Assumed oxygen consumption frequently results in large errors in the determination of cardiac output.

**Abstract:**

OBJECTIVE: We sought to investigate the differences in assumed and measured oxygen consumption values for the determination of cardiac output by using the Fick principle in a pediatric population with congenital heart disease. METHODS: The patient population consisted of 143 patients with a mean age of 11.3 years (age range, 2 days to 23.8 years) undergoing cardiac catheterization during general anesthesia and with mechanical ventilation. Oxygen consumption was measured with a standard commercial analyzing system (Deltatrac II; Datex, Engström, Helsinki, Finland). Assumed oxygen consumption values were calculated according to the formulas of Krovetz and Goldbloom and LaFarge and Miettinen. Comparisons between measurements and assumptions were performed by Bland-Altman plots. Two-sided paired t tests were used to assess a difference of the assumed and measured values. RESULTS: The range of measured oxygen consumption values was between 55.2 and 249 mL \( \cdot \) min \(^{-1}\) \( \cdot \) m \(^{-2}\). The Krovetz-Goldbloom formula led to systematically larger values compared with the measured values (\(P = .0001\); mean difference of -53.3 mL \( \cdot \) min \(^{-1}\) \( \cdot \) m \(^{-2}\); 95% confidence interval, -56.7 to -49.8 mL \( \cdot \) min \(^{-1}\) \( \cdot \) m \(^{-2}\)). The use of the LaFarge-Miettinen formula tends to overestimate oxygen consumption (\(P = .0037\); mean difference of -15.9 mL \( \cdot \) min \(^{-1}\) \( \cdot \) m \(^{-2}\); 95% confidence interval, -26.5 to -5.4 mL \( \cdot \) min \(^{-1}\) \( \cdot \) m \(^{-2}\)). A similarly poor
agreement was found when analyzing a subgroup of 25 patients with Fontan-type circulation.

CONCLUSION: The use of assumed instead of measured oxygen consumption values introduces large errors in the determination of cardiac output.