

Title: HEMODYNAMIC CONTROL SUPPRESSES MYOCARDIAL ISCHEMIA DURING ISOFLURANE OR SUFENTANIL ANESTHESIA FOR CABG

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**Introduction.** The reported incidence of myocardial ischemia in patients undergoing coronary-artery bypass (CABG) ranges from 11-78%<sup>1-2</sup>. It has been suggested that hemodynamics play little role in the pathogenesis of intraoperative ischemia, though the reported association ranges from 40-78%. We questioned this high incidence of intraoperative ischemia and the supposed insignificant role of demand indices. Accordingly, we designed a study in CABG patients randomized to receive sufentanil or isoflurane administered with strict control of blood pressure and heart rate to measure the incidence of ischemia in the absence of these hemodynamic confounders.

**Methods.** After approval from the committee on human research 39 males and 1 female scheduled for elective CABG were enrolled after informed consent. 11 received isoflurane and 29 received sufentanil. Randomization was unequal due to the multiple questions studied in the protocol. All subjects were monitored by continuous electrocardiography (ECG) (Holter monitor, leads CC5 and CM5) for two preoperative days and intraoperatively (total monitoring time = 1,571 hours). Three to ten preoperative blood pressures and heart rates were averaged to determine preoperative baselines for each patient. Routine anti-anginal medications were continued until the morning of surgery, and the anesthetic management of the patients was rigidly controlled to maintain hemodynamics within  $\pm 20\%$  of control. To document the hemodynamic control, continuous hard copy information was collected and systolic blood pressure (SBP) and heart rate (HR) were trended every 90 seconds from induction to bypass.

**Results.** During the preoperative period, 28% of the patients had ECG ischemic episodes (total of 40 episodes), 92% of which were clinically silent. Only 15% were associated with significant HR changes (>20% of pre-episode baseline). However, intraoperatively only 1 patient developed a single episode of ischemia (fig 1). This episode occurred during an isoflurane anesthetic. In each group, SBP was rarely below 90 mm Hg (0.8% of all time recorded) or above 180 mm Hg (0.9% of all time recorded)(fig. 2). Heart rates were also well controlled, mainly between 50-70 beats/min and were above 90 beat/min only 0.67% of total time (fig. 3). Only 3.9% of total time was the HR above 20% of control.

**Discussion.** The authors conclude that: 1) preoperatively, CABG patients have frequent episodes of myocardial ischemia, most of which are silent; 2) anesthesia, given under strict

hemodynamic control, suppresses the preoperative ischemic pattern; and 3) no apparent difference in incidence of ischemia exists between the two anesthetic techniques though sample size precludes statistical analysis. These results imply that in patients with CAD rigorous hemodynamic control minimizes intraoperative ischemia, regardless of anesthetic. Also, confounding hemodynamic effects must be controlled and precisely measured in order to assess the influence, if any, of anesthetic agents alone.

#### References

Slogoff, S et al: Anesthesiology 62: 107-114, 1985.  
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