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Reply to the Editor:

We thank Drs Evora and Rodrigues for their interest in our case report and their comments. The clinical improvement as described in the series by Leyh and associates¹ and the case reports by Grayling,² Sparicio,³ and their colleagues, was not evident in our case. Those authors described dramatic improvements in mean arterial pressure with commencement of methylene blue (MB); our patient experienced no such benefit. Norepinephrine, epinephrine, and vasopressin requirements persisted for at least the first 24 hours after the operation in our case. Her treating intensivists believe that her postoperative course was not significantly shortened by the use of MB. The dose used (2 mg/kg at induction of anaesthesia, 2 mg/kg on initiation of CPB, and an infusion of 1 mg/kg per hour for a total of 4 hours) was based on the description by Grayling and Deakin,² which is longer than that used by others.^{1,3}

Nitric oxide vasodilation is implicated in both sepsis and the refractory vasoplegia associated with cardiopulmonary bypass (CPB). The different outcomes in the studies of MB in the septic group and our patient may be due to the different pathology and underlying heterogeneity of septic patients.⁴ A case report of dramatic improvement after MB in a patient with infective endocarditis refutes this.² Evora and Rodrigues describe the "random" efficacy

of MB when used as a "last minute vasopressor." The evidence for use of MB as anything other than the "last minute vasopressor" in such situations does not exist for children. We, therefore, reiterate the need for clinical trials to answer this question.

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Assumed oxygen consumption in the determination of cardiac output in children after cardiac surgery

To the Editor:

We read with interest the article by Fakler and associates¹ titled "Assumed oxygen consumption frequently results in large errors in the determination of cardiac output." However, we were surprised that our previous article was not cited. We used respiratory mass spectrometry to continuously measure oxygen consumption (VO_2) and compared these direct measurements with estimated VO_2 values using 4 equations, including that of Lafarge and Mietinen. We studied ventilated children with congenital heart disease both during cardiac catheterization and in the intensive care unit early after cardiopulmonary bypass surgery.² We showed an overestimation of VO_2 in children during cardiac catheterization and an underestimation in the

postoperative children, with all 4 equations being particularly unreliable in the postoperative group.

As rightly pointed out by Fakler and colleagues,¹ use of assumed VO_2 will result in large errors in the calculation of hemodynamic variables, such as cardiac output and systemic and pulmonary vascular resistance. This issue becomes particularly important in patients during the early postoperative period, when VO_2 is not only increased as a result of systemic inflammatory response syndrome but is also highly dependent on temperature,³ the use of inotropes and vasoactive drugs,⁴ and ventilatory manipulation.⁵ Thus although the conclusions of Fakler and colleagues¹ support our previous observations regarding the use of estimated VO_2 during cardiac catheterization, we believe our data suggest the need for even greater caution in the more highly dynamic hemodynamic milieu of the postoperative cardiac intensive care unit.

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