has critiqued, we are not referring to a particular statistical model and consequently (but perhaps ambiguously) using "parameter" synonymously with "measurement". For the sake of clarity we would therefore be content to replace "parameter" with "measurement" in the locations Dr. Goodman has highlighted.

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Convulsions after the administration of high dose ropivacaine following an interscalenic block

To the Editor:

Mardirosoff *et al.* describe the occurrence of convulsions after the administration of high dose ropivacaine following an interscalene block.[1] This interesting case merits further documentation and comments to increase its educational value. The delay of 20 min between the end of the administration of ropivacaine and the convulsions argues against an *iv* injection. Therefore, it will be interesting to know if the authors observed premonitory signs (such as dizziness or incoherent speech) before convulsions. Indeed, it seems the sequence of the different phases of central nervous system intoxication are better individualized with ropivacaine,[2] which is usually not the case with bupivacaine. Furthermore, did the authors make a second blood drug measurement in order to build a pharmacokinetic model and, by extrapolation, estimate the ropivacaine blood concentration at the time of the convulsions? In a case reported previously with severe cardiac toxicity after sciatic block with ropivacaine,[3] we evaluated by extrapolation the total and unbound plasma concentration of ropivacaine to be 8.8 and 1.8 $mg \cdot L^{-1}$ respectively, at the time of the critical event. Indeed, a "grey" zone remains between the appearance of central nervous system toxicity and slight changes in EEG recordings with venous total plasma concentration of ropivacaine of 2.2 $mg \cdot L^{-1}$ (range 0.5–3.2) as reported by Knudsen *et al.*[4] and the development of severe cardiac toxicity. The ropivacaine plasma concentrations in Mardirosoff's case together with ours[3] and those known in the literature[4,5] could add valuable information.

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REPLY:

We thank Ekatodramis and Borgeat for their interesting comments.

We did not observe any premonitory signs before the convulsions took place; neither did we perform a second blood drug measurement.

Nevertheless, unlike the case they reported,[1] the total venous concentration at the time of convulsions was probably lower than 2.09 $mg \cdot L^{-1}$ which, in our case, was the concentration measured one hour after the injection. Indeed, studies on ropivacaine pharmacodynamics suggest that 45 to 60 min is the average time to achieve maximal plasma concentrations after a plexus block or a wound infiltration.[2,3] The 2.09 $mg \cdot L^{-1}$ concentration measured in our patient is consistent with concentrations observed in the aforementioned studies, in which such severe central nervous system (CNS) toxicity was not observed.

Moreover, Scott showed that the rate of absorption was better correlated with CNS toxicity than the peak plasma concentration.[4] This might also constitute another causal factor in our case, since a faster rate of local anesthetic absorption has been demonstrated in patients with chronic renal failure.[5]

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Medication safety in anesthetic practice

To the Editor:

The editorial by Orser[1] on medication safety in anesthetic practice lists 17 recommendations to help reduce the incidence of medication errors. One of these is to "pre-label syringes" (*note pleural)* before drawing up the drug. I do not think this is a good idea. It is much better to check the ampoule, draw up the drug, recheck the ampoule and then label the syringe. I am aware of an instance of two syringes being pre-labelled 'fentanyl' and 'suxamethonium' and then the other drug being drawn up, with the suxamethonium administered mistakenly to the patient before fentanyl. This was the only instance in six syringe swaps that the syringes were incorrectly labelled. In four of the other cases the syringes had correct colour coded labels.[2,3]

However bad a practice it may be, anesthesiologists use visual cues in their day to day work. Induction agents are usually drawn into 10 mL or 20 mL syringes. An antibiotic and albumin have been administered instead of induction agents. A swap has also been reported[2,3] between suxamethonium diluted in a 10-mL syringe, to what was described as a convenient concentration for a pediatric patient, and the induction agent. It would seem that the suggestion by Fasting and Gisvold,[4] which I too had made earlier,[2,3] that one size of syringe be used for one group of drugs should also be one of the recommendations to reduce the incidence of medication errors.

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REPLY:

Dr. Jayasuriya's comments were appreciated regarding the recommendations to reduce the incidence of medication errors.[1] It was suggested that it is inadvisable to pre-label the syringe before drawing up the drug. Although not stated in the recommendations, it is imperative that the labels on the syringe and ampoule are cross-checked before and after drawing up the drug. Since most drugs administered during anesthesia are identical in appearance, it is impossible to identify the contents of the syringe once the drug has been drawn up. Therefore, it is advisable to transfer the drug from one labelled container to another. The window of opportunity for error is opened if the anesthesiologist is distracted after drawing up the drug or if the unlabelled syringe is placed on the drug cart while the label is prepared.

Dr. Jayasuriya raises a second interesting point regarding the value of secondary visual clues such as syringe size to identify groups of drug. Many anesthesiologists, including myself, find these self-designed systems helpful.[2] However, secondary identification systems are not standardized and can reduce vigilance. The opportunity for error emerges if two or more anesthesiologists, that use different secondary identification systems, are involved in the same case.

I thank Dr. Jayasuriya for the stimulating comments. Anesthesiologists must continue to discover practical solutions to reduce the likelihood of medication error during anesthesia and contribute to broader efforts to design safer medication delivery systems.

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