European Heart Journal Supplements (2020) **22** (Supplement E), E153–E156
The Heart of the Matter
doi:10.1093/eurheartj/suaa082

ESC
European Society
of Cardiology

Prevention after acute coronary syndrome the 'less is more' philosophy

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KEYWORDS
Chronic coronary disease ;
Secondary prevention ;
Non-invasive clinical testing

In the cardiology field, in recent years, we have witnessed an exponential increase in the use of both invasive and non-invasive instrument diagnostics. Particularly after an acute coronary syndrome, instrumental examinations, especially non-invasive ones, are often prescribed inappropriately until they almost completely replace the clinical evaluation. Their correct use, on the contrary, would require the choice of a test to be prescribed according to the epidemiological and clinical context of the individual patient. The strategy of early diagnosis, obtainable through instrumental screening and borrowed from oncological pathologies, was transferred 'tout court' in the cardiovascular field without any scientific basis, replacing the pharmacological or non-pharmacological intervention, such as the appropriate lifestyle, aimed at reducing cardiovascular risk factors. The guidelines of the main scientific societies define the most appropriate paths in the management of the coronary heart disease patients, both in the immediate post-acute phase and in the chronic phase. Although the guidelines sometimes show an excessive simplification of clinical problems, in an age in which the control of health expenditure has become a priority the correctness of the indications is an indispensable objective, being incontrovertible that a test is indicated only when an instrumental examination is able to modify the diagnostic-therapeutic path and the outcome of the patient.

Introduction

The management of the patient who has passed the intra-hospital phase of an acute coronary syndrome (ACS) is a complex process that requires flexible organizational structures and specific competences able to determine an optimal control of cardiovascular risk factors, to favour the timely taking of pharmacology treatments recommended, and adherence to the same, and to correct lifestyles in the medium-long term, as well as to plan a 'personalized' clinical-instrumental follow-up based on the individual risk profile. The objectives of this approach are represented by an improvement in prognosis, with a reduction in the incidence of new fatal and non-fatal cardiovascular events, and the evolution towards heart failure, with a consequent reduction in hospitalizations and health costs.

Patients discharged after ACS should, therefore, be directed to care pathways, especially in the first year, calibrated to the level of individual risk and not in a standardized way and equal for all. To achieve this goal, it is necessary to establish immediately a clear hierarchy among the variables with documented prognostic value after an ACS. The traditional risk factors retain an undoubted value but their long-term predictive ability is lower than the parameters correlated with the damage suffered by the left ventricle during the acute episode or with the risk of new coronary events. In a recent national document, the cornerstones of prognostic stratification after ACS were first identified in left ventricular dysfunction, heart failure, and its predictors and, secondly, in the accurate assessment of ischaemic recurrence risk, otherwise known as thrombotic risk.[1] Consequently, after having correctly

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framed the risk profile, the patient should be directed to the path most appropriate to him. A more recent national inter-societies document has outlined an ideal clinical-instrumental follow-up focused on the first year after the acute event.[2] For patients at high risk, that is, who underwent percutaneous revascularization (PCI) for ACS with a reduced ejection fraction (<45%) or with symptoms of heart failure, a rehabilitation course should always be considered after discharge from the acute phase. In stable patients, a cardiac examination with an ECG and an echocardiogram should, in any case, be carried out at least at 3 and 12 months, and subsequently on the basis of clinical evolution. In diabetic patients with left ventricular dysfunction, an annual echocardiogram can be considered even if the patients are clinically stable. The execution of a stress test must always be evaluated based on the clinical/angiographic features.

In revascularized patients with ACS without left ventricular dysfunction and/or acute decompensation but with diabetes mellitus, multivessel disease, left main and/or proximal anterior descent disease, or with incomplete or suboptimal revascularization a cardiac examination with ECG should be provided at 6 months and 1 year and then annually. Routine echocardiographic examination is not recommended in asymptomatic patients without residual ventricular dysfunction. A 3-month stress test may be indicated in case of incomplete revascularization or suboptimal PCI result and should be repeated annually thereafter.

