

COMMENTARY

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Invited commentary: “Identifying traumatic significant haemorrhage is challenging for patient with low and intermediate risk, not when bleeding is obvious”

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We would like to thank the authors for their valuable comments on our study, wherein we investigated how pre-hospital lactate (P-LACT) measurements could be used to predict the need for (ongoing) in-hospital blood product transfusion in patients attended by HEMS with major traumatic haemorrhage.

As mentioned in our article, the algorithm we developed is a decision *support* tool, which means that it should be used in conjunction with other parameters, such as clinical gestalt in a heuristic approach to estimate transfusion requirements. The cut-off value of a P-LACT < 2.5 mmol/l used in our population yielded a sensitivity of 80% (corresponding to a low probability of major haemorrhage as the authors rightly mention), and hence was inadequate to be used in isolation. The SOP in our service states that a P-LACT < 2.5 mmol/l is used in conjunction with an SBP > 100 mmHg to identify patients who have a low probability of major hemorrhage. This is supported by a recent publication of Gaessler et al. (2023)

wherein the authors show that P-LACT and SBP are complimentary in terms of predictive probability [1].

To identify patients with a high likelihood of major haemorrhage requiring in-hospital transfusion, a P-LACT of 6.0 mmol/l was used, as at this point the predicted probability curve (Fig. 2 in our original article) starts to flatten: using a higher cut-off would not have yielded a higher specificity, whereas a lower cut-off would have dropped specificity whilst not yielding a much higher proportion of the population meeting the cut-off criteria (n = 13, 6.7% for a lactate of 6.0 mmol/l vs. n = 17, 8.7% for a lactate of 5.5 mmol/l). Although we agree that it is likely that many patients with a lactate > 6.0 mmol/l will show clinical signs of shock, 5/13 patients had an SBP > 100 mmHg on first occasion, two of whom also did not exhibit tachycardia. In these patients P-LACT may still be a useful tool. Despite this however, the major challenge remains to identify the bleeding patients in the P-LACT group of 2.5–6 mmol/l, and serial measurements may be the way forward in this group.

Finally, we acknowledge that transfusion requirement is not always a good surrogate to use for outcome, especially not when confounding by indication may be present: using lactate may result in transfusing more patients in the pre-hospital setting, which again may result in a lower threshold to continue transfusion in-hospital. However, as 2/3 of the patients in our cohort received a massive transfusion (> 10 units PRBC within 24 h) rather than a major transfusion, we think transfusion requirement was a reasonable surrogate for risk of death from bleeding in our population. We agree however, that

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ideally outcome studies should be performed using hard endpoints to confirm this.

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Authors' contributions

JG/EtA initiated the original project. EtA drafted the comment. All authors read and approved the final version.

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Consent for publication

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Competing interests

None.

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References

1. Gaessler H, Helm M, Kulla M, et al. Prehospital predictors of the need for transfusion in patients with major trauma. *Eur J Trauma Emerg Surg*. 2023;49:803–12.

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