Vancomycin Dosing Practices, Trough Concentrations, and Predicted Area Under the Curve in Children With Suspected Invasive Staphylococcal Infections

Reply to Letter to the Editor—We appreciate the comments from Dr Frymoyer concerning the most appropriate pediatric equation for calculating glomerular filtration rate (GFR) and agree that each method has limitations. Although the original Schwartz equation [1] may overestimate GFR when the newer method for measuring creatinine is used, there are several reasons why we chose to use the original equation instead of the revised Schwartz equation [2]. First, the newer equation was developed from the Chronic Kidney Disease in Children cohort and has not been widely studied in children without kidney disease. Schwartz and colleagues [2] concluded that additional studies in healthy children with a higher GFR are needed before recommending the widespread use of this equation in all children. Also, data from 2 recent studies suggest that the newer equation may underestimate GFR in children with mild kidney disease [3] and in children with normal renal function [4]. Therefore, our institution has not implemented the revised Schwartz equation into routine clinical practice due to the limited data supporting its applicability in children without kidney dysfunction. Finally, Schwartz [5] also suggested that equations used to estimate GFR should correct for differences in body habitus, sex, puberty, infancy, and prematurity. Because our patient cohort included children ages 2 months to 18 years with normal baseline renal function, we chose to use the original Schwartz equation that accounts for differences in age and sex [6].

We agree that the difference in equations used to estimate GFR likely contributes to the difference in predicted area under the curve (AUC) reported in the modeling study by Frymoyer and colleagues [7] and our retrospective study [8]. In addition, we excluded patients with any type of renal dysfunction, so we would expect to observe a faster vancomycin clearance compared with a general pediatric population kinetics study. Our estimate for vancomycin clearance of 0.15 L/h/kg is within the range of reported values for vancomycin clearance in children (0.103–0.157 L/h/kg) that Frymoyer and colleagues [7] used in their original modeling study.

These differences in estimated GFR and predicted AUC reaffirm the conclusions by Schwartz and colleagues [5] that more studies are needed in order to generate a widely applicable equation to estimate GFR in pediatric patients. Therefore, we do not believe there is currently a standard method of calculating GFR, and the method chosen should not only be based on the process used for measuring serum creatinine but also be based on the patient population being assessed, as we attempted to do in our study.

References


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