

applied, we observe comparable rates of block success (85.5%, 92% and 95% in groups NS, USNS and US respectively) in the present study.¹ Our results are clearly not different from other studies using similar endpoints. Most importantly, the same rigorous definition of block success was applied across all study groups, thus not biasing against group NS.

We disagree with the notion that the accepted endpoint of a proximal radial motor response had a major impact on our study results. Sia³ compared distal and proximal radial motor response during axillary block and concluded that seeking a distal motor response could enhance blockade of "the sensory distal branches of the radial nerve" (distal 95% vs proximal 81%) only. However, neither the overall block success rate (blockade of median, ulnar, radial and musculocutaneous nerves) nor the onset time were improved by intentionally seeking a distal radial motor response.³ Furthermore, it is interesting to point out that in the present study, a proximal radial motor response was observed in a majority of patients in both groups NS and USNS, yet the overall block success rate was significantly higher in group USNS (80.7% vs 62.9% in group NS).

We acknowledge an error in Table II. The count of successful surgical anesthesia without supplementation should read 61/64 instead of 59/62 in group US with no change in the percentage (95%) or the P value (0.07).

In our opinion, experts who can consistently achieve block success of 90% or higher with traditional paresthesiae or nerve stimulation techniques may not need ultrasound guidance to enhance block success rates. However, assessment of local anesthetic spread, early detection of an intraneural and intravascular injection, and prevention of a pleural puncture are some of the distinct features unique to ultrasound which surpass traditional nerve block techniques. We believe that before we can conclusively address clinical outcomes and develop evidence-based practice of ultrasound guided regional techniques, large scale randomized controlled trials are needed, and our recently published study is one step in the right direction.

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Electrical stimulation: an important force behind the growth of regional anesthesia

To the Editor:

Having had the privilege to participate in clinical care and research of patients enjoying the well-described benefits of peripheral nerve block analgesia within the past 20 years, we read with interest the recent editorial by Dr. Ban Tsui in the *Journal*.¹ In his editorial, Dr. Tsui described the evolution of ultrasound imaging, and its role in increasing the availability of peripheral regional techniques to patients.

Overall, we found the editorial to be very well-written and balanced. Its content raised important questions, and acknowledged that we do not have enough information yet to answer most of those questions. The author's acknowledgment regarding personal experiences with earlier-version ultrasound software was appropriate, and certainly forthcoming technological improvements with imaging should be valuable. We generally agree with the editorial's overall message.

Dr. Tsui, however, stated that in contrast with the clinical popularity evolving with ultrasound imaging in peripheral nerve blocks, "Not surprisingly, the introduction of (electrical stimulation) failed to result in a renewed interest in regional anesthesia." We respectfully disagree with this statement based on our collective research and experience with electrical stimulation, at least in the context of when neurostimulation was made available commercially in a sufficiently "user-friendly" format. We will illustrate our point with a brief example.

A prominent vendor of peripheral nerve stimulation equipment and supplies shared sales data with us (1998-present). This vendor has appropriately requested anonymity for this report. The annual percentage sales growth (when compared with the previous year, not the baseline year) is shown in the Figure. Data are also provided regarding the number

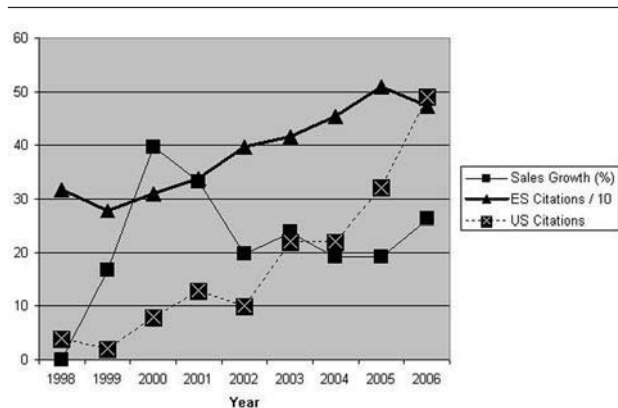


FIGURE Annual sales growth (%) increases when compared with the prior year (with 1998 as baseline) for one vendor's nerve stimulation-related products and supplies are tracked over time. Also tracked are the number (n) of indexed citations of nerve block-related manuscripts describing electrical stimulation (ES) and ultrasound (US). Note that the graphic for ES citations is an order of magnitude greater than for US citations.

of citations meeting the OVID Medline search criteria of “‘nerve block’ and ‘nerve stimulator or nerve stimulation or electrical stimulation,’” and “‘nerve block’ and ‘ultrasound or ultrasonography.’” The search is meant to be illustrative, but not comprehensive, and is not designed to over- or under-represent manuscript indexing of either neurolocation technique. The numerical increase in the number of indexed manuscripts per year is also presented in the Figure. The reader should be able to conclude that product sales enjoyed annual growth ranging from 17% to 40% in the period 1999-2006, while the number of manuscripts addressing neurostimulation for nerve blocks were indexed at least an order of magnitude more frequently than were ultrasound-related nerve block manuscripts. We believe this refutes Dr. Tsui's statement that electrical stimulation failed to result in a renewed interest in regional anesthesia.

That said, we do agree with the overall theme that the practice of regional anesthesia is not yet where placing central catheters is for anesthesiologists today: there is a subset of anesthesiologists who are comfortable routinely performing regional techniques, but certainly not all anesthesiologists.

Based on these impressions, we suggest that any new studies of block success rates comparing neurolocation techniques should be discouraged in future research, with the exception of manuscripts addressing

“learning curves” of trainees on regional anesthesia services.² Future neurolocation research should be focused primarily and specifically on long-term safety outcomes. Such studies will indeed require thousands upon thousands of patients. Because of the relatively low occurrence of nerve injury, these events will be especially difficult to study without first developing consensus-based outcome parameters, and appropriate vendor-sponsored and foundation-sponsored underwriting. The time has come to reconsider traditional seamless publication addressing “my technique vs your technique,” reminiscent of the needle-induced-paresthesia era. Instead, our subspecialty should reallocate scarce research resources to show: (i) whether ultrasonographic imaging effectively excludes anesthesiologist-attributed nerve injury, and (ii) that the surgically-induced or previously-undiagnosed patient-specific neurodeficits are appropriately attributed as such, when such deficits are manifest after surgery performed under peripheral nerve block.

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Reply:

I sincerely thank Dr. Williams and his colleagues for their interest and comments regarding my recently published editorial.¹ Contextually, I would like to emphasize that the opinions expressed in the editorial were not intended to undermine the important role and merits of nerve stimulation related to the growth of regional anesthesia. Clearly, the introduction of nerve stimulation some 30 years ago was the first step towards trans-