Advanced Ultrasound Imaging for Kidney Stone Detection

VANDERBILT UNIVERSITY
CTTC Center for Technology Transfer & Commercialization

Summary

The standard for kidney stone detection is through the use of computed tomography (CT). However, CT is expensive and delivers harmful ionizing radiation into the body. Ultrasound would be the ideal way to detect kidney stones except that it performs poorly in detecting and accurately sizing stones. Vanderbilt researchers inventors have developed a technique that is able to separate hard, mineralized material (i.e kidney stones) from soft tissue in a way that is both cheaper and safer than CT and performs better than conventional ultrasound imaging.

Addressed Need

Conventional ultrasonography suffers from poor sensitivity and overestimation of kidney stone size. This method overcomes these issues and can be implemented in all current ultrasound imagers. Likewise, this method can be applied to any task where mineralized tissue is of interest, including kidney stones, gall stones, breast microcalcifications, cardiovascular calcifications, etc.

Technology Description

The technique these inventors developed is a way to separate hard mineralized material from soft tissue. This is done through ultrasonic imaging wave front coherence. Soft tissues is typically incoherent while hard mineralized material is typically coherent. However, these differences aren't usually apparent in typical ultrasound beam sequences. As a result, this technique intentionally uses unfocused ultrasound beams to avoid inducing coherence in soft tissue. This makes it so you are only able to detect the hard, mineralized objects that have a natural coherence such as kidney stones.

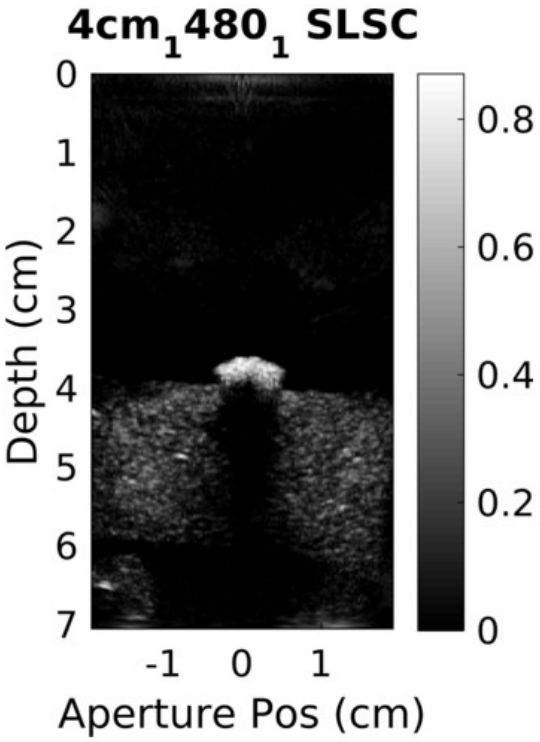

Figure 1: Image of a kidney stone using the technique developed by Vanderbilt researchers.

Technology Development Status

- In vitro results of this method have been obtained
- IRB approved for human study

Intellectual Property Status

- Pending patent application & Copyrighted software

CTTC CONTACT:
Masood Machingal, PhD
(615) 343-3548
Masood.machingal@vanderbilt.edu

INVENTORS:
Brett Byram, PhD
Jaime Tierney
Beam Lab
Ryan S. Hsi, MD

VU REFERENCE: VU17141

Visit **http://cttc.co/technologies** for available Vanderbilt technologies for partnering