Overall, we found that adding a very small dose of intrathecal morphine (0.05 mg) to spinal bupivacaine and fentanyl, together with local anesthetic infiltration and regular nonsteroidal antiinflammatory drugs, produced improved postoperative analgesia and higher patient satisfaction despite a higher incidence of opioid-related side effects. We continue to recommend that clinicians consider using a small dose of neuraxial morphine for analgesia after postpartum tubal ligation in women who will be inpatients for 24 h after the operation.

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Awareness During Anesthesia

To the Editor:

The report by Sebel et al. (1) is worrisome if the conclusions are valid. Can the authors provide more documentation for their results? In which cases did personnel in the operating room confirm the recalled events, and what were the details? In cases that lacked such confirmation, how were the investigators convinced of awareness? Is it possible that what the authors interpreted as recollections of intubation were actually recollections of extubation?

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1. Sebel PS, Bowdle T, Ghoneim MM, et al. The incidence of awareness during anesthesia: A multicenter United States study. Anesth Analg 2004;99:833–9.

DOI: 10.1213/01.ANE.0000159009.93168.02

In Response:

We thank Dr. Atwood for his interest in our study. Assessment of awareness during anesthesia depends to a greater or lesser extent on self-reporting. Thus, it is impossible to independently confirm descriptions of pain and paralysis. It is, of course, possible that some of the awareness descriptions were related to extubation. Obvious patient reports of extubation were not included in the 25 patients in Table 4 in our original article. Full details of the individual patient reports are included so that the reader can evaluate the cases for him or herself.

We agree that our report is "worrisome." This is a complication that has often been ignored or disregarded by the profession. However, recently, the Joint Commission of Healthcare Organizations has published a sentinel alert on awareness during anesthesia (1) and the ASA has appointed a task force to look into the issue of monitoring and awareness. We applaud the president elect of the ASA, Dr. Guidry, who addressed the issue in the January 2005 ASA newsletter (2). It thus appears that the profession is taking this "worrisome" complication seriously.

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Ultrasound Evidence of Intraneural Injection

To the Editor:

Schafhalter-Zoppoth et al. (1) reported an interesting case of delayed sensory recovery purportedly as a result of inadvertent femoral nerve impalement and subtotal intraneural injection visualized by ultrasound. A short video clip they provided showing withdrawal movement of the block needle that has initially traversed the femoral nerve is presumably evidence of nerve impalement. A second video clip shows presumably a subtotal intraneural injection represented by a hypoechoic fluid collection underneath the hyperechoic nerve shadow. These ultrasound images and videos invite some comments.

The elliptical hyperechoic density shown in the article (Fig. 1A) is indeed a typical ultrasonographic image of the femoral nerve in cross-section. Generally, nerve fascicles are not readily seen in the femoral nerve location, and it is difficult to tell if the hyperechoic density represents a single nerve structure. One may visualize divisions of the femoral nerve at the time of local anesthetic injection when the hyperechoic nerve structure is split into two, highlighted by surrounding hypoechoic fluid collection within an expanding femoral sheath compartment. Without knowledge of prolonged anesthesia in this case, I would have considered the image in Figure 1B a picture of an extraneural injection within the sheath compartment.

The authors suggest that an intraneural injection diminishes nerve diameter as the result of compression and increased intraneural pressure (Fig. 1). To the contrary, I suggest a true intraneural injection will show on ultrasound an obvious expansion of the hyperechoic nerve structure as the nerve increases in size. Our preliminary study in a pig model shows that a purposeful direct intraneural injection into the brachial plexus with a 22-gauge long bevel needle and 10 mL of saline dramatically increases nerve dimension on gross examination and the ultrasonographic appearance of the hyperechoic nerve structure (Fig. 1). We speculate that ultrasound imaging may add safety to the practice of peripheral nerve block by showing early evidence of an inadvertent intraneural injection, but further imaging studies are warranted.

