TITLE:

Ischemic Preconditioning With Volatile Anesthetics in CABG: A Meta-Analysis

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INTRODUCTION: Coronary artery bypass graft surgery (CABG) remains associated with significant complications, including myocardial ischemia, death, and acute myocardial infarction (AMI). Volatile anesthetics have been shown to have a preconditioning-like effect (1). But no study to date has had the statistical power to show improved morbidity. This systematic review assesses the effect of ischemic preconditioning with a variety of anesthetics on post-operative morbidity after CABG.

METHODS: We searched MEDLINE, Science Citation Index, PubMed, and reference lists without language restriction for prospective randomized controlled trials (RCT) evaluating volatile anesthetics during CABG. Two reviewers independently abstracted data on myocardial ischemia, acute myocardial infarction (AMI), and death. Treatment effects were calculated as odds ratio (OR) with 95% confidence intervals (CI) for binary data, and weighted mean difference (WMD) with 95%CI for continuous data.

RESULTS: The search yielded 31 studies involving 2859 patients. There were no differences in baseline characteristics including pump time, aortic cross clamp time, number of vessels bypassed. The incidence of beta-blocker use was 28% higher in the IV groups ($p=0.03$). In the *post hoc* analyses, we found that volatile anesthetics were associated with trends towards reduced death (OR, 0.65; 95%CI, 0.36-1.18; $P=0.16$), AMI and death/AMI. Enflurane was associated with trends towards increased AMI (OR, 1.34; 95%CI, 0.68-2.64; $P=0.40$) and death/AMI. The *post hoc* analyses showed Sevoflurane, Desflurane, and Isoflurane significantly reduced cardiac troponin I (cTnI) 6 hours, 12 hours, 24 hours [WMD, -1.45; 95%CI, (-1.71, -1.20); $P<0.00001$], and 48 hours after operation.

DISCUSSION: Sevoflurane and Desflurane significantly reduce the post-operative rise in cTnI. The overall effect of volatile anesthetics was associated with trends towards reduced death, AMI and death/AMI together. Enflurane showed a trend increasing AMI and death. Well-designed large randomized control trials are needed to further investigate the ischemic preconditioning effects of volatile anesthetics.

REFERENCES:

1. Zaugg M, et al. Anesthesiology 2002; 97:4-14