Nuclear cardiology was introduced in clinical practice in the early 1970s, and since then there has been a sustained growth of 15% per year. Radionuclide methods allow for the accurate assessment of both relative myocardial perfusion and ventricular contractile function. Recently, a great deal of attention has been placed on risk stratification of patients with coronary artery disease. With this risk-based approach, the focus is not on the detection of coronary artery disease, but on identifying patients at high or low risk for major cardiac events in the future.

The diagnosis of coronary disease is the cornerstone for the therapeutic decision process. In patients with typical angina, medical treatment aims at relieving symptoms; interventional treatment (percutaneous coronary intervention or coronary artery bypass grafting) may be considered if conservative treatment fails to control symptoms. On the other hand, risk stratification addresses the cases in which symptoms are not the principal or the only criterion for selecting the appropriate therapeutic management. In the presence of atypical symptoms or mild angina, or in the absence of symptoms, improving the prognosis of patients may be the therapeutic criterion. Nevertheless, the therapeutic target may include both the relief of angina and the improvement of prognosis. Clearly, risk stratifying patients with coronary artery disease is the prerequisite for selecting the appropriate therapeutic strategy to improve prognosis.

The prognostic evaluation of patients with coronary artery disease is based on the prediction of future cardiac events. Cardiac events may be defined as hard events, including cardiac death (sudden or non-sudden) and nonfatal myocardial infarction, and soft events, namely severe angina pectoris, unstable angina, need for hospitalization, and requirement for revascularization in less than 3 months after the nuclear test. Obviously, although the latter may be of subjective concern, the former appear well-defined and therefore reliable end-points.

To date, accumulated data show that coronary artery bypass surgery prolongs survival, in relation to medical treatment, only in selected subsets of patients (multi-vessel disease, two-vessel disease with left anterior descending artery involvement, left-main disease, left ventricular dysfunction). Conversely, although there is no evidence persuasively supporting that invasive treatment reduces the risk for myocardial infarction, publications reported that aggressive lipid-lowering treatment may be beneficial in reducing future ischaemic events. In particular, percutaneous coronary interventions do not ap-
pear superior to medical treatment in reducing the risk of major cardiac events; thus the former should be primarily applied in patients with single-vessel disease and angina refractory to antiischaemic medication. Certainly, as considerable success is achieved by angioplasty in conjunction with stent implantation, percutaneous interventions may obviate bypass surgery in selected groups of patients.

Apparently, as the cardiac death rate of patients undergoing revascularization procedures is >1%, mildly symptomatic patients with a <1% mortality risk should not be candidates for revascularization to improve survival. For purposes of risk assessment in patients with coronary artery disease (measured in cardiac mortality rate per year) it has been proposed that low risk is defined as <1%, intermediate risk refers to the 1%-3% range, and high risk is considered as >3%.

The most widely applied nuclear tests in cardiology are: a) myocardial perfusion imaging for the detection of jeopardized myocardium, and b) radionuclide ventriculography, for the measurement of ejection fraction and the assessment of segmental wall motion. The recently introduced Gated SPECT technique for the combined assessment of myocardial perfusion, global ventricular function, and segmental contractility, has not yet convincingly shown that allows for accurate evaluation of the latter two aspects in moderate or severe ischaemic heart disease, that is in cases where this is particularly important, and it is no further commented.

Finally, it should be emphasized that in published reports the contribution of nuclear cardiology to the risk stratification of patients with coronary artery disease is undervalued. This may primarily be due to the fact that high-risk patients, often identified by radionuclide techniques, are either more intensively treated, so that their prognosis may be improved, or withdrawn form the studies; thus, the positive predictive value of nuclear tests may appear diminished.

### Physiologic basis of risk assessment in myocardial perfusion imaging

Myocardial perfusion imaging yields positive results in the presence of a haemodynamically significant coronary artery stenosis (>50%), which induces demand myocardial ischaemia at stress. The predictive power of myocardial nuclear imaging is based on the assessment of both the extent and the severity of myocardial perfusion abnormalities, which are generally considered to reflect the extent of coronary artery disease and the severity of atheromatic lesions in coronary vessels. However, it has been observed that most acute coronary syndromes occur in lesions causing less than <50% stenoses, as these are unstable and vulnerable to disruption, which may result in supply ischaemia in myocardium.

