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Ultrasound a Game Changer

Ultrason Bir Oyun Değiştirici

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“Bravery died when the rifle was invented”

The use of ultrasonography in anesthesia practice has been gaining great attention in recent years. The practice of regional anesthesia has incorporated ultrasonography into most of its procedures. Regional blocks have evolved from the landmark and paresthesia technique, to nerve stimulation, and now to ultrasound-guidance (1). The second American Society of Regional Anesthesia and Pain Medicine (ASRA) evidence-based medicine assessment of ultrasound-guided regional anesthesia report (2) was published in 2016 and clearly indicated the usefulness of ultrasonography in regional anesthesia practice.

Since the introduction of ultrasonography into anesthesia practice, clinicians and researchers have taken it upon themselves to discover what more this technology could do. Case reports, case series, and randomized trials have looked into many of the applications of ultrasound-guidance, and more of these are published on a routine basis. In the current issue, Mohan and Nisa report successful central venous cannulation under ultrasound guidance in a young boy with neurofibromatosis type 1 (NF1) (3). This patient presented with a nerve sheath tumor extensively invading the brachial plexus and almost precluding the ability to insert a central venous cannula in the internal jugular vein for fear of neurological injury. Without ultrasound guidance, there was a limited chance of accessing vessels and a high risk for harm. In another study, Erdogan and colleagues report that the use of ultrasound helped avoid unnecessary injury to a patient with absent right internal jugular vein (4). They correctly conclude that a landmark technique for internal jugular vein cannulation, while routinely performed, could have caused complications in cases such as this one where the anatomy is unexpectedly different. In a retrospective review of pediatric central line insertions utilizing the brachiocephalic vein, Thompson reports successful cannulation in 100% of the cases (total of 49) with no significant complications (5). Accessing the brachiocephalic vein at the author's institution was preferred to other central line locations because it is better tolerated by the pediatric patients and is easy to perform under ultrasound guidance as per the author's experience.

Ultrasonography has become the preferred modality in other regions of anesthesia practice. As previously mentioned, patients with anatomical variants presenting for a regional anesthetic or line insertion can be better managed without the conventional “trial-and-error” approach which could potentially introduce more errors than benefit. This is true for congenital anomalies, post-surgical blocks, and amputations (6). One of the more routine uses for ultrasound guidance relates to the growing obesity pandemic. Overweight surgical patients require more effort and expertise when undergoing regional, neuraxial, or vascular interventions. Figure 1 shows a typical obese patient presenting for neuraxial analgesia. The ultrasound scan is shown in Figure 2 and clearly establishes the landmarks and distances between skin and spinal canal.

Perhaps now is an appropriate time to promote ultrasonography from a “luxury” to a “necessity”. When peripheral oxygen saturation, or pulse oximetry, was first “discovered” in the 1800s, it slowly made its way into medical practice to become a standard monitor nowadays (7). After that, the questions we were asking about the proper oxygenation of our patients suddenly got upgraded into more detailed and outcome-related inquiries (8). Today, pulse oximetry is regarded as one of the most important advances in patient monitoring (9). We would not be doing such a great job in Anesthesiology if we were still relying on cyanosis as a sign of respiratory compromise! Similarly, further advances in vascular and neural



Figure 1. Obese patient presenting for neuraxial anesthesia with indistinct landmarks

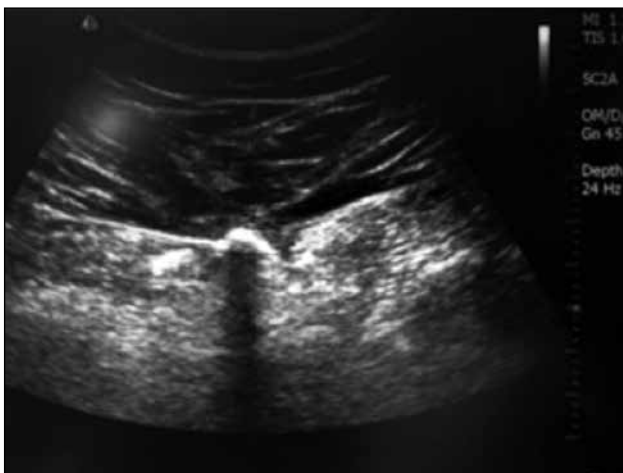


Figure 2. Ultrasound scan of lumbar spine showing skin, subcutaneous tissue, and bone. Ultrasound guidance can potentially direct the spinal or epidural needle tract to achieve clinical benefit and avoid harm especially in difficult scenarios

access require adoption of ultrasonography as a standard of practice so we could look beyond the daily struggle of finding that one ultrasound device we currently own at a large rural hospital or getting the “nicer” ultrasound device that shows us blood flow. What we need to be looking at now is how to use ultrasonography to do things we have not done before,

and clinicians are already taking the lead. Ultrasound-guided regional anesthesia has made it possible for elderly patients undergoing peripheral limb surgery to avoid a deleterious general anesthetic (10), for clinicians to perform newer blocks (11), and for the introduction of mechanical adjuncts such as a new needle guide that was shown to decrease the time required to place a femoral nerve catheter (12). Ultrasonography is also making it easier for clinicians to teach medical students and anesthesiologists in training as they are able to see the structures involved and appreciate the anatomy far better than with the use of a “blind” landmark technique. It is simply no longer acceptable not to have this technology available and not use it.

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