marketed ultrasound transducers do not comply with these recommendations. Bedside ultrasound may indeed have application in improving the safety profile of ophthalmic regional anaesthetic blocks, principally perforation, or penetration complications associated with needle-based techniques. Clinicians should be cognizant of differences between probes and ensure that they use appropriate orbital-rated transducers.

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Editor—We thank Drs Gayer and Palte and Prof. Kumar for this important note regarding the technical side of using ultrasound for regional anaesthesia in eye surgery. We are aware of the potential risk of ultrasound waves, especially for sensitive structures like neuroretinal tissue. Our cadaver study was intended to prove the concept of a new technique without danger to patients. We investigated the ultrasound-guided correct placement of the needle and the proper spread of the applied drug. The bioeffects of ultrasound were not in the scope of our investigation.

The ultrasound device used for our study on cadavers did not meet the quoted FDA limits,4 especially not the limits for the MI which was 0.4 and therefore higher than 0.23. In this case, the energy applied to the eyes did not make any difference as the subjects were cadavers. We agree that the use of ultrasound for eye block anaesthesia should improve the safety rather than represent a potential risk to the eye tissues. Therefore, only orbital-rated transducers for in vivo sonography meeting FDA recommendations should be used for clinical studies and daily routine practice. The lower output energy of these transducers does not impair the detection of intraorbital structures or needles used for the eye block—and the method described in our study is also valuable with other small curved array transducers. Companies providing ultrasound equipment will produce suitable transducers in the near future which will be in accordance with the regulations.

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Convulsions associated with ropivacaine 300 mg for brachial plexus block

Editor—We read with interest the case report by Satsumae and colleagues,1 describing convulsions associated with ropivacaine 300 mg for brachial plexus block. The article raises several questions about the authors’ selection of regional anaesthetic technique and the dose of local anaesthetic used.

First, regarding the choice of regional anaesthetic technique for navicular (scaphoid) surgery, adequate intraoperative anaesthesia should be provided by axillary brachial plexus block alone. A blind technique without a peripheral nerve stimulator or ultrasound will inevitably result in a higher incidence of musculocutaneous and radial nerve failure, but this is hardly an indication for additional interscalene block. Occasionally, additional interscalene brachial plexus block or a specific low-volume block of C5/6 with ultrasound or peripheral nerve stimulator can be useful to provide analgesia of the shoulder when arm positioning is problematic, but this approach seems excessive if used for supplementation or tourniquet analgesia alone. Using a peripheral nerve stimulator or ultrasound will improve the success rate2 and safety profile of the axillary technique by allowing accurate injection of local anaesthetic and more importantly facilitate reduction in the dose of local anaesthetic administered.

Secondly, regarding the dose of local anaesthetic used, although the authors acknowledge that the dose of local anaesthetic used was excessive, we wish to highlight that the use of a ‘safer agent’ should not be an excuse to use larger doses of local anaesthetic but to improve the margin of safety for a ‘conventional’ dose. In our practice, the majority of brachial plexus blocks can be performed with <170 mg of ropivacaine, despite the maximum dose limit of 250–300 mg recommended by the manufacturer and
the BNF. This should, however, take into account patient weight, co-morbidity, and site of injection.

For a single-shot brachial plexus block, ropivacaine has been shown to be equipotent to bupivacaine and has a similar pharmacokinetic profile. It is effective at a concentration of 5 mg ml$^{-1}$, and there seems little benefit in increasing its concentration to 7.5 or 10 mg ml$^{-1}$, although lack of a 5 mg ml$^{-1}$ ampoule is unhelpful in achieving this. In our practice, we use a 30 ml mixture of 7.5 and 2 mg ml$^{-1}$ at 2:1 or 1:1 ratio to achieve concentrations of 5.6 or 4.7 mg ml$^{-1}$, respectively.

Finally, partial i.v. injection can acutely increase plasma concentration of local anaesthetic and therefore decrease the overall toxic dose necessary to provoke significant side-effects after further systemic absorption. This may have been a contributing cause in this case. In conclusion, we wish to highlight the importance of choosing the most appropriate regional anaesthetic approach for a given procedure and use of the ultrasound-guided techniques to minimize complications and reduce the total dose of local anaesthetic administered.

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Editor—We would like to thank Drs Marri and Coventry for their interest and thoughtful comments on our case report.1 They pointed out two problems associated with our selection of regional anaesthetic technique and the dose of ropivacaine used.

First, we performed combined axillary/interscalene brachial plexus block. We added the interscalene brachial plexus block to completely anaesthetize the upper extremity, as axillary brachial plexus block alone might result in sparing of the radial region of the forearm. As a result, performing two regional blocks facilitated central nervous system toxicity related to ropivacaine overdose. Secondly, minimum effective dose of a local anaesthetic should be used in small increments with a heightened vigilance when performing regional blocks. Although a definite criterion does not exist, we agree with Chazalon and colleagues stating that it is reasonable to accept a maximum ropivacaine dose of 3 mg kg$^{-1}$ for an upper limb block. Although the dose of ropivacaine used in our case was within the manufacturer’s recommended dose for brachial plexus block in the UK, USA, Japan, and many other countries, the fact that our case resulted in an overdose indicates that the recommended dose should be reconsidered.

Intravascular injection is unlikely to have been an aetiology in our case because the seizure occurred 10 min after the second ropivacaine injection and total ropivacaine concentration 2 min after the seizure onset was only 2.13 mg litre$^{-1}$. If intravascular injection is associated, seizure might have occurred earlier and the serum ropivacaine concentration would have been higher. Axillary brachial plexus block using peripheral nerve stimulator, ultrasound guidance, or both would have been appropriate for the choice of regional anaesthesia in our case, which would facilitate reduction in the local anaesthetic requirement. Alternatively, we should have switched to general anaesthesia if axillary brachial plexus block did not achieve satisfactory analgesia.

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Urinary catheterization in labour

Editor—The recent article by Wilson and colleagues1 concludes that mobile epidural analgesia for labour encourages normal bladder function and reduces the risk of catheterization in labour. Urinary retention associated with epidural analgesia is usually a secondary outcome2 as in this paper, and has been previously been found to be dose-dependent, with increased concentration of local anaesthetic regimes causing a higher incidence of urinary retention.3

In view of their reference to mobile epidural techniques, it is unfortunate that this paper does not present information from the original study which may have been relevant to their findings. For example, the incidence of motor block was 20% in low-dose groups and not reported in the traditional group in the original study.4 In addition, although more than one-third of women in each mobile technique group did actually walk or stand, this mobilization has not been reported with reference to urinary catheterization and bladder function. Thus, although the authors suggest that mobile epidurals are advantageous, in fact they can only claim that low-dose epidurals improve bladder function compared with traditional doses, as has been previously demonstrated.5 Moreover, although mobilization during labour


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