

pacemaker indications, type of pacemaker (single- or dual-chamber pacemakers), and usage of anti-tachycardia therapy were not provided. In our opinion, it would be of interest to investigate the impact of atrial pacing on development and progression of AF because it has been suggested that pacing of atrial tissue influences development of AT (3). It should also be taken into account that pacemakers and implantable cardioverter-defibrillators continuously monitor cardiac rhythm, which increases the chance of detecting asymptomatic episodes of AT. Hence, the observed incidences of AT might be higher than the incidences reported in patients without implantable devices.

Intra-atrial reentry tachycardia (IART) and focal AT were differentiated from each other using the surface electrocardiogram only. However, previous studies demonstrated discrepancies between diagnoses made using surface electrocardiograms and endovascular electroanatomical mapping studies. For example, ectopic AT in the presence of large areas of conduction delay can produce a surface electrocardiogram resembling an IART (4). Because in the present study invasive electrophysiological studies were not performed in all patients, grouping of all different regular AT seems appropriate. In future studies, it would be of interest to investigate differences in the time course of AF for each of these different types of regular AT.

Altogether, Labombarda et al. (1) conducted an interesting study supporting our initial findings on AF in CHD patients, and we expect more reports that focus on this important health issue will follow in the future.

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REPLY: Atrial Fibrillation

The Next Epidemic for Patients With
Congenital Heart Disease



I sincerely thank Drs. Teuwen and de Groot for their interest in our paper (1), and for their seminal contributions to the epidemiological and mechanistic characterization of atrial arrhythmias in adults with congenital heart disease. The relatively young age of onset of atrial fibrillation observed in our study, together with progression toward permanent atrial arrhythmias, is indeed consistent with observations from their retrospective study of patients exclusively with atrial fibrillation (2). By broadening inclusion criteria to encompass other atrial arrhythmias, we found that intra-atrial re-entrant tachycardia (IART) remains the most common presenting arrhythmia in patients with congenital heart disease (1). Nevertheless, atrial fibrillation increases with age to surpass IART as the most prevalent arrhythmia in patients aged ≥ 50 years.

The coexistence of bradyarrhythmias and tachyarrhythmias in patients with congenital heart disease is well established. Recommendations state that permanent pacing is reasonable (class IIA, level of evidence C) in adults with congenital heart disease and sinus or junctional bradycardia for the prevention of recurrent IART, with preference for devices with atrial antitachycardia pacing properties (3). Although it is true that cardiac implantable electronic devices enhance sensitivity for detecting atrial arrhythmias, and can therefore, affect observed incidence rates, the issue is of limited relevance to our study because all patients had documented arrhythmias as an inclusion criterion. Our study was not designed to quantify, nor did it report, incidence rates for atrial arrhythmias. Rather, it was intended to shed light on the pattern and distribution of arrhythmias and age-related trends in patients with congenital heart disease.

Last, Teuwen and de Groot inaccurately contend that "IART and focal atrial tachycardia were differentiated from each other using the surface electrocardiogram only." Although IART and focal atrial tachycardia are often indistinguishable on the basis of a surface electrocardiogram, arrhythmias were

independently classified by a blinded adjudicating committee using all available evidence. This included, but was not limited to, mode of onset and termination; response to vagal maneuvers, pharmacological agents (e.g., adenosine), antitachycardia pacing and electrical cardioversion; and detailed electrophysiological studies. It remains to be determined whether preventive strategies could thwart the progression of IART and focal atrial tachycardia toward atrial fibrillation and improve arrhythmia-free survival.

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Will Physicians Benefit From Appropriate Use Criteria—Based Education and Feedback Intervention?



We read with interest the report in which Bhatia et al. (1) investigated the impact of an appropriate use criteria (AUC)—based educational intervention on the ordering of outpatient transthoracic echocardiography (TTE) by cardiologists and primary care providers. This is an excellent randomized trial, and the educational and feedback intervention was observed to reduce the use of rarely appropriate TTE (1).

Notably, the stratified randomization based on hospital site and physician specialty raised some concerns. Eliminating bias of physician baseline appropriateness, malleability, and patient baseline characteristics among 2 groups was critical to the credibility of this trial. Thus, a stratified randomization including the baseline appropriateness of the physician may be a proper approach. Simultaneously, the attitude of the physicians toward AUC and patient baseline characteristics should be collected and reported to verify the effectiveness of randomization, which may make the outcome convincing (2).

In addition, the investigators demonstrated that nearly 40% of physicians in the intervention group failed to be intervened by educational material or feedback report, indicating that it is necessary to be cautious about the intervention implementation (1). Because the intensity of intervention is of great importance in comprehending the outcome, the detailed information of the physicians who were not successfully intervened should be analyzed.

Because the effect of the specific intervention was reported as not sustained in another time series analysis, we strongly agree with the opinion in the limitations of the paper that the sustainability of the impact of this type of intervention needs further study (1,3). However, in realistic clinical practice, diverse interventions should be developed and be consecutively implemented to gradually establish regular audit and feedback mechanisms, which may finally improve specific medical test use and treatment appropriateness.

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