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Did Preoperative Fixation on Choice of Anesthetic Confound Assessment of Alternative Techniques?

To the Editor:

We commend Vadi *et al.*[1] for their valuable case report of local anesthetic systemic toxicity (LAST) and for highlighting human factors that likely contributed to the poor outcome. At the risk of displaying outcome or hindsight bias, we would like to highlight two further educational aspects of the case. One possible scenario is that in deciding on technique the anesthesiologist was fixated on using a peripheral nerve block and discounted the relative merits of alternative techniques. It should be emphasized that for this patient, there were no contraindications to general or neuraxial anesthesia. The blocks necessitated a relatively large total dose of local anesthetic. Moreover, low body weight and site of injection are recognized, independent risk factors for LAST[2]; notably, that site of injection is associated with high serum levels[3] of local anesthetic and increased risk of LAST.[4]

The authors' indicated that they thought the presentation of LAST was atypical. However, the presentation and onset of LAST are extremely variable. Loss of consciousness is a known symptom of LAST and may or may not be preceded by prodromal features.[5] Recognizing such clinical variability can aid in the prompt diagnosis and management of LAST.

The incorporation and discussion of human factors in the case scenario is particularly welcome. The value of such nontechnical skills are important components of anesthesiology practice and particularly pivotal in crisis resource management (CRM).[6] Lack of implementation of CRM might have contributed to the delay in calling for help and secondarily to the poor outcome. For instance, as a first step in CRM, calling for aid and engaging helpers in a dialogue assists in critical decision making and might have included saying something like: "*I think this patient may have local anesthetic toxicity, but I am unsure; it is unusual, she has many medical problems, what do you think?*" This would encourage a structured discussion of the differential diagnosis and treatment priorities. One important by-product of CRM is that all clinicians should feel empowered to make critical treatment decisions. CRM applies to many scenarios in anesthesiology and should be considered important universally, especially in crisis management scenarios like LAST.

In sum, we believe attention to systems issues including consideration of all management options and timely use of CRM can reduce the risk of LAST specifically and regional anesthesia in general.

Competing Interests

The authors declare no competing interests.

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In Reply:

We thank Drs. Petrar and Montemurro for their letter regarding our case scenario[1] and for outlining the impact of local anesthetic dosing on this case. These considerations are all important and relevant; the subject of this case scenario may indeed have received a relative overdose of local anesthetic. Although local anesthetic dosing is certainly germane to a discussion of systemic toxicity itself, we do not feel the dosing is central to the purpose of this article. Accepting that the case was performed in the manner it was with the dosing and technique used, there is still much to learn from this case. Because diagnostic error is now recognized as a critical problem of huge clinical and financial consequence by safety experts and both the Joint Commission and the American Medical Association, occurring with unacceptable frequency across all medical specialties,[2] we chose to focus on the cognitive factors that impacted the clinical decision making. These lessons are broadly applicable to all decision-making situations, well beyond the reach of this particular clinical situation.

We also thank Drs. Barrington and Weinberg for their comments on the possibility that fixation error occurred, and the importance of crisis resource management. The

anesthesiologists involved in this case did believe that a regional technique was likely to be the best option for this patient, which may or may not be accurate. Certainly, the patient could have suffered an adverse event under general anesthesia if that had been chosen. The team desired to avoid hypotension associated with neuraxial and general anesthesia, given the patient's hemodynamic lability and comorbid conditions. Whether general anesthesia, neuraxial anesthesia, or other regional techniques are superior for specific patients with various comorbid conditions is often a subject of debate, even among highly skilled experts. Evidence does not suggest that general anesthesia is safer. A recent analysis of nine Cochrane reviews including patients of all ages undergoing all kinds of moderate to high cardiac risk surgery found that neuraxial techniques offer a mortality benefit in the first 30 days compared to general anesthesia.[3] At present, there is no well-defined best practice to guide these decisions.

Having said that, fixation is one of the earliest cognitive errors described by Gaba *et al.*[4] and it may have played a role in this case. It is also possible that a training bias predisposed a regional specialist to prefer a regional technique. To the suggestion regarding early implementation of crisis resource management principles, we cannot agree more. This case occurred at night when there were no additional anesthesiology team members available to recruit, and the surgical team members were recruited and involved immediately. However, the general point that emergencies are better managed when one calls for help, activates resources, solicits input, shares situation awareness, and others is broadly endorsed. To clarify whether this patient's presentation was perceived to be "classic" for local anesthetic systemic toxicity (LAST), we did not mean to imply that we thought the patient's presentation was unusual on retrospective analysis, but rather, that as it was unfolding, it did not seem to fit the presentation in a way that triggered the anesthesiologists to consider it. Instead, it seemed more likely consistent with the patients preexisting neurological comorbid conditions. Additionally, although the phenomenon of LAST is not new, this clinical case predated the publication of the 2010 American Society of Regional Anesthesia and Pain Medicine (ASRA) Practice Advisory on LAST,[5] and perhaps the specialty as a whole has increased overall awareness of the manifestations and importance of prompt treatment in cases in which LAST is a possibility. Nonetheless, the language model put forth by Barrington and Weinberg is an excellent example of how one could structure a shared decision-making model with the other members of the care team.

Competing Interests

The authors declare no competing interests.

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