This paradox, to predict acute ischaemic events due to supply ischaemia with a method that in principle detects demand ischaemia, may be explained by the association of plaque instability with endothelial dysfunction. It is postulated that factors released at stress may result in vasodilation in stable, mild coronary stenoses, whereas they may stimulate vasoconstrictive response in mild coronary lesions with unstable plaques, associated with endothelial dysfunction. This different response may yield defects in myocardial perfusion images, induced by mildly stenotic lesions with unstable atheromatic plaques. Therefore, myocardial perfusion imaging may be able to discern endothelial dysfunction, which is associated with an increased risk of cardiac events. In this setting coronary angiography may detect anatomically insignificant stenoses, but not haemodynamically important. Certainly, stress induced myocardial ischaemia taken as criterion, cannot be interpreted as a false positive myocardial perfusion result.

### Risk assessment in patients with chronic coronary artery disease

Data showing the prognostic power of radionuclide techniques in patients with coronary artery disease initially appeared in 1983. Concordant with these results, a landmark study, published in 1986, undoubtedly demonstrated that the extent and severity of myocardial perfusion abnormalities are significant, independent variables for the prognosis of patients with angina. This study also demonstrated that the greatest incremental information for prognosis was provided in patients with a high pre-test likelihood of coronary artery disease. Over time, a growing body of evidence substantiated the initial observations on the considerable predictive power of myocardial perfusion assessment in patients with suspected or known coronary artery disease, with either 201Tl or 99mTc compounds.

Notably, in the presence of an extensive myocardial perfusion abnormality, cardiac mortality risk is increased 5-10 times, in comparison to a normal
result. Despite this, myocardial perfusion imaging possesses a low positive predictive value (≈10%) and therefore it may not be considered a powerful variable for clinical decision-making. However, as described below, a positive result may be successfully utilized for selecting the appropriate therapeutic strategy. Conversely, a normal or borderline abnormal myocardial perfusion is associated with a remarkably high negative predictive value (≈99%), which entails an annual cardiac event rate similar to that of the general population (<1%)\(^1\). This high negative predictive value may be the most clinically relevant aspect, as it practically obviates any further catheter-based investigation or treatment, provided that symptoms are minimal or easily controlled on antiischaemic medication. Moreover, it has been reported that myocardial perfusion imaging retains its high negative predictive value when combined with submaximal exercise or even in the presence of multi-vessel disease\(^2\). Thus, low risk for adverse events may be related with multi-vessel involvement, whereas high risk may be associated with one-vessel disease. In addition, it is worth mentioning that the majority of patients enrolled in the prognostic studies were on antiischaemic medication.

Studies demonstrated that myocardial perfusion imaging provides considerable predictive power over clinical or exercise test variables, which are easier and cheaper to obtain\(^2\). Indeed, it was found that 201Tl SPECT myocardial perfusion assessment provides significant prognostic information over clinical markers alone or clinical plus exercise information\(^1\). Importantly, it was shown that no incremental prognostic information was provided by catheterization findings, once clinical data, exercise test variables and myocardial perfusion results were known.

It has been previously shown that radionuclide ventriculography parameters, mainly the ejection fraction at rest and during exercise and its change from rest to exercise, are significant prognostic variables in patients with coronary artery disease\(^2\). It appears that an ejection fraction at rest or during exercise <35% bears an unfavorable prognosis. In most cases resting ejection fraction provides significant prognostic information, as it possesses 80%-85% of the prognostic value of exercise ejection fraction\(^3\).

Numerous myocardial perfusion and radionuclide ventriculography studies, comprising tens of thousands of patients, have undoubtedly documented the effectiveness of nuclear cardiology techniques in predicting adverse events in patients with coronary artery disease, and resulted in the incorporation of nuclear tests in ACC/AHA/ACP-ASIM Guidelines\(^3\). High risk (>3% annual cardiac mortality rate) are considered a resting or exercise left ventricular ejection fraction <35%, a stress induced large defect (particularly if anterior), stress induced multiple perfusion defects of moderate size, and a stress induced moderate perfusion defect or a large “fixed” perfusion defect with either left ventricular dilation or increased lung 201Tl uptake. Moderate risk (annual cardiac death rate 1%-3%) constitutes a resting left ventricular ejection fraction 35%-49% or a stress induced moderate perfusion defect without left ventricular dilation or increased lung 201Tl uptake. Finally, a normal or mildly abnormal myocardial perfusion result signifies a low risk (<1% annual cardiac mortality rate).

Exercise electrocardiography is not an obsolete test. In fact, there is an interplay among exercise testing and myocardial perfusion assessment results\(^9\). However, myocardial perfusion imaging is clearly superior as a single prognostic variable, it provides considerable incremental information over exercise data, and it can more effectively identify patients at low or high risk\(^30\).

