Quantity may be more important than type of intravenous fluid

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To the Editor:

We read with interest the recent paper by Bayer et al (1) in which a comparison was made between rates of renal dysfunction in septic patients who were treated with hydroxyethylstarch, gelatin, or crystalloid solutions. In this single-center observational study, the incidence of renal failure was lower in the cohort of patients receiving only crystalloids when compared with historical control groups treated with either hydroxyethylstarch or gelatins in addition to crystalloids. The authors conclude that colloids represent a source of iatrogenic renal injury. Of note, patients in the colloid-treated groups had a significantly higher total fluid intake than those receiving crystalloid alone, and the authors conclude from this that not only is colloid potentially injurious to kidneys, but ineffective as a volume expander.

We believe that the data presented in this paper are compatible with an alternative explanation. Quantity, as well as type of fluid administered, differed substantially between the three groups. The median total volumes of fluid administered to the hydroxyethylstarch, gelatin, and crystalloid-only groups were 649, 525, and 355 mL/kg body weight, respectively. The colloid-treated groups received more crystalloid than did the crystalloid-only group, and nearly twice as much intravenous fluid overall. The observational nature of this study means we have little idea why such generous volumes of fluid were given, nor the reason for differences between groups. However, during the resuscitation stage, the crystalloid groups received more fluid to achieve similar hemodynamic parameters. The authors' assertion that

colloids provide ineffective volume expansion is difficult to support from these data. It is more likely that the excess crystalloid administration in the earlier (colloid) groups represents cumulative administration of “maintenance” fluid over time, and perhaps with increasing awareness of the harm associated with positive fluid balance, more attention was paid to limiting unnecessary intravenous fluid (2, 3).

Using multiple logistic regression analysis, a significant dose-response relationship was present for crystalloids and risk of renal failure, while this was not the case for either colloid. This fails to support the hypothesis that higher observed rates of acute kidney injury (AKI) are attributable to colloid administration.

The optimal intravenous fluid in sepsis remains controversial, and questions such as whether synthetic colloid use is safe can only be definitively answered by adequately powered randomized controlled trials using clearly defined fluid strategies. We believe that volume of fluid administered, rather than type, may be more relevant to AKI. In heart failure, it is becoming clear that venous congestion, rather than low cardiac output, is strongly associated with deterioration in renal function (4). In septic shock, an association has been demonstrated between higher central venous pressures and AKI (5), and between a more positive fluid balance and AKI (5, 6). This study provides further evidence of a dose-related risk of AKI with intravenous fluid administration, but does not answer the question of which fluid to use.

The authors have not disclosed any potential conflicts of interest.

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