Editorial

Clinical Need for Evaluation of Ischemia

Necesidad clínica de evaluación de la isquemia

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In the setting of patients with known ischemic heart disease, clinical management depends on ruling out active disease, i.e.
ischemia, or on the correct decision for appropriate therapy.1 The
former requires a test with high negative predictive value on a per
patient basis while the latter involves a quantitative test with
high positive predictive value on a per segment basis (as tested in
a high prevalence population).

Therapy (either with medication, percutaneous coronary
intervention or surgery) is warranted to: a) treat symptoms, or
b) improve prognosis, i.e. to reduce the risk of coronary events and
sudden death.2

The identification of unstable coronary plaques could become
more important in the future, when targeted therapy of such
plaques becomes available and treatment can be shown to
improve prognosis. Until such treatment and evidence become
available, plaque imaging is a very important and challenging
research tool, but has no immediate role to play in clinical practice.

Prognosis is related to the presence and extent of ischemia,
including silent ischemia, and the specific substrate for arrhythmic
events. The latter could be related to ongoing ischemia and/or
the co-existence of scar and normal myocardium in the border zone of
a previous myocardial infarction.

The extent of ischemia is important since the choice of
revascularisation vs medication depends on the presence of more
or less than 15% of ischemic myocardium3: quantification of ischemia is therefore required to make correct therapeutic choices.

The extent of ischemia and its quantification is also relevant in
view of the very poor prognosis of left main and 3-vessel disease,
which influences this negative prognosis through the presence of
extensive ischemia.

Ischemia imaging is thus warranted in the setting of patients
with an intermediate pre-test probability on the basis of non-
invasive risk stratification with history, clinical examination,
resting function and electrocardiogram exercise testing. In these
patients, various imaging modalities (echocardiography, nuclear,
cardiocvascular magnetic resonance, computed tomography) and
stressors (exercise, dobutamine, vasodilatation) can be used.4

More recently it has become evident that acute coronary
syndromes are at least in part (and probably in the majority of
cases) related to ischemia causing lesions,5,6 rather than to less
than 50% lesions as was previously presumed.7,8

Lesions could, therefore, also prevent acute coronary syndromes,
but this remains to be proven.

In the present setting of economic constraints, stakeholders i.e.
the citizens paying directly or indirectly for these imaging
examinations, request evidence showing a benefit when using
these technologies and we need to ask whether such use of an
imaging test changes patient management and possibly outcome.
In contrast to what is required for medication to enter the
“market”, medical technology has far fewer regulatory steps and,
apart from limited evidence on safety, no additional proof of
efficacy is needed, let alone the requirement to show an added
value over other existing techniques. In the “hierarchy” of
diagnostic efficacy described by Fryback and Thornbury,9 most
medical imaging technologies only reach level 2 or 3:

- Level 1: Technical quality of the images.
- Level 2: Diagnostic accuracy, sensitivity and specificity of the
  images.
- Level 3: Degree to which the results influence physicians’
diagnostic thinking: prognosis.
- Level 4: Degree to which imaging results affect patient
  management.
- Level 5: Efficacy studies that measure the degree of effect on
  patient management.
- Level 6: Analyses of societal costs and benefits of a diagnostic
  imaging technology.

Both clinicians and industry should work together to provide
evidence reaching at least level 4 or 5 and preferably 6. Only then
we can avoid a blind limitation in the use of imaging in ischemic
heart disease and in cardiology in general.

The choice of one imaging technology over another, i.e.
echocardiography vs nuclear vs cardiovascular magnetic
resonance or computed tomography to substantiate and quantify
ischemia, mainly depends on the experience of the center
involved1: there is no definite evidence to prefer one over the
other but one should use what one knows best, where one has
experience and knows one’s limitations.10

In contrast, there is ample evidence that the information which
emerges from imaging studies is not always translated into
appropriate patient management,11 i.e. the presence or absence
of significant ischemia should be converted in either a revascu-
larization strategy or conversely in an abstinence of further
invasive procedures, let alone revascularization. In real practice,
some patients with ischemia are not appropriately treated by

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percutaneous coronary intervention or coronary artery bypass graft, while patients without evidence of ischemia are routinely catheterized and sometimes revascularized (without substantiation of a decreased fractional flow reserve).

CONFLICTS OF INTEREST

None declared.

REFERENCES