The importance of radionuclide tests in the assessment of patients unable to exercise or with abnormal resting electrocardiograms (left bundle branch block, left ventricular hypertrophy, digoxin, Wolf-Parkinson-White syndrome) is apparent. However, the application of nuclear cardiology tests in cases with an interpretable exercise electrocardiography remains controversial, as clinical data and exercise testing may be considered adequate in this setting. Myocardial perfusion imaging should not be performed in patients with a low likelihood of coronary artery disease post-exercise testing, as the cost per cardiac event predicted was found excessively high\(^31\). On the other hand, in patients with an intermediate or high likelihood of disease on the basis of exercise electrocardiography, myocardial perfusion assessment may subsequently stratify this group into subsets with low or high risk for major cardiac events in the future\(^30,31\). In particular, it appears reasonable to pursue further nuclear testing in patients with an intermediate risk post-exercise testing in whom the cardiac mortality rate is in the range of 1%-3\%\(^9,32\).

Finally, it should be added that as coronary artery disease may progress over time, particularly in the absence of intensive medical therapy, the low risk associated with a normal myocardial perfusion scan remains valid for no more than two years\(^1\).
The prognostic value of radionuclide methods in the selection of the therapeutic strategy in patients with chronic coronary artery disease

Published data demonstrated that catheterization rates closely parallel myocardial perfusion imaging results.33,34 Moreover, similar satisfactory outcomes with either medical or invasive strategy were reported in patients with non-extensive ischaemic heart disease, as assessed by myocardial perfusion scans.35 Myocardial perfusion imaging reliability was further strengthened by data demonstrating a low mortality rate in patients with severe ischaemic heart disease having undergone revascularization, as opposed to patients with extensive myocardial perfusion abnormalities and medically treated.36 In this remarkable publication both cardiac mortality rate and acute myocardial infarction risk, as a function of myocardial perfusion assessment, were also investigated. It was observed that patients with mild ischaemic heart disease were at intermediate risk for acute myocardial infarction (2.7% per year), whereas in patients with moderate or severe ischaemic heart disease the risk was high (2.9% and 4.2% per year respectively). Conversely, despite the fact that cardiac death rate was increased in patients with moderate or severe ischaemic heart disease (2.3% and 2.9% per year respectively), mild ischaemic heart disease was associated with a low mortality risk (0.8% per year). Finally, patients with normal or equivocally abnormal myocardial perfusion had a low annual risk for both cardiac death and myocardial infarction (0.3% and 0.5% respectively). On the basis of risk stratification by myocardial perfusion imaging, an optimized management strategy may be proposed for patients with intermediate or high likelihood of coronary artery disease before nuclear testing (Figure 1). Patients with moderate or severe myocardial perfusion abnormalities face a high risk for cardiac death per year; therefore, coronary angiography with consideration of revascularization is recommended, as the latter may improve their prognosis. Similar strategy is recommended in patients with refractory symptoms, despite intensive medical treatment. However, patients with mildly abnormal myocardial perfusion are at increased risk only for acute myocardial infarction (>1% per year); therefore, medical treatment may be the optimal therapy in this subset, as invasive procedures do not appear to reduce the risk of myocardial infarction.

Apparently, risk stratification by nuclear cardiology techniques may substantially affect the therapeutic management and the outcome of patients with coronary artery disease. In particular, myocardial perfusion assessment may identify patients in whom coronary revascularization may be beneficial, from others in whom invasive treatment does not improve their prognosis.36

Risk stratification after invasive revascularization

Despite the fact that nuclear tests may define the presence, location and severity of myocardial ischaemia before percutaneous coronary interventions, it has been noted that a substantial proportion of patients is not submitted even to exercise testing before the procedure. Indeed, it was reported that only 29% of patients having undergone percutaneous interventions had been previously submitted to an exercise tolerance test.37

Figure 1. Diagnostic and therapeutic strategy in patients with coronary artery disease, based on myocardial perfusion imaging (CAD: coronary artery disease, ECG: electrocardiography, MPI: myocardial perfusion imaging, MI: myocardial infarction).
Significant restenosis after percutaneous coronary interventions is not necessarily heralded by angina\(^3\). It has been demonstrated that myocardial perfusion assessment may accurately detect the presence of restenosis, regardless of whether recurrent symptoms are present\(^3\). Recent publications have suggested that myocardial perfusion imaging remains similarly effective in detecting restenosis in angioplasty with stent implantation\(^4\). Although few data exist on the prognostic value of radionuclide tests after percutaneous interventions, particularly in asymptomatic patients, it appears that an abnormal myocardial perfusion is associated with an increased cardiac event rate\(^3\).