In patients with complete revascularization, without left ventricular dysfunction and without significant comorbidities, i.e. at low risk, routine echocardiographic examination is not indicated. If stable, these patients should only undergo cardiac examination with ECG within 12 months (not routinely recommended later). A stress test is not recommended within the first year in stable patients.

Doing more does not mean doing better

In recent years, a growing use of diagnostic methods and therapeutic interventions has been observed in the medical and especially cardiology field. However, a significant share appears inappropriate, that is, potentially redundant, dangerous, costly, and of little use.

The problem is common to all industrialized countries. The USA, for example, has the most technologically advanced healthcare system in the world. Although they spend much more on health care than any other country, indicators, such as life expectancy and child mortality, have lower results than countries that spend much less. In seeking an answer as to why the performance of their huge investments in health care is not better, it emerged that hundreds of billions of dollars are wasted each year on health care costs that do not contribute to the well-being of patients.[3] This has given rise to a growing recognition among doctors that many patients receive excessive (and in some ways useless) healthcare. Avoidable treatments are often linked to beliefs that individuals, including the medical profession, tend to maintain despite evidence that should lead to at least contradictory or more nuanced beliefs. Some examples of this wrong way of thinking are the beliefs that advanced technology is always good, that new technologies are always better than older technologies, and that uncertainty in the medical field is unacceptable and should be excluded at any cost.

From the beginning of the new millennium, a series of documents including the 'Medical Professionalism in the New Millennium: A Physician Charter,[4] issued in 2002, the Putting the Charter into Practice program of the American Board of Internal Medicine (ABIM) Foundation of 2009, and the series of articles by *JAMA* 'Less Is More'[5] have provided doctors with some indications to tackle the hyperprescription in healthcare. In 2010, the ABIM Foundation campaign 'Choosing Wisely'[6] was also launched. As part of Choosing Wisely, each participating scientific organization has created Things Physicians and Patients Should Question lists, which provide specific, evidence-based recommendations that doctors and patients should discuss to make their choices on the most appropriate individual care. In Italy, Slow Medicine launched the analogous campaign 'Doing more does not mean doing better' to which the National Association of Hospital Cardiologists (ANMCO) has joined. An *ad hoc* working group has prepared a list of five cardiology procedures whose routine use seems inappropriate in our country.[7] Not surprisingly, most of these inappropriate procedures concern chronic ischaemic heart disease (*Table 1*).

The follow-up strategies in patients with chronic ischaemic heart disease are in fact extremely heterogeneous and, unfortunately, often incorrect. Low-risk patients are often subjected to periodic clinical evaluations and useless non-invasive examinations, while paradoxically patients at higher risk are less likely to access serious clinical and instrumental controls.[8,9] In fact, even in Italy, as in many countries with high technology, many investigations, especially non-invasive tests, are often inappropriately prescribed to almost completely (and inappropriately) replace the clinical evaluation. A recent analysis of administrative data in 224 American hospitals has clearly documented that there is a wide variability in the use of non-invasive cardiac imaging in patients with suspected ischaemia.[8] However, hospitals with higher imaging utilization did not have a consequent different therapeutic approach or lower percentages of new ACS admissions. In this sense, the latest European guidelines do not help to clarify as the subject is only marginally addressed.[10]

Precisely in the logic of limiting inappropriate tests prescriptions in our country, a document from the ANMCO Prevention Area[11] and a national inter-company cardiology consent document[12] have provided precise indications in the last few years on the timing of instrumental investigations plus follow-up requests of the chronic cardiac patient with the aim, above all, of highlighting what we can do without losing diagnostic/therapeutic accuracy. In summary, for resting echocardiography, outside the time window of the first year after ACS (of which we have already discussed above, and in which it is useful to repeat the echocardiography to monitor the systolic–diastolic function and the evolution of remodelling) echocardiographic examination, especially on an annual basis, is not useful in patients with clinically stable chronic ischaemic heart

Table 1 Inappropriate diagnostic investigations in patients with stable coronary heart disease

1. Do not request routine echocardiography in patients with mild to moderate valvulopathy or left ventricular dysfunction, in the absence of new symptoms, signs or clinical events.
2. Do not routinely request exercise electrocardiographic testing in asymptomatic patients after surgical or percutaneous revascularization.
3. Do not request Holter ECG in patients with exertional chest pain who are able to perform exercise testing, unless there is also suspicion of arrhythmias.
4. Do not request stress imaging in the initial evaluation phase of suspected ischaemic heart disease.
5. Do not request exercise electrocardiographic testing for screening for ischaemic heart disease in asymptomatic patients at low cardiovascular risk.

