make them the preferred choice. The importance of biochemical classification for prognosis is now clearly established, with the weight of current evidence again supporting the use particularly of troponins, although the admission ECG remains of independent predictive value as demonstrated both in this study and others.

It is indeed time for a change in the epidemiological classification of acute myocardial infarction. Optimum initial ECG assessment with optimum biochemical quantification are the key elements required.

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Comprehensive cardiac rehabilitation: an issue to be readdressed

See pages 1465 and 1473 for the article to which this Editorial refers

A multifactorial and multidisciplinary approach is imperative nowadays in order to meet the challenges of reducing the progression of coronary disease, the rate of cardiovascular events and of improving the quality of life in patients with proven coronary artery disease. According to meta-analytical data from more than 4000 patients, cardiac rehabilitation attained a reduction in cardiac and overall mortality of about 25% during a 3-year follow-up period\[1\].

A crucial point is not to consider cardiac rehabilitation as exercise training, but as a programme based on the individual’s requirements, aiming at the improvement of the quantity and quality of life by means of: reduction (or abolition, when possible) of the classical risk factors, such as smoking and cholesterol levels, modification of dietary habits, increase and maintenance of endurance training, psychological support, and guidance on returning to work.

A problem that health care systems are facing in all developed countries is the exponential increase of the ageing population. At the beginning of cardiac rehabilitation, the referral of elderly patients to cardiac rehabilitation programmes was considered as contraindicated. In contrast, in the current issue of the journal Stahle et al\[2\] provide very appropriate data on the value of cardiac rehabilitation in patients above the age of 65 years, demonstrating a positive influence of cardiac rehabilitation on exercise capacity and quality of life (better feelings of well-being and performance of daily activities).

According to previous data\[3\], the initial gain is partially lost at mid-long term if the scheduled programme is limited to the initial period (12 weeks in this study) after the index coronary event. This is particularly relevant in the elderly, whose physical activity is ‘naturally’ less than patients below the age of 65 years; therefore, continued organized training seems even more relevant for the preservation of the initial success. To further underscore this concept, we should remember that Oldridge et al\[4\] have
demonstrated that the positive influence on mortality of cardiac rehabilitation is strongly influenced by the continuation of the programme beyond the usual 8–12 weeks.

The capacity to adjust the type of exercise programme appropriately (hospital supervised training, supervised exercise training, spontaneous activity) according to risk stratification on entry to the programme, family and social support and individual motivation should be utilized to tailor the programme to each individual and optimize medical resources without jeopardizing the patient’s outcome. Finally, greater participation by older women should be encouraged in cardiac rehabilitation programmes; they have been reported to benefit from cardiac rehabilitation, but under-use it[4].

There are very few papers on comprehensive cardiac rehabilitation after PTCA. Cultural and logistic procedure-related factors may explain the low rate of PTCA patients involved in cardiac rehabilitation programmes. Immediate achievement of well-being, the limited length of stay in hospital, the ‘mechanics’ of solving the problem of coronary narrowings (if you have resolved it you have gained the patient’s health) together with different reimbursement strategies of medical care systems (i.e. in some countries cardiac rehabilitation is mandatory after myocardial infarction and CABG and is reimbursed by retirement funds, but not after PTCA) are some reasons why a limited number of patients join a formal cardiac rehabilitation programme after angioplasty as part of their overall follow-up.

Hofman-Bang et al.[5] point out in this issue that a structured, intensive intervention (4 weeks of residential rehabilitation) tends to reduce cardiovascular events up to the second year after PTCA (with a consensual reduction of need for re-hospitalizations). These data are encouraging, and the hypothesis of a favourable effect of cardiac rehabilitation on the restenosis rate and atherosclerosis progression should be tested in a large group.

Unfortunately, only 57.5% of patients in this study agreed to follow the cardiac rehabilitation programme and this bias in the selection of patients is probably the major problem of cardiac rehabilitation after PTCA and in general. For instance, it is reported that less than 5% of patients are included in cardiac rehabilitation programmes after a cardiac event in the U.S.A.[6]. On the other hand, it is also probably true that standard rehabilitation programmes, and not residential programmes do not suit most patients after PTCA. Therefore, the need for reassessing some protocols (less resource-demanding and more flexible to allow long-term patient adherence and mid-course corrections, strongly oriented to secondary prevention) is a primary goal in this group of patients; appropriate trials to test these new educational experiences are undoubtedly required.