In patients with single-vessel disease and angina or interpretable exercise electrocardiography before a percutaneous coronary procedure, post-intervention assessment may be based on symptoms and standard exercise testing. Myocardial perfusion imaging can be useful in multi-vessel disease in defining the culprit vessel and assessing the extent of ischaemia. In asymptomatic patients radionuclide testing 3-6 months after angioplasty is recommended\(^4\). Whenever moderate or severe myocardial ischaemia is detected, subsequent catheterization is the logical approach. Otherwise, repeat nuclear testing 1-2 years after the initial radionuclide assessment is recommended, similar to the management of chronic coronary artery disease.

It is known that by 10 years after coronary bypass surgery 75% of vein grafts are occluded or severely stenosed, whereas better results are achieved if internal mammary arteries are used\(^2\). Using a 5-year cutoff point after surgical revascularization, myocardial perfusion assessment has been shown to be particularly useful for the prediction of major cardiac events, even in patients with no symptoms\(^3\). The recommended strategy for the post-coronary surgery assessment, formed from a synthesis of up to date published reports, is as follows: When angina reoccurs at any time following coronary bypass surgery, myocardial perfusion imaging may be used, as it may define the presence of ischaemia and assess its extent. In addition, myocardial perfusion assessment is recommended 5 years after bypass surgery in all asymptomatic patients\(^5\). If myocardial perfusion scan shows an considerable area of induced ischaemia or ischaemic, albeit viable myocardium, further invasive treatment should be considered. In this setting, illustration of coronary anatomy is necessary to decide whether to proceed percutaneously or surgically.

### Risk stratification in acute coronary syndromes

Although the diagnosis of acute myocardial infarction is often straightforward, in many cases is not. Clinical presentation, electrocardiography and biochemistry are the main tools for the assessment. However, electrocardiography, for example, may not be diagnostic in one third of patients with acute myocardial infarction presenting in the emergency department, and a considerable proportion of patients with myocardial infarction may be missed\(^6\). It is therefore important to distinguish patients with non-diagnostic electrocardiograms who may benefit from early intervention, from those who do not require intensive care.

Published data have demonstrated that in chest pain units, where rapid investigation protocols are applied, a distinctly lower proportion of myocardial infarctions are missed (from 4% to 0.4%). In parallel, both the admission rate and the cost per patient are reduced\(^7,8\). Radionuclide methods may play a pivotal role in these units\(^9\). Interestingly, it has been found that even when troponin measurements are utilized, cardiac radionuclide imaging and enzyme tests provide complementary information\(^10\).

A resting \(^99\)mTc-MIBI study in patients presenting with chest pain and non-diagnostic electrocardiograms may predict a high likelihood for acute myocardial infarction, need for catheterization and primary revascularization, and final diagnosis of coronary artery disease\(^11\). Compiled data disclose an average sensitivity of 98% and a specificity of 69% in detecting acute coronary syndromes in patients with an abnormal resting myocardial perfusion\(^1\). It thus appears that a normal myocardial perfusion scan possesses a high negative predictive value, and in the absence of other compelling evidence these patients may be discharged or subsequently investigated for induced ischaemia with stress testing, with or without radionuclides.

The assessment of patients having suffered an acute coronary event is drawing particular attention. Guidelines suggest that in post-myocardial infarction patients with a low or intermediate clinical risk, exercise testing (without or preferably with perfusion imaging) may be effective in risk stratification, subsequent catheterization referral, and therapeutic decisions\(^12\). This recommendation for selective catheterization is based on several publications, among which the TIMI IIIB study is the most widely quoted\(^13\). Notably, radionuclide methods were not used in a
standardized manner in these studies. Recent results, with a standardized approach of nuclear cardiology techniques, have demonstrated that a similar selective catheterization strategy may be beneficial in patients with non-Q acute myocardial infarction. Interestingly, recently published data support invasive strategy in all patients with non-ST-elevation acute coronary syndromes. However, no risk stratification based on clinical markers was employed in this study. Moreover, the prognostic assessment in the conservative treatment group was based on any non-invasive modality available, without exclusively using the most effective test according to literature, namely myocardial perfusion imaging. With careful non-invasive risk stratification, that study might augment previous results.

