Duration of Hypotension (Still) Matters

To the Editor:

In a retrospective analysis of 16,263 records of adult patients undergoing noncardiac anesthesia, Dr. Kertai et al. provide evidence suggesting that the duration of “triple low” states, as originally defined,1 does not appear to be independently associated with adverse long-term patient outcome following adult noncardiac surgery.2 These seemingly differing findings might conceivably, yet erroneously, be interpreted as there not potentially being any benefit to bringing patients out of protracted “triple low” states such as by elevating their mean arterial pressure (MAP). While these findings may point at a conceptual weakness in the definition of “triple low,” by virtue of considering any MAP <75 mmHg, regardless of the severity of hypotension, they should not be interpreted as ruling out the possibility of extended periods of hypotension being independently associated with adverse outcome. This assertion is supported by the recent observation in now over 100,000 patient records from different health systems of an independent association of hypotensive exposures, certain combinations of severity, and duration of MAP accumulated below various hypotensive thresholds, with adverse 30-day survival following adult noncardiac surgery, independent of patient comorbidity.3,4,5 Specifically, it was observed that in somewhat of an analogy to diving charts, less time was required to be accumulated at a lower MAP (a greater depth) to incur the same relative increase in risk for adverse outcome. Accordingly, 20 min spent at an MAP of 74 mmHg would be expected to have much less of an adverse impact than, let us say, 20 min spent at an MAP of 60 mmHg. Yet, for the purpose of the determination of the duration of “triple low,” these would be treated equally. While “triple low” as currently defined may thus very well fail to adequately capture the extent of the underlying physiologic abnormality and its impact on patient outcome, these latest findings should not be construed as suggesting that duration of MAP accumulated below 75 mmHg does not matter (“triple low” or not): inadequate blood pressure represents quite likely (one of) the principal, potentially modifiable risk factor(s) we are being urged to keep looking out for to identify and address as anesthesiologists.

Having said this, the authors actually did find an association between duration of “triple low” and adverse outcome, which only disappeared after adjustment for procedural risk.2 To the reader, this begs the question to what extent “triple low” might have perhaps accounted for at least some (potentially modifiable fraction) of this procedural risk. Accordingly, it might be interesting to explore what the procedural risk might have been after adjustment for the duration of “triple low.” In our quest to better understand and, hopefully, reduce procedural risk, we must be very careful not to inadvertently adjust for what we are trying to better understand: when, let us say, studying the effect of global warming (man-made or not) on the water level of the oceans one would obviously have to (risk-) adjust for the effect of tidal changes. However, had this been done by Johannes Kepler (recognizing that these were well-known to maritime cultures since antiquity), the effect of the moon’s and sun’s gravity on ocean waters would have remained obscured. Unless we are absolutely certain that known procedural risk is not in any way attributable to physiologic abnormalities such as “triple low” or, for that matter, hypotensive exposures, we need to be very careful adjusting for such risk while trying to better understand it without risking to obscure the identification of potentially modifiable contributing factors that may allow it to be reduced.

Competing Interests

The author declares no competing interests.

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References

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