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## Integration of CT in patients with suspicion of CAD or known CAD

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Hybrid imaging provides information about myocardial perfusion by SPECT and about coronary arteries by CT calcium scoring (CACS) or/and by CT angiography (CTA). It offers a unique opportunity to evaluate for coronary artery disease and its pathophysiological consequences (1, 2).

Coronary artery calcium (CAC) is highly specific for the presence of coronary atherosclerosis and is directly related to the total atherosclerotic plaque burden in the coronary arteries. Although CAC is frequently found in angiographically significant CAD it is of low specificity. Thus, calcification implies atherosclerosis but not necessarily the presence of a stenosis. Otherwise, assessment of coronary calcium allows detection of atherosclerotic lesions often long before they become hemodynamically significant (2, 3).

The difference between myocardial perfusion SPECT (MPS) and CT CACS is that MPS represents an excellent tool for assessing short-term risk, thus effectively guiding decisions regarding revascularisation. In contrast, CACS provides greater long-term risk assessment and, thus, is more useful for the need of medical prevention measures (4).

The principal prognostic value of coronary artery calcium scoring (CACS) lies in asymptomatic patients with a low to intermediate likelihood of CAD. A CACS threshold >400 generally appears appropriate to refer for stress MPS. The referral of patients for MPS is generally not needed when the CACS is <100 because of the very low likelihood of myocardial ischemia in such patients. A CACS of 100 to 400 constitutes a "gray zone" relative to the issue of who may require stress test referral after CACS. For CACS in this range, clinical factors (e. g. diabetes) are likely to determine whether ischemia testing is needed. In these cases a threshold of  $\geq 100$  for further testing seems appropriate (4).

Although the relationship between CACS and MPS is well understood, the relative roles of MPS and CTA are not clearly defined. Given the higher specificity of coronary CTA than of MPS, it may be that coronary CTA will produce changes in the approach to diagnosis in patients with an intermediate likelihood of CAD. Coronary CTA may well become the preferred initial test in these patients, with MPS serving more of a secondary test role. If a patient with an intermediate likelihood of CAD has a normal coronary CTA, without significant coronary calcification, no further testing would be required. If critical coronary stenoses are found, catheter-based coronary angiography would be indicated for possible PCI or CABG. In many patients, however, stenoses defined by coronary CTA will be of uncertain significance, and MPS would then be appropriate for further diagnostic assessment. In patients with known disease or in patients with known or likely to have extensive CACS MPS represents the initial test for risk-stratification and further patient management (2, 3).

### References

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