

starting slope as for isoflurane, the slope depression for 1.3% isoflurane and 0.75% halothane may not be significantly different.

Lastly, the clinical situations in which baroreceptor responsiveness would be important are equivalent to the depressor tests of the baroreflex, *i.e.*, the increase in heart rate (decrease in R-R interval) in response to a fall in blood pressure produced by sodium nitroprusside. When the depressor responses are compared, little sparing is seen (figure 3 of reference 1).

In conclusion, isoflurane may depress the arterial baroreflex heart rate responses less than halothane or enflurane in humans, but the studies to establish this are difficult to perform, and the available data are not interpreted easily.

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In reply:—Dr. Roy raises some important points in his letter and I appreciate the opportunity to answer them.

The pressor slopes in the abstract reported by Duke *et al.*¹ indeed indicate a greater depression of baroreflex function than we have observed.² It would be erroneous, however, to draw conclusions from their abstract alone. Neither baseline arterial blood pressures nor heart rates are reported and awake control pressor slopes of Group 1 subjects in our study² were different from the pressor slopes of Duke *et al.*¹ The data from the larger group of patients we have presented ($n = 23$) also may be more reliable than preliminary data by Duke *et al.*¹

In our study, spontaneous ventilation was allowed for a short period of time after intubation in order to demonstrate that the hydrolysis of succinylcholine has terminated its effect prior to collecting data. As stated in the study procedures, all tests were performed 10–15 min following introduction of isoflurane. During this time period, ventilation was kept constant (assisted or controlled) to assure normocarbic conditions the P_{aCO_2} ranging from 35 to 42 mmHg (determined by arterial blood gas analysis).

The studies of Seagard *et al.*^{3,4} have shown that both halothane and isoflurane depress baroreceptor reflex function at multiple sites of the baroreflex arc. The overall depression at 1.0 MAC isoflurane was less,

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compared with 1.0 MAC halothane. At 2.0 MAC of isoflurane there was further progressive depression of baroreflex slopes while no further depression was seen with halothane. This seems to indicate that 1.0 MAC isoflurane appears to be less depressant than halothane with some of the baroreflex function spared. Dr. Roy points out the difference between the control slopes in the two studies. Not only were the control slopes different, but the anesthetic technique used in the halothane study differed from the isoflurane study in that it employed 50% N_2O in O_2 in addition to halothane and thiopental. Isoflurane, on the other hand, was used with 100% O_2 and no N_2O . Duke and Trosky⁵ have observed that substitution of N_2O for a portion of halothane MAC resulted in significantly smaller baroreflex depression when compared with halothane in 100% O_2 . It therefore is clear that N_2O itself alters baroreceptor reflexes. Seagard *et al.*^{3,4} elected to compare absolute baroreflex slope values in the two studies because a different population of animals was used each time and normalizing such different control slopes may present additional problems (personal communication).

The role of anesthetics in human baroreflex mediated tachycardia in response to the depressor test has been reported in literature for isoflurane only.^{1,2} Figure 3 of our study reveals depression of sodium nitroprusside baroreflex slopes in Groups 1, 2, and 3 with isoflurane.

Whether this depression is more or less sparing than with other anesthetics in humans is unknown. Seagard *et al.*^{3,4} have investigated the baroreceptor reflex utilizing depressor test under halothane, N₂O/O₂, thiopental and isoflurane, thiopental/O₂ anesthesia in dogs. At 1.0 MAC there was almost 75% depression of the reflex slope with halothane. There was a 55% depression of baroreflex slopes in the isoflurane study. Again, it should be pointed out that the methods of the two studies differed.

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