

Portable Ultrasound Empowers Special Forces Medics

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FORT BRAGG, NC – In the summer of 2007, when MAJ Andrew Morgan, MD, became the battalion surgeon for 1st Battalion, 3rd Special Forces Group (Airborne), he already knew the value of ultrasound machines from being an emergency physician at Womack Army Medical Center at Fort Bragg.

He and his staff realized a deficiency in the arena of medical imaging after they reviewed the medical capabilities of the battalion's Special Forces operational detachment alpha (ODA) teams. So he pushed to acquire more ultrasound machines in order to get them to the Special Forces medics in the field where they would have the greatest impact.

The machines, which use high-frequency sound waves to look into the body for a variety of medical purposes, such as identifying blood in the abdomen, finding fractures, skin infections, and collapsed lungs, already have widespread use in Army medicine, but until recently, were not extensively utilized in the Special Forces arena.

With the advent of portable ultrasound machines, which can weigh less than five pounds, Special Forces medics are realizing the power of this technology in their environment.

Currently, each Special Forces battalion is authorized a single portable ultrasound machine, but when Morgan took his current position, he requested more machines to put in the hands of the unit's medics. He argued there was a "lack of practical imaging on the battlefield" and, in his eyes, one portable ultrasound wasn't sufficient for training or operational employment.

So Morgan proposed an idea to the Command Surgeon at the United States Army Special Forces Command (USASFC), then COL Peter Benson, that if his battalion was authorized more portable ultrasound machines, they would be put to good use. He would give a detailed report to USASFC on how the machines were used by medics in the field. His proof would come in the form of numbers.

Major Morgan, SFC David Hubler, the 1st Bn senior medic, and CPT William N. Vasios, physician assistant for 1st Bn, spent more than a year training 26 Special Forces medics to use the machines, and in Jan-

uary 2009, the battalion deployed to Afghanistan with nine portable ultrasound machines to put to the test in a combat zone.

"The concept of putting portable ultrasound machines in the hands of our 18Ds (Special Forces medics) is something I'm very excited about," Morgan said. "Ultrasound has been around for years, but the novelty in our concept is empowering medics, in addition to medical officers." Battalion medics collected hundreds of images from exams from their deployment to use for documentation and to characterize how Special Forces medics employed their new skill.

Along with their newly acquired capability to use ultrasound in the field, the battalion also had X-ray at their disposal; however, Morgan said the contrast between the two systems could not be greater when it comes to portability and practicality.

Although each Special Forces battalion has one portable X-ray system, the size of the machine made it impractical to use in remote combat environments. "It would take one-third of a Chinook helicopter to get an X-ray machine out to a fire base," Hubler said.

This is in stark contrast with the currently-fielded portable ultrasound machine's ability to fit inside a standard-size medical aid bag. Therefore, the medics of 1st Bn took full advantage of portable ultrasound on the battlefield.

"We were interested to find that the Special Forces medics found it practical not only for trauma, but also routine medical care of their teammates and host nationals," Morgan said.

One ODA medic returning from this recent deployment said he was initially apprehensive to use portable ultrasound. SFC Robert Lopez envisioned a lengthy learning curve and thought portable ultrasound's use was more for pregnancy than for battlefield injuries. However, learning to use the machine took less time than he thought and his feelings of apprehension quickly subsided after he used it for the first time.

As a Special Forces medic with 1st Bn, Lopez was a beneficiary of the training organized by Morgan and his staff, and on their recent deployment he ran a remote firebase clinic where his machine saw prolific use. He described several stories of his practical use of

portable ultrasound to a large crowd of physicians and medics during the Special Operations Medical Association (SOMA) annual conference in Tampa, FL. But it was the story of the first time he put his training to the test downrange that had the audience captivated.

Early in 2009, Lopez thought he was going to have an easy day at his remote clinic when a local national came in with a pain in his hand. Lopez didn't notice anything out of the ordinary with the patient's hand, so he said he gave the man some pain medicine and told him that if it still hurt to come back later. Four hours later the local national was back.

"It was then that I looked behind me and saw the ultrasound machine," Lopez said. He decided to put his training to work. Lopez conducted an evaluation of the patient's hand using the portable ultrasound machine and found a foreign body: A piece of shrapnel from a blast at a trash pit some time back.

Lopez was able to consult with one of his doctors several hours away by describing what he saw on the ultrasound. The doctor confirmed the patient did indeed have a foreign body in his hand. In a matter of five to ten minutes Lopez was able to remove the shrapnel. "My ability to find the foreign body and remove it gave the patient a lot of confidence in my abilities," Lopez said. "And it gave me a lot of confidence in using the ultrasound machine."

Up to a 100 patients a day came through Lopez's clinic, and by the end of the rotation, he said "if patients came in and I didn't use the ultrasound, they thought I didn't care about them." But it took some time for an ultrasound machine to find its way to Lopez's hands.

