

# Micro Air Bubble in Psoas Muscle

## Is It Psoas Muscle Abscess or Nerve Block?

### To the Editor:

In a recent issue of the journal, Liu and Mei reported the efficacy of using micro air bubbles for the visualization of needle tips in ultrasound-guided peripheral nerve blocks, especially those located deep inside the body trunk, such as lumbar plexus block.<sup>1</sup> At first glance, the air bubble appears to provide an alternative for normal saline in the hydrolocalization technique.<sup>2</sup> Visualizing needle tips deep inside the body with an ultrasound probe with lower frequency apparently requires a relatively large amount of liquid. In this respect, the technique described by Liu and Mei appears to be superior to the original one.

The lumbar plexus, after the formation from the ventral rami with L1–L4 together with the additional branches from Th12 and L5, runs between the quadratus lumborum muscle and the psoas major muscle, which forms the psoas compartment. During the placement of a catheter into the psoas compartment, bacterial colonization of the catheter may occur, and its frequency is relatively high.<sup>3</sup> The catheter would provide microbial pathogens direct access to these nerve trunks from the skin surface. Once the infection is established, the microbial pathogens, mostly *Staphylococcus aureus* and *Staphylococcus epidermidis*,<sup>4</sup> being bridged by the nerve trunks of the lumbar plexus, spread into the intervertebral space. The intervertebral discs are avascular and are particularly vulnerable to the direct microbial invasion, providing further bacterial access to the adjacent vertebral body and epidural space. Thus, although rarely recognized, catheterization to the lumbar plexus is carried out at the risk of spinal infections. The early signs and symptoms of the infections are nonspecific, and low back pain is usually the first sign that the patient as well as the anesthesiologist would notice. In the case of continuous lumbar plexus block, however, these early signs are “blocked” by the local anesthetic(s), which makes the clinical diagnosis of the infection difficult.<sup>5</sup> The presence of a micro air bubble in the psoas muscle would be the first sign that anesthesiologists as well as radiologists would notice the presence of infection. Hence, the routine use of micro air bubble contrast in ultrasound-guided lumbar plexus block makes the clinical diagnosis of psoas muscle abscess and the subsequent development of pyogenic spondylodiscitis difficult.

### Competing Interests

The author declares no competing interests.

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### In Reply:

We appreciate Dr. Asakura for his interest in our recent article titled “Enhanced Needle Visibility by Micro Air Bubble in Ultrasound-guided Nerve Block”<sup>1</sup> published in *ANESTHESIOLOGY* this year.

A variety of techniques, including use of an echogenic needle or needle guide apparatus, optical flow-based tracking, and image-based tracking of a needle, have been used for improving visualization, which is paramount in ultrasound-guided nerve block. In our clinical practice, we have found that needle visibility can be enhanced by introducing microbubbles into the needles. Our experiences may suggest the potential clinical application of this technique in improving ultrasound-guided nerve block.

Dr. Asakura raises the concern that introducing micro air bubbles into the psoas muscle may interfere with the diagnosis of psoas muscle abscess or pyogenic spondylodiscitis, given that micro air bubbles generated by