Is cardiac rehabilitation ready for prime time? It is known that an improvement of physical fitness is associated to a lower risk of mortality in healthy and unhealthy men[7]. In addition, cardiovascular event rates in patients with coronary artery disease is 5–7 fold that in patients with the same risk profile but without evidence of coronary artery disease[8] and that cardiac rehabilitation, defined as a multifactorial intervention, has been proven to attain a significant reduction in coronary event rates, and has also improved quality of life. Comprehensive cardiac rehabilitation is certainly an appropriate modality of care. The data in the present issue suggest that subgroups, generally not exposed to a formal cardiac rehabilitation programme, such as the elderly and patients after PTCA, benefit from such programmes.

We feel that the role of comprehensive cardiac rehabilitation should be strengthened in the future, because of the progressive change of the population, the increasingly favourable effects obtainable by strict secondary prevention follow-up, and the increasing demand for a better quality of life.

In order to monitor the indications for cardiac rehabilitation, to assess and compare the populations chosen and the methods used, to follow the type and quality of care, the use of resources and the clinical outcome, the implementation of multi-national databases seem a desirable tool, in addition to planning larger controlled clinical trials.

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Stress echocardiography results in context

See page 1485 for the article to which this Editorial refers

Chest discomfort, which may or may not signify ischaemic heart disease, is extremely common. The prevalence and significance of ischaemic heart disease makes its recognition of paramount importance to physicians and patients alike. Even in the age of coronary intervention, a careful clinical history is acknowledged as the best way to recognize those with ischaemic heart disease. Talking to the patient is the best initial ‘screening test’, but physicians often use additional tests.

In this issue an experienced group of investigators from Aachen report their study of parameters derived from dobutamine stress echocardiography[1]. It is notable this study did not end the stress test on the basis of finding a single new wall motion abnormality. Deterioration of wall motion in more than three segments was required as one of the end-points. This study demonstrates that increased extent and severity of induced wall motion abnormalities during stress echocardiography result in higher positive predictive accuracy compared to less extensive or severe abnormalities. Specifically, deterioration in wall motion by one grade in a single segment gave a positive predictive value of 85% compared to angiographic findings. If the deterioration by one grade occurred in two or more segments the positive predictive value was 90% and it was 94% for three or four segments. Deterioration of wall motion by two grades in a single segment had a positive predictive value of 96%. The authors make the appropriate recommendation that ‘... the degree of positivity should be reported in clinical practice'[1].

Many laboratories now do this in an informal way; they present graphic representations of wall segments with each segment graded for normal motion, hypokinesis, akinesis, and dyskinesis. The study from Aachen is welcome as it formalizes and quantitates this practice. Additionally, however, the authors highlight some of the test parameters associated with reduced sensitivity or specificity. They suggest it is desirable to have the heart rate greater than 85% of the predicted maximal level. Interestingly, the use of atropine to achieve this goal occurred more often in those with a false-negative test results compared to those with true-positive result. Does this mean that atropine causes false-negative tests? Patients with chronotropic incompetence, achieving less than 85% of the predicted maximum rate, are more likely to be missed because their threshold for ischaemia has not been reached[2]. Patients who do not respond ‘appropriately’ with increased heart rate may have more severe and complex abnormalities compared with those achieving higher heart rates for the same exercise or pharmacological stress[3]. The authors have not given much attention to the relatively recent observations that chronotropic incompetence per se is a predictor of more severe coronary ischaemia and also of all-cause mortality[4]. Thus it is important to recognize and give special attention to an inadequate heart rate response to stress.

While this article is extremely valuable, it is necessary to point out a few issues that are unavoidable. Several categories of patients were excluded including those with Q wave myocardial infarction, congestive heart failure, cardiomyopathy, and some other features. Thus, it is a set limited to those...