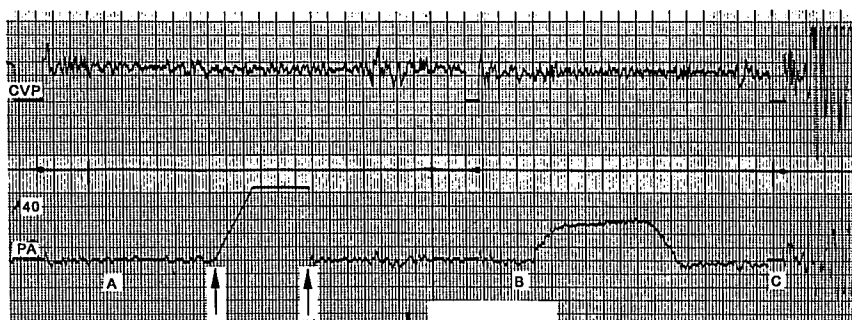


FIG. 1. A: The fingertip occlusion test identifies the correct monitoring channel. B: The calibration test confirms the accuracy of the system, giving a reading of approximately 30 mmHg. C: Shaking the catheter causes movement in both the central venous pressure (CVP) and pulmonary arterial (PA) pressure tracings and is not helpful in confirming either proper labeling or function. Fingertip pressure was applied to the distal lumen between the arrowheads.



of the transducer and its cable. However, it does not check the accuracy of the calibration system.

This can be done by holding the catheter at the 30-cm mark and extending the tip vertically above the patient's chest. This column of water, now about 40 cm above the zero of the transducer system, should give a reading of approximately 30 mmHg ( $40 \text{ cmH}_2\text{O} \times 0.735 \text{ mmHg/cmH}_2\text{O}$ ) (fig. 1).

We have been performing these maneuvers for several years, and although we have never detected and mislabeled catheters, we have found several malfunctioning or incorrectly labeled transducers.

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#### REFERENCES

1. Bergman SK, Jimenez JF: Another reason for difficult pulmonary catheterization. *ANESTHESIOLOGY* 74:962-963, 1991
2. Dinardo JA, Satwicz PR: Occlusion-shake test for pulmonary artery catheters. *ANESTHESIOLOGY* 61:349-350, 1984

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### Prediction of Myocardial Oxygen Consumption

To the Editor:—Hoeft and colleagues are to be complimented on a fine study in which they determined the appropriate human coefficients for the pressure-work index (PWI).<sup>1</sup> Their study reconfirms the benefit of cardiac output in the estimation of myocardial oxygen consumption ( $\dot{M}\dot{V}_{\text{O}_2}$ ). It is curious that stroke volume remains largely ignored despite numerous studies demonstrating its utility.<sup>2-4</sup>

Regression analysis on the pooled data of many subjects as used by Hoeft *et al.* may underestimate the relative value of the external work term in the PWI because the best-fit values for the pressure-rate term and the external work term are influenced by the intersubject variability. The coefficients for the PWI were originally defined as the average values obtained from regression analysis performed separately on each animal.<sup>2</sup> When a pooled data analysis was performed on the same data, the coefficient for the external work term decreased from  $3.25 \times 10^{-4}$  to  $2.40 \times 10^{-4}$ , and the coefficient for the systolic pressure-rate term increased from  $4.08 \times 10^{-4}$  to  $4.64 \times 10^{-4}$ . The overall correlation coefficient was 0.870, better than the published value of 0.867 for the PWI.<sup>2</sup> The choice between the two methods depends on whether one wishes to know the actual value of  $\dot{M}\dot{V}_{\text{O}_2}$  or if one is more concerned with the percentage change of  $\dot{M}\dot{V}_{\text{O}_2}$  within a subject. If one desires the actual value, then the pooled regression method used by Hoeft *et al.* may be used. If percent change in  $\dot{M}\dot{V}_{\text{O}_2}$  is important, then average coefficients from separate regressions on individuals will probably be superior.

Lastly, if cardiac index is expressed in liters per squared meter, should not the coefficient for the external work term in PWI modified

for clinical use ( $\text{PWI}_{\text{mod}}$ ) be  $8.0 \times 10^{-3}$ , not  $8.0 \times 10^{-6}$ ? Otherwise, the  $\dot{M}\dot{V}_{\text{O}_2}$  associated with the external work term would be negligibly small and make  $\text{PWI}_{\text{mod}}$  no different than the systolic pressure-rate product.

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#### REFERENCES

1. Hoeft A, Sonntag H, Stephan H, Kettler D: Validation of myocardial oxygen demand indices in patients awake and during anesthesia. *ANESTHESIOLOGY* 75:49-56, 1991
2. Rooke GA, Feigl EO: Work as a correlate of canine left ventricular oxygen consumption, and the problem of catecholamine oxygen wasting. *Circ Res* 50:273-286, 1982
3. Khalafbeigui F, Suga H, Sagawa K: Left ventricular systolic pressure-volume area correlates with oxygen consumption. *Am J Physiol* 237:H566-H569, 1979
4. Burns JW, Covell JW: Myocardial oxygen consumption during isotonic and isovolumic contractions in the intact heart. *Am J Physiol* 223:1491-1497, 1972

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