Portable ultrasound in Special Forces actually had its beginnings in 2003 when the groups received their initial fielding. Upgraded machines were added 18 months ago, and only recently did demand mount for more widespread fielding, said LTC Andrew Landers, current command surgeon at USASFC.

"I have always been a big proponent of ultrasound, but we needed some data to support the use, and to look at training issues," Landers said. Morgan provided that data, as well as a model training program. He and several other medical practitioners devised a program they dubbed Special Operator-Level Clinical Ultrasound, or SOLCUS, which they loosely based off guidelines given for training emergency physicians by the American College of Emergency Physicians.

Morgan said he intends for the training program to spread and bring ultrasound capability to all types of Special Operations units. Those intentions moved forward on 13 December 2009 when he briefed his two-year experience with training and applying ultrasound in the Special Forces environment at the SOMA Conference. He, along with Lopez and Hubler, also briefed their personal accounts of success with ultrasound and demonstrated the value of the equipment to physicians and medics from across the world.

In attendance were Special Operations medical professionals from allied nations, civilian government agencies such as NASA, physicians, and physician assistants from various specialties, and Special Operations medics from every branch of the U.S. Armed Forces. They were immersed in eight hours of lessons learned and practical training on the portable machines. The audience also heard some of the technical aspects of why Morgan had such a passion about ultrasound.

Portable ultrasound machines offer capabilities such as being able to save images as jpg files, as well as recording live video of procedures in which they are used. These can then be downloaded through USB ports on the machines. The machines can see nerve bundles to help in local anesthesia, as well as showing clear pictures of veins to guide medics when drawing blood or giving fluids intravenously.

They operate off a standard Operators' radio battery or can be plugged into a 110-volt power source with a continuous run-time of two hours. They are roughly \$40,000, a third of the cost of a portable X-ray machine, and have a much greater diversity of functions than X-ray. This makes portable ultrasound a more viable financial option and a more powerful clinical tool for the groups, Morgan said.

"Using portable ultrasound in theater is a kind of like the guy who first decided to put a lid on a coffee cup – it just made sense," Vasios said. "So we used it, and we proved it."

With these factors in mind, the medical staff of 1st Bn and LTC Landers continue to work to get more portable ultrasound machines in the hands of those they feel need them most: The Special Forces medic. "The plan is to increase the program to all the groups in a phased approach," Landers said. "The key is training and maintaining the skills required to operate and use the machines."



MAJ Andrew Morgan, MD (right), battalion surgeon, 1st Bn, 3rd SFG (A), explains some of the functions of a portable ultrasound machine to SFC Kevin Burkett, medic, 1st Bn, while SFC Steven Radloff, medic, 1st Bn, looks on during the SOMA's annual conference 15 December in Tampa, FL. Morgan and his office have been pushing to get more portable ultrasound machines, as well as practical training, in the hands of Special Forces medics in order to help empower them on the battlefield. (U.S. Army photo by SSG Jeremy D. Crisp/ 3rd SFG(A)).



SFC David Hubler, senior medic, 1st Bn, 3rd SFG(A), practices placing a syringe in a vein on a training device while using a portable ultrasound machine for guidance during the SOMA's annual conference 15 December in Tampa, FL. Ultrasound can see patient's veins as well as a syringe entering an area, which helps ensure the needle is put in the right place. (U.S. Army photo by SSG Jeremy D. Crisp/ 3rd SFG (A)).



SFC David Hubler (left), senior medic, 1st Bn, 3rd SFG (A), practices placing a syringe in a vein on a training device while MAJ Andrew Morgan, MD, battalion surgeon, 1st Bn, 3rd SFG, looks on during the SOMA's annual conference 15 December in Tampa, FL. Ultrasound can see patient's veins as well as a syringe entering an area, which helps ensure the needle is put in the right place. (U.S. Army photo by SSG Jeremy D. Crisp/ 3rd SFG (A)).



CPT William N. Vasios (left), physician assistant, 1st Bn, 3rd SFG (A), explains to an audience what is seen on the screen of a portable ultrasound machine while SFC Robert Lopez, Special Forces medic, 1st Bn., 3rd SFG, conducts a training exam using the machine during the SOMA's annual conference 15 December in Tampa, FL. Lopez used the machine exclusively during his latest deployment and he and Vasios have been big proponents of helping get the machines in the hands of more Special Forces medics. (U.S. Army photo by SSG Jeremy D. Crisp/ 3rd SFG(A)).



Clinicians attending the forum on portable ultrasound are given live views of the machine's capabilities during the SOMA annual conference 15 December in Tampa, FL. The all-day session involved practical training and lectures on the use of portable ultrasound. The forum included briefings from Soldiers with 3rd SDFG(A) about their effective use of portable ultrasound in a combat environment. (U.S. Army photo by SSG Jeremy D. Crisp/ 3rd SFG (A)).

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