ROBERT BARD, MD '68

Using Imaging to Prevent Suicide

The New York City Police Department is experiencing an epidemic of suicide, with 10 officers taking their own lives in 2019 as of mid October. Radiologist Robert Bard, MD '68, who has forged his reputation using cutting-edge imaging technology to diagnose cancer, is now applying that same technology to assess suicide risk as well as the efficacy of depression treatment.

Bard is internationally recognized as a leader in the field of 21st-century 3D ultrasonic volumetric Doppler imaging. At his practice, Bard Cancer Diagnostics in Manhattan, Bard uses 3D ultrasound to diagnose cancers including melanoma, thyroid, breast cancer, prostate cancer, and other tumors through blood flow imaging as an alternative to biopsy, as well as to guide biopsies, target therapies, and provide focused follow-up after treatment. Now, he's using ultrasound to study blood flow in the part of the brain that regulates emotion.

According to Bard, an ongoing multi-center National Institutes of Health study has already demonstrated reactions in the brain to pleasant or stressful stimuli using fMRI technology. Based on the brain activity, the information can help diagnose specific mental illness as well as a risk for suicide. "The problem," says Bard, "is that fMRI is extremely expensive and not readily available. There are only three places in New York State that have this technology."

Bard is trying to develop an easier, less expensive screening method using ultrasound.

His interest in brain imaging began as a fourth-year medical student at Upstate, observing a patient who had undergone a successful surgery but was experiencing swelling of the brain. "There was really no good way to measure intercranial pressure of the brain at the time," Bard recalls. "It killed people."

Since 1980, ultrasound of the optic nerve has been used to detect increased cranial pressure. For the last decade, ultrasound has been used to look at blood flow in the developing brains of babies in utero, which have smaller brains and soft skulls. Now, says Bard, "we've finally calibrated equipment to detect abnormal blood flow in the adult brain."

Bard says placing the ultrasound probe on the eye shows the blood flow coming to the back of the eye, which is fixed to the frontal part of the brain. Putting the probe on the temple shows the entire brain blood flow. "You can see if there's a spasm or abnormal flow in the area you're looking at," he says.

For years, Bard has treated New York City first responders through the 9/11 Cancer Scan Program. In May, Bard became a Trooper Surgeon, working with the New York State Troopers to use Doppler sonography to diagnose PTSD in troopers. "You can measure brain thought activity by observing the alterations in capillary blood vessels in the retina located in close proximity to the main emotional center of the front of the brain," he says.

In October, Bard became a member of the Public Health Division of the Medical Society of the State of New York, the mental health group that works with the NYPD. "Most recognizable patterns with suicide occur in the anterior cingulate cortex of the brain and are vascularized by orbital branches of the anterior cerebral artery," he says. "Ultrasound devices can show changes in brain oxygenation linked to suicide as well as MRI without the stress or the cost."

The first goal is to have an inexpensive, easily accessible screening test available for someone who feels they may be at risk, says Bard, who is the author or editor of 11 books, most recently *Image Guided Dermatologic Treatments* (Springer, 2020). The next is to use the technology to quantifiably measure the effectiveness of anti-depressant treatment in the same way that imaging has been used to study cancer treatments.

"By finding the abnormal blood flow in the brain, we should be able to see if a prescribed medication is making it better or worse," Bard says. "I'm trying to usher in a new way of thinking about brain imaging."

—Renée Gearhart Levy

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