JACC: CARDIOVASCULAR IMAGING, VOL. 8, NO. 5, 2015
MAY 2015:616–22

electrophysical law governing the catheter design and the insulative nature of the balloon that gives accurate results regardless of the electrical properties of the surrounding environment. The CB catheter offers accurate, real-time sizing capabilities completely independent of subjective user input and allows the user to adjust the inflation instantaneously. The CB sizing electrodes easily integrate into existing standard coronary balloons and hence do not significantly alter clinical procedures. The CB catheter functionality is flexible and could easily be integrated into other devices, such as stent delivery balloons, drug-eluting balloons, and valvuloplasty balloons. Future work will include a first-in-man validation and the use of multiple sets of measurement electrodes inside the balloon to provide a balloon profile showing variation in the CSA dimension along the balloon length.

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http://dx.doi.org/10.1016/j.jcmg.2014.07.021

Please note: This study was supported by National Institutes of Health grant R43-HL120517. Drs. Svendsen and Berwick are employed by 3DT Holdings, LLC. Dr. Sinha has a speaking relationship with Boston Scientific; and has received a research grant from Edward Life Sciences. Dr. Bhatt has received research grants from Amarin Corporation, AstraZeneca, Bristol-Myers Squibb, Eisai, Ethicon, Medtronic, Roche, Sanofi-Aventis, and The Medicines Company; and has participated in unfunded research for FlowCo, PLx Pharma, and Takeda. Dr. Kassab is the founder of 3DT Holdings, LLC. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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Physical Examination Is Still Necessary and Important

Handheld ultrasound (HHU) is very useful in clinical diagnosis of suspected cardiac condition, but there are limitations. How can one diagnose Heberden's angina by HHU? It is necessary to take an adequate history for diagnosis of angina.

Heart failure is a common and potentially lethal condition. Admittedly, HHU can distinguish between heart failure with reduced ejection fraction and heart failure with preserved ejection fraction. However, the prognosis of these patients is related to the severity of heart failure. New York Heart Association (NYHA) functional classification is an accepted method to assess the severity of heart failure. I do not believe that HHU can diagnose NYHA functional class.

I believe that bedside clinical examination is less expensive than transthoracic echocardiography (TTE) or even the HHU device. It can be repeated as frequently as necessary, and it is less expensive than repeated TTE or HHU examination.

I can provide many more examples of limitations and usefulness of both physical examination and imaging studies.

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http://dx.doi.org/10.1016/j.jcmg.2014.10.018

Please note: Dr. Chatterjee passed away between final acceptance and publication of this letter.

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REPLY: Physical Examination Is Still Necessary and Important

We agree with Dr. Chatterjee that history is key to making a diagnosis. In our paper (1), we did not suggest a substitution of history by handheld ultrasound (HHU), but the substitution of the stethoscope. In regard to heart failure, again it is a clinical diagnosis, as Dr. Chatterjee rightly states, but HHU can differentiate patients with reduced left ventricular (LV) systolic function from those with "normal" LV function. It can

also be used to measure the size of the inferior vena cava, thus helping in the estimation of right heart filling pressure. It can provide an assessment of right ventricular size and function, which are independently related to prognosis. Other findings that may be important in heart failure that can be picked up by HHU and may not be evident on physical examination are LV and left atrial size, wall thickening abnormalities indicating presence of coronary artery disease, presence and severity of mitral and tricuspid regurgitation, presence of LV thrombus, and visual assessment of LV dyssynchrony. All of these findings can assist in making management decisions.

To our knowledge, there are no data in regard to the value of repeated examinations with HHU in terms of managing patients. It may be that clinical examination alone may be adequate in most patients once a comprehensive initial assessment has been made. HHU may be useful when the clinical situation changes. More studies are needed to address this issue.

Finally, the days of the giants of physical examination such as Aubrey Leatham (2) and Proctor Harvey (3) are, unfortunately, over. And there are only a few Kanu Chatterjees left. There is no shame in admitting that physical examination skills are poor to middling for most other modern-day physicians. For them and their patients, HHU may be the answer. It is time to move on!

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http://dx.doi.org/10.1016/j.jcmg.2014.10.017

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Handheld Ultrasound is a Valuble Bedside Tool Which Can Supplement the Bedside Cardiac Exam but not Replace It

I read the article "Handheld Ultrasound Versus Physical Examination in Patients Referred for Transthoracic Echocardiography for a Suspected Cardiac Condition" by Mehta et al. (1) and the accompanying editorial by Marwick et al. (2) with great interest. In our current practice of cardiovascular medicine, where we have restricted time at the bedside, electronic medical record (EMR) documentation requirements, concern about appropriate testing, and the cost of medical care, a re-evaluation of the value of bedside diagnostic techniques is proper and necessary. However, I have several concerns regarding their article. The question is not whether comparison of the stethoscope in isolation to handheld ultrasound (HHU) is a better diagnostic tool when compared with an ultrasound gold standard but whether, in the presence of a good history, the time and information gained from a HHU is equivalent or better than completing a cardiovascular examination to establish a diagnosis and whether those findings result in a different clinical outcome. It is unclear from the article what the factors were that influenced downstream testing. Was it determined by the cardiac examination and HHU, by individual physician preferences, or totally by the patient's clinical picture? The article states that experienced cardiologists completed the cardiac examination but does not describe how the examination was carried out. We recently reported that cardiologists often do an incomplete examination without completely undressing the patient, examining in multiple positions, or using maneuvers to evaluate murmurs (3). The authors list the most common reasons given for the infrequent use of the HHU. The cardiology trainees in our clinic currently have access to HHU but use it infrequently, commenting that it rarely adds to clinical assessment after the history and physical or that the complete echocardiogram would still be clinically necessary to appropriately manage the patient and document findings. I agree with the editorial's comments concerning the traditional cardiac examination but would note that currently, much of the same criticism is true of HHU. It is often carried out inexpertly, is very operator dependent, and currently cannot be hard copied into the EMR. It is our observation that most cardiologists can complete an excellent bedside examination; they just do not make the effort. I do not question that HHU is a superior technology to the stethoscope, especially in the assessment of left ventricular function, but we need to study in which patients the HHU replaces the stethoscope, when it augments the bedside examination, and with which symptoms and diseases it improves our diagnostic skills and influences disease management. With these data in hand, we can have guidelines for practice that will inform the cardiologist when she should carry out a thorough cardiac examination or he should reach for the HHU.