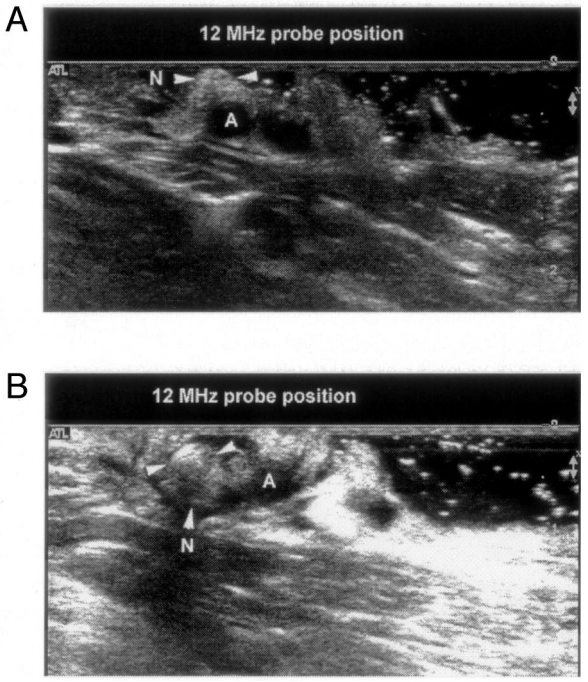

Figure 1. A, Transverse sonogram of the brachial plexus of a pig using a 12 MHz probe before direct intraneural saline injection. A = axillary artery, *n* = brachial plexus, arrows indicate size of nerve. B, Transverse sonogram of the brachial plexus after an intraneural 10-mL saline injection. A = axillary artery, *n* = brachial plexus, arrows indicate an increase in nerve size.

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1. Schafhalter-Zoppoth I, Zeitz ID, Gray AT. Inadvertent femoral nerve impalement and intraneural injection visualized by ultrasound. Anesth Analg 2004;99:627–8.

DOI: 10.1213/01.ANE.0000159011.02691.23

In Response:

We thank Dr. Chan for his interest in our report and his insightful commentary. Although intraneural injection has been the focus of recent investigations (1), sonographic evidence has been limited. One case of ultrasound imaging obtained in follow-up after presumed intraneural injection has been published (2). Since acceptance of our manuscript a case series of ultrasound guided injections into neuromas has been described (3). In contrast, our letter reports injection into the normal fasciculated tissue of the femoral nerve (4).

We emphasize that most of the 35-mL injection is extraneural, with only approximately 0.1 mL being considered intraneural (assuming limited longitudinal distribution with equal spread in all directions within the nerve). We agree with Dr. Chan and other authors on the basic principle that intraneural injection acutely expands nerve structure (5–8). Our transverse sonograms show fasciculated femoral nerve architecture (9) on both sides of the block needle. Even without a surgical pathology specimen, our ultrasound scans and clinical course make a highly compelling case for intraneural injection. In clinical practice we have appreciated anatomic divisions of the femoral nerve only rarely during these procedures (approximately 2 in 73 cases of femoral nerve blocks with ultrasound guidance) and do not include our case as one such example.

Dr. Chan presents new experimental data demonstrating high-volume (10 mL) injections into porcine brachial plexus nerves. However, one potentially important issue is that the consequences of intraneural injection in a dividing nerve may be quite different than injection in a discrete nerve without local branching. These new data raise many exciting questions regarding characteristic internal signs of nerve injection injury that can be answered with real time high-resolution ultrasound imaging. More importantly, a major safety goal with imaging is to develop techniques that improve needle (10) and nerve visibility to reduce block-related complications.

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Existential Distress and Palliative Sedation

To the Editor:

I read with interest the article by Perry Fine (1). Dr. Fine justly addressed existential distress and palliative sedation (he prefers to label it as total sedation), given that existential suffering can be just as consequential and debilitating as physical suffering. However, he did not discuss a valuable subset of palliative sedation that can be used for existential distress, respite sedation (2,3). Respite sedation is a form of palliative sedation in which patients are deeply sedated for a predetermined amount of time (usually 24 to 48 h), and then reawakened to assess the extent of symptomatic improvement and the need for further sedation. Because many dying patients are afflicted with existential turmoil that engenders fear, fatigue, and insomnia, respite sedation may break a cycle of sleep deprivation and existential distress and allow such patients the opportunity to regain psychological strength and assuage the existential issues that precipitated the need for palliative sedation. Respite sedation also allows second-guessing and reassessment by health care providers, patients, and family members, negating the sense of overwhelming finality and guilt that may occur with continuous deep sedation.

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Dr. Fine does not wish to respond.