Arrhythmia Monitoring Through Pacemakers

To the Editor:

In their ancillary study of the MOde Selection Trial (MOST) study, Glotzer et al.\(^1\) provide important findings about the clinical relevance of arrhythmia monitoring through pacemakers in patients with sinus node dysfunction. However, their results do not support those of the MOST study. In the MOST study,\(^2\) the development of clinically evident atrial fibrillation was observed less often in the patients with the DDD mode of pacing, but the pacing mode had no effect on stroke occurrence. In this ancillary study of MOST, the occurrence of nonsustained atrial arrhythmias was not influenced by the pacing mode, and the patients with such arrhythmias had a higher mortality. How does the DDD mode prevent clinically evident atrial fibrillation but not the occurrence of nonsustained atrial arrhythmias? Which kind of arrhythmia is then relevant in terms of prognosis in pacemaker patients—a symptomatic atrial fibrillation or a nonsustained atrial arrhythmia that is often asymptomatic?

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Response

Dr Piot points out that, although atrial-based pacing is now generally accepted as reducing the incidence of persistent and permanent atrial fibrillation (AF) as was demonstrated in the main MOde Selection Trial (MOST) trial, there was no statistically significant difference in the proportion of patients with atrial high-rate events (AHREs) between the dual-chamber rate-modulated mode (DDDR) and the single-chamber rate-modulated mode (VVIR) groups in the ancillary study of MOST. There are several possible reasons for this seemingly paradoxical observation.

Although MOST enrolled 2010 patients, the ancillary study enrolled only 312 patients. The statistical power for finding a modest difference between groups was therefore very reduced, and the chance of a type II error much greater. The ancillary study patients were not a randomly selected subpopulation of MOST. Thus, the response to atrial-based pacing would not, a priori, have been expected to be identical to that of the overall MOST population.

In addition, a greater proportion of ancillary study patients had a prior history of AF. In the main trial, the reduction of AF by DDDR pacing was minimal for patients with a prior history of supraventricular tachyarrhythmia. This further decreases the likelihood of finding a difference in the incidence of AHREs between groups (DDDR versus VVIR) in the ancillary study.

The implied assumption that prevention of persistent or permanent AF should tightly correlate with a reduction of shorter, nonsustained, generally asymptomatic atrial high rate events may be flawed. An equally plausible hypothesis is that patients in DDD mode are less likely to progress from short bursts of AF to sustained AF, perhaps because the time course of this progression is attenuated by DDD pacing. This hypothesis has not yet been satisfactorily tested. In addition, it may be that AHREs are not a marker for the development of clinically evident AF (although our paper suggests that they are), but that the presence of AHREs may simply be a marker for sicker patients who are more likely to have bad outcomes, such as death or stroke.

Dr Piot also expresses concern that the stroke rate was not different between groups in the main MOST trial, reflecting the reduction in AF rate by DDDR pacing. The overall stroke rate was very low in the trial. This low rate reduced our statistical power to detect a significant difference between groups.\(^1\)

Although both sustained and nonsustained atrial arrhythmias appear significant, it is crucial to remember that the totality of evidence in dozens of retrospective and prospective studies of thousands of patients conclusively supports the importance of AF in the pathogenesis of stroke. Our study is an initial step in evaluating the importance of previously undetectable, nonsustained, and generally asymptomatic atrial arrhythmias.

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Subsequent to the publication of the original manuscript, Dr Glotzer has served as a consultant to Medtronic. Dr Lamas has received research grants and served as a consultant to Medtronic.