

Morbidity (POSSUM) between the groups, the only right conclusion about the longer surgery time must be that surgery in the crystalloid group was more difficult. It is likely that difficult surgery is associated with more tissue damage and therefore more inflammation. Accordingly, longer surgery is associated with increased markers of inflammation.<sup>3</sup> Moreover, the longer duration may still indicate a difference between the groups, an underlying (inflammatory) condition. Thus, an increased state of systemic inflammation in the crystalloid group could have contributed to increased microvascular permeability, resulting in a higher need for fluid administration.<sup>4</sup> Longer duration of surgery is also an independent risk factor for anastomotic leakage, which is significantly more present within the crystalloid group.<sup>5</sup> Both could explain the results showing an observed better outcome in the colloid group. So unfortunately, in this study it may not be the intervention that makes the difference, it might be the control group.

### Competing Interests

The authors declare no competing interests.

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### In Reply:

We would like to thank Drs. Slagt and van Eijk for their interesting comments regarding our recent publication.<sup>1</sup> These authors suggested that the complexity of surgery, resulting in a longer procedure (1 h longer in the crystalloid group), and not the type of fluid was responsible for

the higher incidence of postoperative complications in the crystalloid group, due to a higher inflammatory response. We have no data to support more complex surgeries in the crystalloid group beyond the surgical time because surgical procedures and incidences of high-risk surgery were comparable in the two groups. Additionally, blood loss was also not different between the two groups, further supporting similar surgical complexity among the two groups. If the inflammatory response related to the surgical procedure was responsible for the higher fluid balance in the crystalloid group, we might also have expected a significantly higher fluid balance on postoperative day 1 in this group, which was not demonstrated. In order to take into account the difference in surgical duration, we originally presented our results in  $\text{ml} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$  and observed a significantly higher fluid administration in the crystalloid group. It is true that we did not directly measure any parameter, which may have indicated a more severe inflammatory response in the crystalloid group than in the colloid group. As a result, we could not completely rule out the hypothesis of Drs. Slagt and van Eijk. To further investigate their hypothesis, we did go back to the data of the 102 patients who underwent a gastrointestinal anastomosis to compare the surgical duration between those who either did or did not have an anastomotic leakage postoperatively. We observed that surgical duration was not different between these two groups (anastomotic leakage, 240 min [204 to 387] *vs.* no anastomotic leakage, 268 min [185 to 336];  $P = 0.850$ ). Interestingly, fluid balance was significantly higher ( $6.0 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$  [5.1 to 8.4] *vs.*  $3.1 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$  [1.7 to 5.0];  $P = 0.021$ ) among patients developing an anastomotic leakage. These data confirm that surgeries with postoperative complications had higher intraoperative fluid requirements, unrelated to length of surgery. It should also be noted that there have been experimental studies demonstrating that goal-directed colloid therapy significantly increases microcirculatory blood flow and tissue oxygen tension in perianastomotic colon tissue compared to a goal-directed crystalloid fluid therapy.<sup>2</sup> Finally, the surgical duration could still be a result of the groups and not a confounding factor. As a result, although we cannot formally exclude that a prolonged surgical duration might have contributed to our results, we remain confident that our results are mainly related to the type of fluid used to optimize hemodynamic management as part of a closed-loop–assisted goal-directed fluid therapy.

### Competing Interests

Dr. Joosten is a consultant for Edwards Lifesciences (Irvine, California). Dr. Rinehart has ownership interest in Sironis (Newport Beach, California), a company developing closed-loop systems; and does consulting for Edwards Lifesciences. Dr. Van der Linden has received, within the past 5 yr, fees for lectures and consultancies from Fresenius Kabi GmbH (Bad Homburg, Germany) and Janssen-Cilag SA (Olen, Belgium). Dr. Delaporte declares no competing interests.

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## Central Venous Lines in Low-birth-weight Newborns: Watch Out

### To the Editor:

I wish to congratulate the authors of the paper “A Retrospective Analysis of the Clinical Effectiveness of Supraclavicular, Ultrasound-guided Brachiocephalic Vein Cannulation in Preterm Infants.”<sup>1</sup> Anyone who has been involved with low-birth-weight newborns know that cardiac tamponade is a real and deadly complication caused by a central line placement. This dilemma is caused by the catheter tip getting lodged in the pericardial sack; the resultant infusion of the intravenous fluids causes the tamponade.<sup>2–4</sup> The reported incidence is between 0.07% and 2%.<sup>4</sup> This complication was not mentioned by the authors.

Their retrospective review of their central venous line insertion technique would seem to be a great step forward in making central venous catheter placement in this group of patients safer. Prospective studies, as mentioned by the authors, must be done to ascertain the real short-term and long-term safety of this technique.

## Competing Interests

The author declares no competing interests.

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### In Reply:

We want to thank Dr. Brock-Utne for his valuable contribution. Undoubtedly, pericardial effusion with ensuing tamponade is a possible complication of any central venous catheter with a high mortality.<sup>1</sup> Peripherally inserted central venous lines may even carry a greater risk due to catheter tip migration with changes of arm position.<sup>2</sup>

However, the purpose of our analysis was to demonstrate the relative ease and safety of supraclavicular, ultrasound-guided brachiocephalic vein cannulations in preterm infants without including any long-term complications as of yet.<sup>3</sup> In 155 brachiocephalic venous catheters in babies less than 2.5 kg, we have not observed a pericardial effusion. The best way to avoid a pericardial effusion caused by central venous lines and other major complications is to follow, *e.g.*, the Italian vascular access guidelines,<sup>4</sup> which also propose the correct catheter tip position in the cavoatrial junction preferentially by the use of echocardiography or intracavitary electrocardiography.

## Competing Interests

The author declares no competing interests.

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