

patient. A CAC-based reclassification has implications for preventive therapy strategies for patients at intermediate cardiac risk that need to be tested in a prospective, randomized manner (4,5).

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Reply

We agree with the comments of Dr. McEvoy and colleagues regarding our paper (1) that there is an urge to implement coronary artery calcium (CAC) cutoff scores in clinical practice to enhance cardiovascular risk stratification in the individual patient. This especially pertains to persons at intermediate cardiovascular risk, in whom risk management strategies are least clear. Yet, we do not think that reporting the absolute CAC score reclassification cutoffs we would have found by using the classic Framingham Risk Score instead of our Framingham “refitted” model would be helpful. The Framingham Risk Score is designed for a population 30 to 74 years of age (2). Our study focuses on the elderly, of whom a substantial proportion is older than 75 years of age. Previous research within the Rotterdam study has pointed out that the Framingham Risk Score does not fit well in our population (3). Thus, cutoffs derived in our cohort using the Framingham Risk Score would not be meaningful.

Of course, in a utopia we would be able to overcome the inaccuracy of available “general” risk functions. However, we think it would be helpful to create more tailored risk functions for populations with specific demographics and/or presence of cardiovascular symptoms. Empirically derived cutoffs from these populations are more likely to apply to the individual patient, although they should be tested in comparable study populations

before they can be safely used in clinical practice. So, despite the urgent need for CAC cutoffs in cardiovascular risk stratification of the individual patient, we feel that abundant research still has to be performed before CAC cutoff scores can safely be used in clinical practice.

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Nonrandomized Data on Drug-Eluting Stents Compared With Coronary Bypass Surgery Caution With Interpretation

In a recent issue of the *Journal*, Park et al. (1) presented long-term follow-up results from the Asan-Multivessel Registry in which patients are followed after percutaneous coronary intervention (PCI) with drug-eluting stents (DES) or coronary artery bypass grafting (CABG) for the treatment of multivessel coronary artery disease. After 5 years, similar rates of death or the composite endpoint of death, myocardial infarction, or stroke were found in the DES and CABG groups. This is the first paper to compare these groups after such long follow-up, but it should be highlighted that this is a nonrandomized study. To date, only the SYNTAX (Synergy Between PCI With TAXUS and Cardiac Surgery) trial compared patients randomized to DES or CABG and after 1 year already showed that DES failed to reach noninferiority to CABG (2). A possible explanation for the contradicting results of Park et al. (1) is that apart from baseline characteristics (age, sex, body mass index) and comorbid conditions (hypertension, hyperlipidemia, diabetes requiring insulin, heart failure, prior myocardial infarction), the severity of multivessel disease is less worse than in the SYNTAX trial (Table 1), with an overall SYNTAX coronary score that is much lower in the DES group (SYNTAX trial 28.4% vs. 17.4% in the present study). The SYNTAX trial also included more than twice as many patients with a left main

Table 1 Baseline Characteristics Comparison

	SYNTAX (n = 1,800)		Asan Registry (n = 3,042)	
	DES	CABG	DES	CABG
Age, yrs*	65.2	65.0	62.0	61.8
Male, %*	76.4	78.9	69.4	73.2
Mean body mass index, kg/cm ² *	28.1	27.9	25.1	24.8
Current smoker, %†	18.5	22.0	29.5	33.6
Hypertension, %*	68.9	64.0	57.1	47.9
Hyperlipidemia, %*	78.7	77.2	24.1	31.7
Medically treated diabetes				
Any, %†	25.6	24.6	31.6	26.9
Requiring insulin, %*	9.9	10.4	5.6	5.1
Ejection fraction <30%, %	1.3	2.5	0.9	3.3
Congestive heart failure, %*	4.0	5.3	1.4	4.5
Prior myocardial infarction, %*	31.9	33.8	10.1	19.7
Left main lesion, %*	39.5	38.8	11.5	24.9
Total occlusion, %	24.2	22.2	7.1	43.9
SYNTAX score, %*	28.4	29.1	17.4	29.9

*Higher risk profile patients in SYNTAX (Synergy Between PCI With TAXUS and Cardiac Surgery).

†Higher risk profile patients in Asan-Multivessel Registry.

CABG = coronary artery bypass grafting; DES = drug-eluting stent(s).

lesion; these patients have been identified as having the worst prognosis (3). Furthermore, CABG has always shown a better prognosis in patients with more extensive coronary artery disease. Outcomes in the study by Parks et al. (1), therefore, represent results from a patient cohort in whom it is unlikely that an advantage of surgery could be demonstrated.

To conclude, the recently published results show interesting data on patients treated with DES in perspective to CABG in a real-world design, but this should not lead to treatment preferences for patients with multivessel coronary artery disease. SYNTAX remains the only randomized trial addressing this issue, and although we anticipate the stronger long-term results from this trial, conclusions from the Asan-Multivessel Registry can only be drawn with caution.

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Reply

We thank Dr. Head and colleagues for their remarks concerning our paper (1). Although a randomized clinical trial (RCT) is the ideal method for measuring true treatment effects, the RCT does not necessarily provide the final answer to treatment effectiveness, as there are many restrictions that limit generalizability of study findings (2).

There are many considerations when one is choosing a treatment strategy for coronary revascularization (3). In real practice, it is mostly likely that patients with less complex anatomy of atherosclerotic coronary artery disease (CAD) and less comorbidity tend to be more often referred for percutaneous coronary intervention (PCI), whereas those with more severe anatomic complexity and coexisting conditions tend to be preferentially considered for coronary artery bypass grafting (CABG). These factors, therefore, may cause potential bias due to confounding by indication in comparative clinical strategies studies (4).

Several comparisons of CABG with PCI suggest a strong relation between the extent of coronary disease and the relative effectiveness of these procedures on survival (5,6). In particular, clinical registry studies have reported that patients with the least extensive coronary disease (i.e., 2-vessel disease) have better survival after PCI, whereas patients with the most extensive disease (i.e., 3-vessel disease) have better survival after CABG. Our registry data collected consecutive “real world” patients who received multivessel revascularization with minimal exclusion criteria. Therefore, the major difference in patient inclusion of our study and the SYNTAX (Synergy Between PCI With TAXUS and Cardiac Surgery) trial was the enrollment of patients with 2-vessel disease. A more beneficial effect of PCI with drug-eluting stents relative to CABG for patients with less severe, 2-vessel disease is the most likely explanation for our contradicting results compared with the SYNTAX trial. Referring patients with 2-vessel disease for CABG is common in clinical situations, but this subset was not included in the SYNTAX trial.

Although findings of observational studies should be interpreted with caution due to selection bias and unmeasured, multiple confounders, well-conducted observational studies can address long-term effectiveness and safety problems of revascularization procedures in a broader array of patients by the optimal judgment of the treating physician in routine practice, and may more accurately reflect “real world” experience.

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