Publications in the post-thrombolytic era (>1985), disputed the prognostic value of radionuclide methods. These studies, however, generally included low-risk patients, as high-risk patients tended to receive catheter-based management, many of them because of an abnormal myocardial perfusion result. Recent work suggested that myocardial perfusion imaging with pharmacological stress may be safely performed 2-4 days after an acute myocardial infarction, and it can separate patients at high or low risk for cardiac events. Furthermore, the prognostic significance of ejection fraction in post-myocardial infarction patients was demonstrated in a meta-analysis. It has also been shown that in patients having suffered a myocardial infarction, very early myocardial perfusion assessment with pharmacological stress can predict early and late cardiac events, with superior prognostic value compared to submaximal exercise testing. Adoption of this strategy may allow for management decisions to be made earlier in selected subsets of patients, with substantial cost savings associated with a shorter hospital stay. Moreover, recently published data support that a radionuclide guided selective catheterization strategy may be extended to patients with an intermediate to high risk after myocardial infarction.

One of the major dilemmas in patients with a myocardial infarction is the use and timing of cardiac catheterization. Currently, most post-myocardial infarction patients are routinely referred for coronary angiography. An alternative strategy, advocated by clinical guidelines, is to submit to catheterization patients with post-infarction angina, complex arrhythmias, or a low ejection fraction (<35%). In patients with an uncomplicated hospital course, a non-invasive approach is recommended to identify patients in whom catheter-based management may be decided (Figure 2). First, left ventricular function assessment is recommended, as it has been proven the most powerful variable for predicting cardiac death. Once ejection fraction is reasonably preserved (>35%), early myocardial perfusion assessment with pharmacological stress, performed 2-4 days after the index event, may provide considerable prognostic information and it may allow for early dis-
charge of low-risk patients\textsuperscript{64,67}. Patients at high risk are candidates for cardiac catheterization with consideration for early revascularization.

Assessment of myocardial viability

Several large trials have demonstrated that coronary artery bypass grafting may prolong survival in patients with multi-vessel disease and resting left ventricular dysfunction\textsuperscript{68,69}. However, as in these patients coronary surgery is associated with an increased risk, identifying patients expected to benefit from this intervention is of utmost importance; otherwise, patients should be candidates for heart transplantation\textsuperscript{70}. Indeed, published data have shown that in patients with left ventricular dysfunction and viable myocardium medical treatment is associated with reduced survival\textsuperscript{71}. Conversely, the outcome of patients with a low ejection fraction and a considerable area of viable myocardium is improved, if submitted to bypass surgery, compared to those managed medically\textsuperscript{72}. Nevertheless, myocardial viability assessment may be entangled by the difficulty in accurately evaluating the bypass surgery result; moreover, there is no unanimously approved criterion for this assessment. The conception of myocardial viability implies the presence of asynergic segments and it has been associated with stunning and hibernation.

Myocardial stunning may be due to a prolonged and severe ischaemic insult, with subsequent restoration of coronary flow, which is associated with reduction in contractile function of the affected segment\textsuperscript{73}. This may occur in the setting of an acute myocardial infarction with restoration of the vessel patency (spontaneous or therapeutic thrombolysis, primary revascularization). In these circumstances, myocardial perfusion imaging with resting injection of the tracer, is normal or almost normal in the asynergic segment. Whether induced ischaemia may appear at stress depends on the presence of a significant stenotic lesion in the insult-related artery. These findings are consistent with improvement of regional wall motion over time. If stunning occurs after prolonged exercise in the presence of a high-grade coronary stenosis, resting myocardial perfusion is normal. However, marked perfusion defects and focal asynergy appear during exercise\textsuperscript{74}. In these patients revascularization offers a high probability of improvement in exercise coronary flow and segmental contractility, as well as post-exercise regional wall motion.

In myocardial hibernation functional down-regulation follows long-standing reduction of blood flow\textsuperscript{69,75}. In these cases, myocardial perfusion with resting injection of the tracer is mildly to severely reduced\textsuperscript{76}. In delayed imaging (rest-redistribution \textsuperscript{201}TI study) improvement of the initial defect is expected. Conversely, at stress a greater degree of reduction in perfusion would appear (stress-rest study). Myocardial segments with defect resolution in delayed imaging, namely reversible defects, or with reduced uptake of the perfusion tracer, albeit >50\% of the maximal, are considered viable\textsuperscript{76}. This is associated with an increased likelihood of left ventricular function improvement with revascularization\textsuperscript{76}. Certainly, dobutamine echocardiography may detect contractile reserve in hibernating segments, which has also been reported to predict improvement in left ventricular function after revascularization\textsuperscript{77}.

