

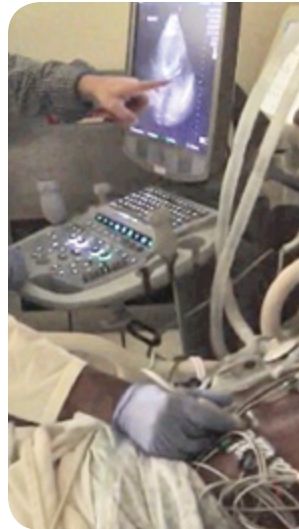
High Quality Ultrasound from ZONARE Key to Appendicitis Diagnosis

Case Background

It was a normal, busy day in the emergency department (ED) where Gerardo Chiricolo, MD was the attending physician. The beds were full, the waiting room was piling up and it seemed as if nobody was making it to the floors. The next patient the resident presented to him was a 54 year-old bariatric female, 5'5" height and 260 lbs weight, who had arrived complaining of general abdominal pain associated with some mild nausea without vomiting. She denied fever, chills, diarrhea, dysuria or anorexia. She also had a history of diabetes, hypertension and hyperlipidemia. Her exam revealed that she was not toxic and not in any apparent distress, but had some moderate RLQ tenderness without the hallmark indications of appendicitis such as local peritonitis, psoas, obturator or rovsing's signs. Despite the atypical presentation, Dr. Chiricolo suspected this was appendicitis.

Without a convincing physical exam for appendicitis, Dr. Chiricolo knew the surgeons would not perform an appendectomy without confirming the diagnosis with ancillary testing so he decided his first steps would be to perform a bedside, point-of-care ultrasound examination. He used the department's z.one ultra system with ZONE Sonography Technology™ (ZST) from ZONARE Medical Systems. This imaging procedure was preferred over a CT scan. A CT scan performed with oral and IV contrast at his institution could typically take 3 to 4 hours and expose patients to the possibility of contrast induced nephropathy.

The ZONARE system's mobility and small footprint along with its stationary system's imaging quality make it a perfect choice for his demanding ED. Dr. Chiricolo initially began the exam with the system's L10-5 linear array transducer but quickly decided the C9-3 curved array transducer would be a better solution due to the imaging characteristics of the obese patient. He immediately determined from the images he saw that the patient had a dilated and inflamed appendix.



Without a convincing physical exam for appendicitis, Dr. Chiricolo knew the surgeons would not perform an appendectomy without confirming the diagnosis with ancillary testing so he decided his first steps would be to perform a bedside, point-of-care ultrasound examination.

Dr. Chiricolo contacted the surgeon on call and recommend emergency surgery.

The surgeon's initial reaction was to still confirm the diagnosis with a CT scan. After some gentle discussion, Dr. Chiricolo encouraged the surgeon to come down and see the patient and the ultrasound images on the PACS.

Outcomes

Convinced by Dr. Chiricolo's high image quality ultrasound findings, the surgeon opted to do

Appendicitis diagnosed of difficult-to-image patient using z.one ultrasound system and C9-3 transducer

*To view video click on image or link:
www.zonare.com/education/case-studies/appendicitis-diagnosis*



surgery without a confirming CT exam. The patient was prepped and moved into surgery. The surgeon quickly discovered not only a dilated appendix, but also saw a small perforation in it. Had he waited the extra hours to confirm the diagnosis with a CT exam, it was highly probable that the appendix could have ruptured risking peritonitis and other complications which would have resulted in a longer hospital stay along with other related costs or procedures.



Enabling Technology

Dr. Chiricolo cited ZONARE's unique ZST architecture as key to his diagnostic confidence in determining this was a case of appendicitis requiring immediate action. "ZST provides multiple advantages including a two-way dynamic transmit and receive focus. This offers exquisite grey scale and color Doppler images with

enhanced penetration by high-frequency probes for superior image quality. You can also optimize the sound speed at the press of a button to provide tailored patient-specific imaging. I know of no other system that offers these critical attributes," Dr. Chiricolo said.

Conclusion

Several studies have indicated that high quality ultrasound imaging can be routinely used to diagnose appendicitis (1-6). Ultrasound is far faster than CT and much less expensive without exposing the patient to radiation and IV contrast media. However, in busy and crowded EDs, mobility and flexibility are essential.

"The z.one ultra not only produces outstanding image quality, but is extremely mobile and easy to transport. If we need to get into a very tight area, we just release the 5.5 pound scan engine and take it quickly to the patient for scanning. It is a remarkable unit with even more remarkable technology for a wide breadth of all ACEP examinations performed in the ED, whether a local community hospital or a Level 1 trauma center," Dr. Chiricolo concluded.



Dr. Chiricolo is the past Chair of the American College of Emergency Physicians (ACEP), Ultrasound Section

References:

1. *Sensitivity and specificity of ultrasound in the diagnosis of acute appendicitis.* Al-Ajerami Y, East Mediterr Health J. 2012 Jan;18(1):66-9.
2. *Can Ultrasound Compete With CT: Diagnostic Ultrasound.* http://www.medscape.com/viewarticle/431119_4
3. *Sonography as the First Line of Evaluation in Children With Suspected Acute Appendicitis.* Leann E. Linam, MD, Martha Munden, MD. <http://www.aium.org/misc/soundJudgment10.pdf>
4. *Sonography in the Evaluation of Acute Appendicitis Are Negative Sonographic Findings Good Enough?* Preeyacha Pacharn, MD, Jun Ying, PhD, Leann E. Linam, MD, Alan S. Brody, MD and Diane S. Babcock, MD. <http://www.jultrasoundmed.org/content/29/12/1749abstract?sid=e4a5be4e-852f-46bf-a5d6-018b29296f6d>
5. *JUM: Ultrasound is 'reasonable' screening tool for acute appendicitis.* http://www.healthimaging.com/index.php?option=com_articles&view=article&id=25592:jum-ultrasound-is-reasonable-screening-tool-for-acute-appendicitis
6. *KLAS: Ultrasound use on the rise as a CT replacement.* http://www.healthimaging.com/index.php?option=com_articles&view=article&id=29132:klas-ultrasound-use-on-the-rise-as-a-ct-replacement



420 N. Bernardo Avenue
Mountain View, CA 94043-1839

877-966-2731
650-230-2800

email: info@zonare.com
zonare.com