Adapted from Ref.[7]

disease, with no history of left ventricular systolic and diastolic dysfunction and with unchanged ECG. Repetition of the routine exercise test (<2 years from the previous test) is not indicated in patients without symptom changes. After revascularization with PCI it is not useful to repeat the routine ischaemia induction test (<2 years after PCI) except in cases where the revascularization has been incomplete or new symptoms have appeared. If the patient with ACS had undergone revascularization with coronary artery bypass grafting (CABG) it is not recommended to perform the routine ischaemia induction test (<5 years after revascularization) except in cases where the revascularization was incomplete or new appearance of symptoms. The indications in the timing of the execution of eco-stress or myocardial scintigraphy are the same as for the exercise test: in the absence of changes in symptoms the routine repetition of the examination should not be performed in the stable patient before 2 years from the previous investigation, especially if the previous test was negative or weakly positive, neither before 2 years from PCI nor before 5 years from CABG with complete revascularization. Coronary computed tomography (CT) angiography is not indicated in patients with chronic ischaemic heart disease, stable at follow-up. There is no use in repeating the CT angiography in the patient previously subjected to revascularization with CABG before 5 years after the operation if asymptomatic or in the patient subjected to previous PCI with stent implantation before 2 years. In the presence of suspected ischaemic or ischaemic equivalent symptoms, angio-CT can be used to check graft patency. Finally, coronary CT angio may be indicated in the case of a previous positive or questionable test for the induction of ischaemia or onset/worsening of symptoms and normal exercise tests.

The timeless appeal of angioplasty in-stable angina

In line with the results of randomized studies[13] and authoritative meta-analyses[14] that showed that an aggressive approach with PCI compared to optimal medical therapy in chronic ischaemic heart disease (CAD) alone does not reduce cardiac adverse events and even less mortality, the guidelines rightly recommended optimal medical therapy as an initial approach to managing these patients.[10] However, in contrast to expectations, even after the publication of the meta-analyses and guidelines, a wide under-utilization of optimal medical therapy became apparent in patients with stable CAD sent to PCI.[15] It is not easy to understand why there is a divergence between scientific evidence, even recent,[16] and the belief that PCI is associated with a great benefit in terms of reduction of events and cardiovascular mortality in the patient with stable CAD. In a US study, it was shown that few cardiologists discuss the evidence-based benefits of coronary angiography and PCI in stable CAD with their patients and some implicitly or explicitly overestimate the benefits.[17]

Conclusions

In recent years, there has been an exponential increase in the use of both invasive and non-invasive instrumental diagnostics in cardiology, particularly in chronic ischaemic heart disease. Instrumental examinations, especially non-invasive ones, are often prescribed inappropriately. When investigations involve exposure to ionizing radiation, it is important to consider also the real biological risk for the patient who grows exponentially in the case of multiple investigations. On the other hand, there is no single proof that the indiscriminate and repetitive use of diagnostic investigations can improve the outcome, or prevent cardiovascular events. Among patients undergoing imaging tests, about one-sixth of the cases does not take adequate therapy and frequently no therapy changes are made at the end of the diagnostic procedure. The appropriateness of the indications, therefore, appears to be a priority objective. It is important to take note of diagnostic investigations that, in secondary cardiovascular prevention, do not make any contribution to patient management in order to optimize available resources, contain expenditure and reduce inappropriate investigations by instead enhancing the paths recognized as more efficient.

Conflict of interest: none declared.

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