Pacemaker selection: time for a rethinking of complex pacing systems: reply

We appreciate the interest in our article expressed by Silberbauer and colleagues. We are surprised to read that we ‘advocate VVI systems instead of DDD systems because of non-inferiority with regard to stroke and mortality as shown by MOST, CTOPP, PASE, and UKPACE.’ Indeed, we never mentioned UKPACE trial,1 published in July 2005, until the submission of our article.

UKPACE trial (in which John Camm is one of the top investigators) compared the clinical effects of VVI(R) pacing and DDD(R) pacing in elderly patients with high-grade AV block. No significant differences were observed between the two pacing modes in the rates of deaths from all causes, atrial fibrillation, heart failure, or a composite of stroke, transient ischaemic attack, or other thromboembolisms.1 This confirms exactly what we wrote about the treatment of patients with AV block.

Regarding the pacemaker syndrome, data from CTOPP trial are totally confirmed by UKPACE trial. The clinical significance of this has been underlined by Toff et al.1: ‘Our results, supported by the PASE and CTOPP trials, suggest that the clinical benefits associated with dual-chamber pacing for atrioventricular block have been overestimated.’

This reply gives us the opportunity to introduce an important point that we did not consider in our article: the incidence of perioperative complications in dual-chamber pacing resulted significantly higher in both UKPACE1 and CTOPP3 trials. The consequence of this is a further increase of difference in costs between dual-chamber and single-chamber devices.

Concerning the new DDD pacemakers equipped with algorithms for minimizing the ventricular pacing in patients with sinus node disease (SND), we believe that: (i) in the absence of data from large trials, it is not scientifically correct to extrapolate the benefits observed by Nielsen et al.4 with atrial pacing to these new devices; (ii) the percentage of patients with SND who develop AV block is low even if not insignifiant in some reports, as mentioned by Silberbauer et al.; a strategy of routine implantation of such a pacemaker whose cost is higher by at least €2000 to one SSIR is totally unjustified; (iii) these new DDD devices in the presence of advanced AV block work just as the traditional ones; the reasons why they may show superiority over VVI pacing and furnish different results from UKPACE1 and PASE4 trials remain yet to be explained.

Reference

initial filter for coronary angiography. Absence of coronary calcium on EBCT has a negative predictive value of >95% for the presence of obstructive CAD and the occurrence of future coronary events. Although for measurement of coronary calcium EBCT no contrast is used and thus no information on luminal obstructions is provided, increasing amounts of coronary calcium are associated with the future risk of coronary events. Detection of coronary calcium may therefore also serve as guide for the initiation of preventive treatment, such as lifestyle modification and aspirin or statin therapy.

We suggest to use a two-staged diagnostic approach for risk stratification prior to coronary angiography, with EBCT as first step and selective use of non-invasive stress tests (MPS, cardiac stress magnetic resonance imaging, or stress echocardiography) in patients with intermediate calcium scores as second step. Patients with low calcium scores do not need coronary angiography, and patients with high calcium scores should undergo coronary angiography without non-invasive stress testing. This approach will result in a low rate of coronary angiographies in patients without obstructive CAD, in combination with a more optimal identification of patients requiring revascularization therapy. Given the costs of EBCT and MPS, a two-staged approach will certainly be more cost-effective.

Reference


Gatekeeper for coronary angiography: reply

We thank Geluk and Zijlstra for their kind words as well as their considerations and proposals. The latter hits right into the heart of the issue: should one stick to the ‘anatomic’ paradigm urging us to detect and treat coronary stenoses and calcifications rather than follow the ‘physiological’ approach to examine for and potentially treat the hypoperfusion, often but not always, caused by stenoses?

Following the first paradigm, a sensitivity of 81% for obstructive coronary artery disease (CAD) and may be even one of 95% for three-vessel disease should be considered suboptimal in what Geluk and Zijlstra term a not-low-risk population. In their opinion, this speaks of using a costly technique such as electron beam computed tomography as a filter detecting coronary calcifications, i.e., a late manifestation of CAD, because the absence of calcifications implies a high negative predictive value with regard to CAD.

However, from a physiological point of view, the reasoning by Geluk and Zijlstra is somewhat upside down. If accepting that angina pectoris is caused by myocardial hypoperfusion or ischaemia, one should primarily prevent, detect, and treat this condition rather than stenoses per se which do, far from always, cause reduced perfusion. Secondly, one should examine whether or not regional myocardial ischaemia is reversible, as revascularization is ineffective in patients with irreversible or fixed perfusion defects. Consequently, it is only when reversible ischaemia has been documented that invasive treatment and preceding catheterization is justified, especially if one considers the cost and risk associated with these procedures. Therefore, MPS is preferable as gatekeeper rather than angiography or EBCT because none of these methods provides information on ischaemia or hypoperfusion. The often used argument that MPS may overlook three-vessel or left main disease is hardly relevant because in our intermediate risk population (in which MPS is generally considered most useful), we ‘overlooked’ severe coronary disease in only 1%. In addition, it has been shown years ago, before the advent of modern medical treatment, that it is only a minority of patients with three-vessel or left main disease who will live longer with coronary revascularization than without, namely patients with depressed left ventricular function. All our patients with normal perfusion and ‘overlooked’ severe CAD had a normal ejection fraction.

Absence of coronary calcium on EBCT may have a high negative predictive value for the presence of obstructive CAD but not for the atherosclerotic process, which is rational to detect and treat if reversible ischaemia is present. In fact, with the advent of non-invasive angiography with 64-slice CT, we fear that the search for coronary calcification will spread and intensify like a steppe fire and lead to even more catheterizations and revascularizations unless MPS (and the presence of reversibility and not coronary calcium) is used as filter early in the work-up process.

Reference


3. Hollund-Carlsen PF, Johansen A, Christensen HW, Vach W, Maldrup M, Bartram P, Veje A, Haghfelt T. Potential impact of myocardial...