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Improving the Appropriate Use of Transthoracic Echocardiography

The Echo WISELY Trial

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ABSTRACT

BACKGROUND Appropriate use criteria (AUC) have defined transthoracic echocardiogram (TTE) indications for which there is a clear lack of benefit as rarely appropriate (rA).

OBJECTIVES This study sought to investigate the impact of an AUC-based educational intervention on outpatient TTE ordering by cardiologists and primary care providers.

METHODS The authors conducted a prospective, investigator-blinded, multicenter, randomized controlled trial of an AUC-based educational intervention aimed at reducing rA outpatient TTEs. The study was conducted at 8 hospitals across 2 countries. The authors randomized cardiologists and primary care providers to receive either intervention or control (no intervention). The primary outcome measure was the proportion of rA TTEs.

RESULTS One hundred and ninety-six physicians were randomized, and 179 were included in the analysis. From December 2014 to April 2016, the authors assessed 14,697 TTEs for appropriateness, of which 99% were classifiable using the 2011 AUC. The mean proportion of rA TTEs was significantly lower in the intervention versus the control group (8.8% vs. 10.1%; odds ratio [OR]: 0.75; 95% confidence interval [CI]: 0.57 to 0.99; $p = 0.039$). In physicians who ordered, on average, at least 1 TTE per month, there was a significantly lower proportion of rA TTEs in the intervention versus the control group (8.6% vs. 11.1%; OR: 0.76; 95% CI: 0.57 to 0.99; $p = 0.047$). There was no difference in the TTE ordering volume between the intervention and control groups (mean 77.7 ± 89.3 vs. 85.4 ± 111.4; $p = 0.83$).

CONCLUSIONS An educational intervention reduced the number of rA TTEs ordered by attending physicians in a variety of ambulatory care environments. This may prove to be an effective strategy to improve the use of imaging. (A Multi-Centered Feedback and Education Intervention Designed to Reduce Inappropriate Transthoracic Echocardiograms [Echo WISELY]; NCT02038101) (J Am Coll Cardiol 2017;70:1135–44) © 2017 by the American College of Cardiology Foundation.

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ABBREVIATIONS AND ACRONYMS

A = appropriate

AHRC = Applied Health Research Centre

ASE = American Society of Echocardiography

AUC = appropriate use criteria

CI = confidence interval

mA = may be appropriate

OR = odds ratio

rA = rarely appropriate

TTE = transthoracic echocardiogram

Overuse of low-value clinical services has received greater attention in recent years in response to an Institute of Medicine report that estimated 30% of health care dollars are spent on services that do not improve patient care (1). The Choosing Wisely campaigns have sought to raise awareness of low-value tests, treatments, and procedures that are potentially unnecessary and may cause harm (2). In response to concerns regarding significant increases in the use of cardiac testing (3), some of which may be of low value, the American College of Cardiology published its first Appropriate Use Criteria (AUC) document in 2005 (4), and then subsequently published multiple documents covering the majority of cardiovascular imaging and procedures (5–8).

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Clinical application of the AUC has been considered as a mechanism to curb the rising use of cardiac testing that may be low value. A small number of prior studies have assessed the ability to change physician behavior with AUC-based interventions. Studies have evaluated the impact on ordering of echocardiography, single-photon emission computed tomography, and coronary computed tomography angiography (9–14) and achieved various levels of success. The previously published studies have been predominantly single-center, nonrandomized studies with a limited sample size and duration of intervention (15).

Recently, our group published the results of a single-center, randomized controlled trial of an educational intervention designed to reduce the frequency of rarely appropriate (rA) transthoracic echocardiograms (TTE) ordered by attending cardiologists (16). The findings demonstrated a significantly lower proportion of rA TTEs ordered by the intervention group (16). It remains unknown whether this type of intervention can be generalized across multiple practice environments, particularly across countries where payment systems differ. To investigate this question, we conducted the first multicenter, investigator-blinded, randomized controlled trial of an educational intervention designed to reduce the proportion of rA TTEs ordered in ambulatory care.

METHODS

STUDY DESIGN. The design of the Echo WISELY (Will Inappropriate Scenarios for Echocardiography Lessen Significantly) study was previously published (17). The Echo WISELY study is an international, multicenter, investigator-blinded, randomized controlled trial to evaluate the effects of an AUC-based education and feedback intervention versus usual care on the proportion of rA TTEs ordered by clinicians in ambulatory care. The study is registered at ClinicalTrials.gov (NCT02038101), reported in accordance with Consolidated Standards of Reporting Trials (CONSORT) guidance, and approved by the research ethics board of each participating hospital. Funding was provided by the Peter Munk Cardiac Centre (Toronto, Ontario, Canada), the Ontario Ministry of Health and Long-Term Care, and the Cardiac Care Network of Ontario. The authors are solely responsible for the design, conduct, and analysis of this study, as well as the drafting and editing of the paper, and its final contents.

PARTICIPANTS, HOSPITALS, AND RECRUITMENT. Attending cardiologists and primary care physicians who practice ambulatory care were recruited at 8 hospitals (7 in Ontario, Canada, and 1 in Massachusetts). The hospitals represented a broad mix of large academic medical centers (University Health Network, Mount Sinai Hospital, Sunnybrook Health Sciences Centre, Brigham and Women's Hospital, St. Michael's Hospital), smaller ambulatory centers (Women's College Hospital), and rural hospitals (Kingston General Hospital).

Only physicians who saw patients in an ambulatory care setting were eligible to participate. Pediatric cardiologists and physicians who specialize primarily in adult congenital heart disease were excluded. Eligible physician practices were screened for preexisting decision support processes for outpatient TTE ordering, and if such a system was in existence, those physicians were excluded from participation.

STUDY PROCEDURE. Following informed consent, study participants were assigned a unique study ID

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