

CORRESPONDENCE

PAIN MANAGEMENT

Ultrasound in pain and regenerative medicine: the emerging stethoscope for the interventional pain sonographer

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Introduction: Ultrasonography (USG) has been one of the greatest discoveries by the anesthesiologists, pain specialists, emergency medicine specialists, and in fact every physician and surgeon during the last two decades. No more, it is the sole domain of the radiologist or rarely by an obstetrician. Apicare Journal has been on the fore-front to create awareness about the divers uses of USG in the medical field, both in diagnosis and as a useful aid in the therapeutic interventions. More than 80 papers have been published so far, and can be searched and freely downloaded on our open access website: www.apicareonline.com

Key words: Anesthesia; Emergency Medicine; Pain management; Point-of-care ultrasound; Ultrasonography

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Dear Editor,

I read the article ‘POCUS: the anesthetist’s emerging stethoscope’ by Leena Ayub, Shahid Rasool Dar, and Waqas Ashraf Chaudhary published in the December 2022 issue of *Anaesthesia, Pain & Intensive Care*, and wish to present our reflections.¹ The article explains excellently the usage of ultrasound, especially in the intensive care units and emergency room, which is popularly known as point-of-care ultrasound (POCUS). In this article, we would like to add more overviews about the emergence of ultrasound in the field of pain and regenerative medicine.

Ultrasound has been used in various fields of medicine for a long time. Most of the people coming to primary care facilities think of the sonogram as a means to determine the health and sex of a baby during pregnancy. However, the usage of ultrasound is well beyond such use. Almost all of the pain management guidelines recommend image guidance including ultrasound, fluoroscopy, or computed tomography (CT) for interventional procedures. The interventional pain procedures were traditionally performed under such image guidance; however, in the previous decade, the use of ultrasound has significantly increased in pain medicine.² Ultrasound has become the gold standard for most non-axial interventions, because it allows the

sonographer to view a live dynamic image of the target structure as the needle is guided to a precise location, avoiding vital organ structures, and visualizing the spreading injectate. It has emerged as a popular modality in multi-disciplines and has been increasingly being utilized for the diagnosis and treatment of various conditions and procedures.^{2,3}

Compared to CT or magnetic resonance imaging (MRI), ultrasound is much more affordable, and the size of the equipment makes it portable and easy to bring into an exam room. So it is an amazing diagnostic and therapeutic tool, especially for patients with claustrophobia. Based on the literature, ultrasound proves superior to other imaging modalities in terms of portability and safety. It has no contraindications and does not emit ionizing radiation like CT and X-ray machines; so it is safe and can be used in cardiac pacemakers or metal implants. In addition, ultrasound has been shown to decrease procedure time and enhance the accuracy of injections by enabling the dynamic visualization of needle course and injectate spread. Ultrasound also allows repeat imaging non-invasively.^{2,4,5}

Despite the advantages and features, there are also challenges to ultrasound imaging which include the quality of images obtained being provider dependent,

difficulty skillset to master, narrow imaging window, inability to visualize structures deep to bone due to acoustic shadowing artifact, and difficulties obtaining quality images in the obese.⁶ Though deep structures can be visualized with a convex probe, the image resolution may be compromised.

In pain management, ultrasound is used in interventions performed on musculoskeletal structures, peripheral nerves, and neuraxial structures. Common musculoskeletal interventions include intra-articular injections, periligamentous and peritendinous injections, intramuscular botox injections, bursa injections, and lavage. Examples of peripheral interventions include greater occipital nerve block, intercostal nerve block, suprascapular and axillary nerve blocks, iliohypogastric and ilioinguinal nerve block, lateral femoral cutaneous nerve block, pudendal nerve block, saphenous nerve block. For neuraxial use, common interventions are stellate ganglion block, cervical and lumbar spine procedures (e.g., nerve root, facet periarticular, medial branch), thoracic paravertebral block, caudal epidural, ganglion impar block, and sacroiliac joint injections etc.⁷

In conclusion, the rapidly emerging and evolving of modality of ultrasound-guidance in the practice of interventional pain medicine has led to an enhancement of procedural selectivity, specificity, and accuracy. Along with the advancement of medical technology, new applications of ultrasound have the potential to be developed in neuromodulation, regional anesthesia, pain, and regenerative medicine. It's time for the anesthesiologists and pain specialists to learn and bring into use this modality for the benefit of the patient.

Conflict of interest: None declared by the authors.

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