggested by White et al. [5] after conducting a post-hoc sample size calculation (a~0.05; â~0.20), is urgently needed to discern if ACEIs or ARBs truly impact POAF.

References


