Perspectives on Image Performance Assessment II

"Primum non Nocere"

Tuesday, August 12th
Room 26A
CE – Ultrasound 2
Perspectives on Image Performance Assessment II

"*The Impact of Compromised Elements Within An Ultrasound Transducer On Image And Doppler Quality*."

G. Wayne Moore – Sonora Medical Systems

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Our research has shown that up to 25% of all diagnostic ultrasound transducers currently in clinical use have some form of performance compromising service issue. Problems related to dead elements within an array may go unnoticed by clinicians as early symptoms have a more dramatic effect on Doppler performance than on imaging performance. Our experience has shown that very few hospitals, if any, in The United States have a program in place that routinely tests transducers in an objective, evidence-based manner. If tested at all, hospital or OEM personnel typically use a tissue mimicking phantom to evaluate probe and system performance. Our data demonstrates that this is a seriously flawed approach and results in clinicians using compromised transducers unaware, thereby potentially producing erroneous

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Results: "As few as 2 consecutive dead elements can materially impact the beam profile; four or more can significantly reduce resolution and penetration, increase the noise floor, and cause Doppler peak velocity errors, flow ambiguity and spectral broadening. Tissue phantoms proved to be equivocal in spotting defective elements."

Conclusion: "…array heath is critical to high-quality, efficacious ultrasound

The Methods and Effects of Transducer Degradation on Image Quality and the Clinical Efficacy of Diagnostic Sonography

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"*…if element-to-element uniformity is not good enough, we effectively create a random array with random element spacing. Grating lobes are not well defined in this case; their angles are also random…*"

Joe Guess, Ph.D.
Acoustic Noise from Arrays is Grating - 1993

"*Sidelobes of the beam can also allow interference from flow outside the vessel under interrogation and may change the spectral mean velocity*."

Bjorn Angelsen, Doppler Ultrasound in Cardiology, 1985