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First Hand EXPERIENCE

The Benefits of Ultrasound Guidance in Regional Anesthesia

Dr. Brian Sites
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Dr. Brian Sites is a leader in the use of hand-carried ultrasound to perform nerve blocks. In his practice at Dartmouth-Hitchcock, Dr. Sites has placed or supervised more than 5,000 ultrasound guided blocks since early 2002. In his practice, ultrasound guidance has increased the speed of performance and the quality of peripheral nerve blocks.

These improvements have led to increased patient comfort and more efficient throughput of patients into and out of the block room, operating room, and recovery area. Further, ultrasound guidance permits Dr. Sites to train first year residents in nerve block placement, which will facilitate the growth of this emerging procedure. "As the evidence based medicine emerges and the next generation of anesthesiologists enter the field, I believe ultrasound guided nerve blocks will become the standard of care in the next five to 10 years," predicts Dr. Sites.

The anesthesiologist's goals are to control pain, minimize the negative side effects of anesthesia and surgery, and facilitate a swift post-operative recovery.

Used appropriately, nerve blocks reduce the requirements for general and other analgesic medicines, allowing the most effective pain control with diminished post-operative complications, such as nausea and vomiting.

However, placing a needle to administer anesthesia in a targeted area within the human body is not without its challenges. For instance, many regional anesthesiologists use visual and tactile cues to guide needle placement, or they may use a nerve stimulator to prompt an observable muscle twitch when the needle locates the targeted nerve.

"These techniques are just surrogates for what you cannot see," said Dr. Sites. Without the ability to see the targeted neural structures, there are two common problems with nerve block placement. The first is accuracy. "I have known needles to touch a nerve without producing a muscle twitch," said Dr. Sites, suggesting that nerve stimulators may not be the best method for safely locating nerve of interest.

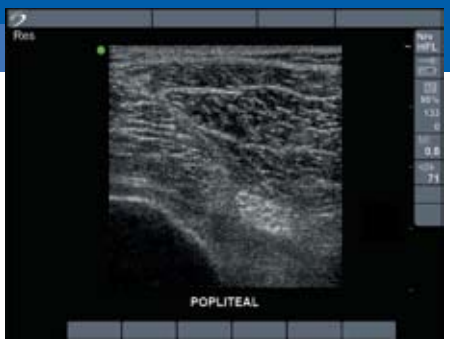
The second problem is the potential for local anesthesia to flow away from the targeted neural structure. "If the anesthesia flows away from the nerve, then it clearly will not provide the intended anesthetic affect."

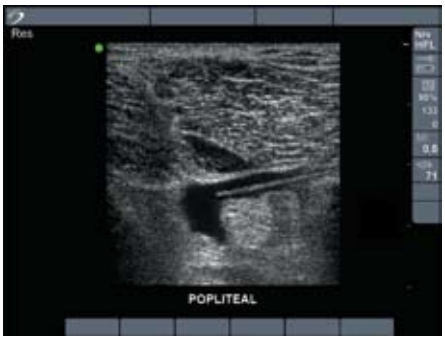
The Benefits of Ultrasound Guidance

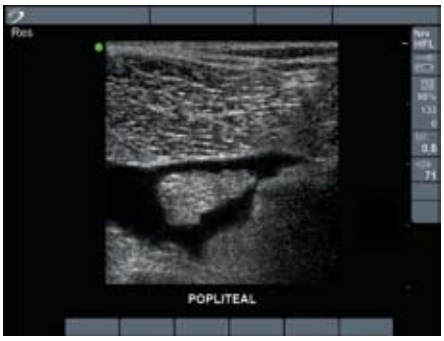
In regional anesthesia, the use of ultrasound is based on the simple premise that, when inserting needles near delicate neural structures, visual guidance is the best method.

"It is difficult to argue with the philosophical concept that it is good to see the structures you are targeting and those structures you wish to avoid," Dr. Sites asserts. For the patient, the advantages of ultrasound guidance are palpable. The hospital sees benefits as well. For instance:

- ***Faster, more accurate needle placement*** – Without ultrasound guidance, a physician may miss the nerve and have to reinsert the needle, causing the patient discomfort and anxiety. A high resolution image of the targeted region improves proper placement of the needle on this first pass.
- ***Closer monitoring of applied anesthesia*** – Ultrasound guidance allows the physician to monitor the flow of anesthesia around the targeted structures. With real-time observation, the physician can make immediate adjustments if the region is not being properly anesthetized, improving the patient's comfort and well-being during surgery.







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- ***Clear visualization of hard-to-reach structures*** – Certain neural structures, such as the infraclavicular brachial plexus, are difficult to reach with a needle. In addition, other blocks, such as the supraclavicular brachial plexus, are near critical structures: the lung and subclavian artery. "Ultrasound has allowed us to feel comfortable performing these blocks, which are often the most effective, but riskiest, for surgical anesthetic conditions of the arm and forearm." said Dr. Sites.
- ***Heightened patient satisfaction*** – Dr. Sites gave this example: "We had two cousins come in for similar rotator-cuff procedures; one had the surgery with a nerve block, the other with general anesthesia. When the patient who had general anesthesia learned of her cousin's faster recovery, smoother discharge and diminished post-operative pain, she requested a block before surgery on her other shoulder."
- ***Enhanced training opportunities*** – At Dartmouth-Hitchcock, first-year residents are placing up to 200 blocks per month under the supervision of an attending physician. "With ultrasound guidance, the procedure can be supervised," explained Dr. Sites. "So in addition to being more efficient and effective, blocks can also be done safely in a training environment."
- ***Improved flow and economics in the operating room*** – At Dartmouth-Hitchcock, Dr. Sites has found that nerve block placement takes between seven and 11 minutes with ultrasound guidance. This quick deployment of anesthesia can save a significant amount of time over the course of a full day and improve the flow of patients through the OR.

Why the MicroMaxx™ System?

Dartmouth-Hitchcock uses the MicroMaxx, SonoSite's third generation hand-carried ultrasound device. The MicroMaxx system represents the technology crossover point between hand-carried and cart-based systems. Battery powered, less than eight pounds and the size of a notebook, the hand-carried device delivers image resolution and performance comparable to costly, conventional cart-based ultrasound systems weighing over 200 pounds.

As in most pre-operative environments, real estate is precious in Dartmouth's block room, which can hold four or five beds at a time. Dr. Sites appreciates the portability of MicroMaxx, and its high image quality.

"The ability to easily move from bed to bed and efficiently administer the nerve block is very exciting," said Dr. Sites, "The MicroMaxx gives us a fantastic image of every neural structure near which we place blocks."

The MicroMaxx system's portability also facilitates the rapid deployment of rescue blocks at Dartmouth-Hitchcock, for patients whose pain management has suddenly been compromised. "In these situations, you can't get a cart based system into a patient room fast enough," said Dr. Sites. "Some cart systems provide excellent images of different neural structures, but they don't replace the usefulness of a single device that can move so easily between clinical departments." Dr. Sites also likes MicroMaxx's comfortable ergonomics and easy-to-use "knobology."

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