

Anesthesiology  
76:859, 1992

*In Reply:*—There are those—I among them—who delight in taking mathematical equations to extreme limits (commonly  $x = 0$  and  $x = \text{infinity}$ ). It is a mistake, however, to extrapolate the pressure rate quotient (PRQ) concept beyond the physiologic ranges of blood pressure (60–120 mmHg) and heart rate (50–150 beats  $\cdot$  min<sup>-1</sup>) that were studied in its development. This limitation was discussed in detail in the original report, yet it bears repeating.

Boba states that the purpose of a formula is to “resolve uncertainty in those instances in which intuition and common sense fail.” I agree. A formula (PRQ) was in the present case to simplify a confusing three-dimensional relationship and to emphasize that decreased arterial pressure combined with increased heart rate (very low PRQ) produce the highest likelihood of ischemia.

In a larger sense, the pressure rate *product* (PRP) failed not because it is a formula per se, but because a valid concept (that the PRP predicts myocardial oxygen consumption) was turned into a clinical dictum (that the PRP predicts myocardial ischemia) without experimental proof. In contrast, the pressure rate *quotient* was developed from experimental data relating ischemia to mean arterial pressure and heart rate.<sup>1</sup> This empirical approach provides a relationship that allows prediction of ischemia in the presence of a fixed stenosis in a nonfailing dog heart with good reliability ( $r > 0.9$ ). A second study has validated the PRQ concept in different dogs during anesthesia with halothane,<sup>2</sup> and a third provides evidence that the PRQ predicts ischemia when blood flow is delivered through collateral vessels instead of through a stenosed coronary artery.<sup>3</sup>

Whether or not the PRQ is a useful clinical tool remains to be determined. Gordon's own data demonstrate that the PRQ is a reasonably sensitive (85%) and specific (91%) predictor of ischemia in clinical circumstances.<sup>4</sup> These results are noteworthy, given the diversity of Gor-

don's patient population and the likely presence of nonhemodynamic ischemia—a situation in which no hemodynamic index could possibly perform well. Look, please, at the data rather than at the interpretation.

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(Accepted for publication January 24, 1992.)

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*In Reply:*—Although Boba points out problems that have been associated with formulas that are indirect indices of myocardial oxygenation and/or ischemia, a number of them have been accepted and physiologically validated.<sup>1</sup> The rate pressure product does not appear to be applicable to the *anesthetized* patient. However, there are substantial research data that show that the rate pressure product is an indirect index of myocardial oxygen consumption in the *awake* individual.

When Buffington developed the pressure rate quotient, he wanted to improve on certain assumptions that were inherent to the rate pressure product. Our work investigated the use of the pressure rate quotient in patients undergoing elective coronary artery bypass graft surgery under very specific conditions and found that it was not applicable. However, we believe it is not applicable because a significant proportion of intraoperative myocardial ischemia is unaccompanied by significant alterations in indices that are usually associated with myocardial oxygen demand.

We agree that anyone who uses these indirect indices of myocardial oxygen consumption must be aware that an infinite set of values can satisfy the equation.

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(Accepted for publication January 24, 1992.)