Notably, improvement of the left ventricular ejection fraction was observed in one third of patients having undergone revascularization, 2 to 3 months after the procedure\textsuperscript{1}. However, it is not known whether this result is sustained at e.g. 12 months, or if a different proportion of patients have improved, similar, or reduced ejection fraction. From only few available published data, the hypothesis that the beneficial result of revascularization is due to left ventricular function improvement cannot be supported\textsuperscript{78,79}. In fact, in an interesting report it was observed that prolonged survival in patients with left ventricular dysfunction and submitted to bypass surgery was not associated with a change in their ejection fraction\textsuperscript{80}. It thus appears that the reversibility of left ventricular dysfunction, namely improvement of the ejection fraction, may not be a reliable basis for the assessment of myocardial viability, as no data document this hypothesis\textsuperscript{78,80,81}. On the other hand, clinical outcome taken as viability criterion, that is prolonged survival and improved quality of life, regardless of potential increase in ejection fraction, a substantial body of evidence shows that bypass grafting may be beneficial in patients with left ventricular dysfunction in the presence of viable myocardium\textsuperscript{81,82}. This may be due to limitation of the ischaemic substrate, which may reduce the likelihood of severe arrhythmias or acute ischaemic events, or in favorable remodeling of the left ventricle. It is also worth mentioning that a considerable area of viable myocardium (>20\%-30\% of myocardial outline in various modalities) should be present to expect improved outcome after revascularization.
Finally, with prolonged survival and improvement in quality of life as criteria, no convincing data document that the presence of contractile reserve in asynergic myocardial segments, as assessed by dobutamine echocardiography, may reliably predict the clinical outcome after revascularization.

Cost-effective implications

Several reports have demonstrated that radionuclide methods may contribute in substantially reducing the cost of diagnosis, follow-up, hospitalization, and therapeutic management of patients with coronary artery disease. A 17% reduction in catheterization rates and cost savings ranging from 22% to 55% have been reported when coronary angiography was limited to patients with moderate or severe ischaemic heart disease. In a large multi-center trial, comparing a direct cardiac catheterization approach to a selective catheterization strategy, based on myocardial perfusion assessment, in patients with chronic stable angina, a substantial reduction in both the early (diagnostic) and follow-up costs was found, ranging from 31% to 50%. Moreover, the selective catheterization strategy was associated with a reduced rate of revascularization by 50%, whereas the outcome was identical in both groups of patients. Similar cost savings, ranging from 20% to 57% per patient, have been reported with resting $^{99m}$Tc-MIBI SPECT imaging used in patients presenting with chest pain, as both the admission rate and hospital stay may be reduced.

Positron emission imaging and other non-invasive modalities

For purposes of completeness, it is mentioned that positron emission tomography (PET) is considered the optimal nuclear technique for the investigation of coronary artery disease. Several studies underscore the usefulness of PET, mainly in myocardial viability assessment. However, up to date reports do not show an unequivocal advantage of PET over conventional nuclear cardiology techniques in routine clinical practice. Wide clinical approval of other competitive non-invasive modalities, such as stress echocardiography, magnetic resonance imaging, and electron beam computerized tomography, is not supported by a large data basis, as yet. Conversely, nuclear cardiology has been successfully tested for many years and a substantial body of evidence strongly supports its clinical usefulness in patients with coronary artery disease.

Conclusion

A large body of evidence documents that nuclear methods are highly effective in the prognostic assessment and the therapeutic management of patients with coronary artery disease. The greatest incremental information for risk stratification is provided in patients with intermediate or high likelihood of coronary artery disease, which signifies that the application field of radionuclide techniques is expanded, compared to their diagnostic utility. The favorable cost-effectiveness ratio with routine nuclear cardiology use in clinical practice is particularly emphasized.

Nuclear tests effectively identify patients with coronary artery disease who may benefit from revascularization, from others in whom medical treatment may be the optimal therapeutic strategy. Thus, nuclear cardiology methods allow for the non-invasive selection of the appropriate treatment, particularly when symptoms are not the principal therapeutic criterion. Moreover, radionuclides may limit the routine diagnostic or prognostic use of coronary angiography, ideally referring for catheterization only patients in whom knowledge of coronary anatomy is necessary in the consideration of interventional revascularization.

All these are consistent with the current medical environment featured by cost-effectiveness considerations, significant advances in medical treatment, enrichment of therapeutic options, and realization of overuse of invasive procedures in patients with coronary artery disease.

References


