

oxide anesthesia in patients undergoing coronary artery bypass operation—Patterns of intra-operative ischemia. *J Thorac Cardiovasc Surg* 82:372–382, 1981

17. Becker LC: Conditions for vasodilator-induced coronary steal in

experimental myocardial ischemia. *Circulation* 57:1101–1110, 1978

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## Is Isoflurane Dangerous for the Patient with Coronary Artery Disease? Another View. II.

*To the Editor:*—I am amused, confused, and frustrated by the continuing ability of internists to opine with certainty from their relatively brief exposure to matters anesthetic—in contrast to the profound uncertainty I perceive after nearly four decades of full-time exposure to these concepts and problems. While Dr. Becker<sup>1</sup> adds sufficient caveats to cover his opinions, his statements that isoflurane is “almost certainly dangerous” and “. . . the safest course would therefore appear to be to avoid isoflurane in patients with known coronary artery disease” may be followed and believed by many. If this were really true, as we can seldom rule out coronary artery disease in large segments of our population, isoflurane should be restricted to the young.

I certainly agree with Dr. Becker that isoflurane is dangerous—not just for those with coronary artery disease, but for all patients. All anesthetic agents are dangerous, but our options rarely include using no anesthetic at all. Isoflurane is currently widely used as a primary or supplementary anesthetic agent in patients having coronary artery disease. This experience yields no data supporting agent dependent outcome differential. This renders Dr. Becker’s certainty most interesting. Extrapolation from models and deductions from

groups of patients small in number and lacking outcome data are hardly the basis for definite opinions.

We predicted many responses which “seemed almost certain” over the earlier immature years of our specialty. Experience with such dicta as the ten gram hemoglobin rule, our inability to prove or demonstrate success of one anesthetic agent or technique *versus* another, the widely variant pontifications by highly respected members of our profession, and the cyclical nature of our preference for agents have taught us that predicting the inherent danger of virtue of specific agents is unwise. Such advice must still await proper clinical trials. Absent these, most of us have learned to opine with moderation.

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### REFERENCE

1. Becker LC: Is isoflurane dangerous for the patient with coronary artery disease? *ANESTHESIOLOGY* 66:259–261, 1987

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## Is Isoflurane Dangerous for the Patient with Coronary Artery Disease? Another View. III.

*To the Editor:*—The editorial by Becker<sup>1</sup> on isoflurane and the patient with coronary artery disease gives a balanced view of the evidence, but one still comes away with an impression that isoflurane has been found guilty. In my opinion, the verdict is by no means certain, and much of the argument against isoflurane is simplistic and flawed.

In the context of the discussion of coronary vasodilators, a serious omission is made. Isoflurane is done a significant injustice when it is not highlighted that this agent is unique among the coronary vasodilators dis-

cussed, in that it has a direct effect on diminishing myocardial metabolic rate. The demand side of the equation cannot be ignored. For this reason, extrapolation of findings with other drugs causing coronary steal to the isoflurane argument becomes very complex.

It is certainly possible for any agent or technique to be abused. Furthermore, in this situation, it is usual for the agent or technique to take responsibility for adverse outcomes (this, the technician seldom does). Given that heart rate, blood pressure, and coronary perfusion pressure are kept close to normal levels, there is no