The management of acute coronary syndromes: towards optimal treatment of STEMI and non-STEMI

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In spite of all the progress made over the last decades, the management of acute coronary syndromes remains an important issue as they continue to be responsible for most of the morbidity and mortality in cardiovascular medicine. Acute coronary syndromes encompass ST-elevation (STEMI) and non-ST-elevation myocardial infarction (non-STEMI) as well as unstable angina. Today, patients with STEMI are treated urgently and effectively by primary percutaneous coronary interventions (pPCIs) in most countries. An issue that remains to be resolved is the management of STEMI patients with coronary lesions in the non-infarct-related artery. In the Editor’s Page ‘Multivessel revascularization in ST-segment elevation myocardial infarction: where do we stand?’, Thomas F. Lüscher and Ronald Binder from the University Hospital of Zurich point out that it still remains unclear whether a multivessel intervention at the time of first presentation with or without the use of fractional flow reserve determinations, a staged procedure, or wait and see is the most appropriate approach to such patients. Based on current available evidence, they propose an algorithm for patients with STEMI and multivessel disease, but point out that additional trials are required to refine further the management of these patients that are at high risk.

The most recent progress made in the field of acute coronary syndromes is thoroughly reviewed by Gilles Montalescot of the Pitié-Salpêtrière University Hospital in Paris, France in their article ‘The year in cardiology 2015: acute coronary syndromes’. Stents, and in particular drug-eluting stents, have revolutionized interventional cardiology. However, the currently used metallic stents cast the coronary segment, permanently preventing coronary vasomotion, may not be fully endothelialized, may be a source of thrombus formation, and may also prevent future bypass surgery. To that end, bioabsorbable stents have been developed and used primarily in patients with stable angina. However, due to the large struts, operators remained afraid of an increased rate to acute and late stent thrombosis. Patients with STEMI feature thrombus-rich lesions with a large necrotic core, which are associated with delayed healing and impaired stent-related outcomes. The use of bioresorbable vascular scaffolds (Absorb) has the potential to overcome these limitations owing to restoration of the native vessel lumen and physiology in the long term. In an ESC FAST TRACK entitled ‘Everolimus-eluting bioresorbable stent vs. durable polymer everolimus-eluting metallic stent in patients with ST-segment elevation myocardial infarction: results of the randomized ABSORB-STEMI TROFI II trial’, Patrick W. Serruys from the International Centre for Cardiovascular Health at the Imperial College in London reports the results of the TROFI II trial that investigated arterial healing in the short term, as a surrogate for safety and efficacy, in 191 STEMI patients receiving either a bioabsorbable Absorb or a metallic everolimus-eluting stent. At 6 months, the healing score was lower with the Absorb compared with the everolimus-eluting stent. The device-oriented composite endpoint was also comparably low between groups. One case of definite subacute thrombosis occurred in the Absorb arm, but none in the everolimus-eluting stent arm. The authors conclude that stenting of culprit lesions with Absorb in the setting of STEMI resulted in a nearly complete arterial healing which was comparable with that of metallic everolimus-eluting stents at 6 months. These findings provide the basis for further exploration in clinically oriented outcome trials, a conclusion that is critically discussed in an Editorial by Michael Joner from the CVPath Institute Inc. in Gaithersburg, Maryland.

In patients with chest pain, morphine is highly recommended by most guidelines as an effective remedy. Furthermore, most patients with anginal pain receive aspirin and a P2Y12 receptor inhibitor. Of note, a drug–drug interaction between morphine and oral P2Y12 receptor inhibitors has been suspected. In a FAST TRACK paper entitled ‘Morphine delays and attenuates ticagrelor exposure and action in patients with myocardial infarction: the randomized, double-blind, placebo-controlled IMPRESSION trial’, Piotr Adamski and colleagues from the Nicolaus Copernicus University in Bydgoszcz, Poland assessed the influence of i.v. morphine on pharmacokinetics and pharmacodynamics of ticagrelor and its active metabolite AR-C124910XX in 70 acute coronary syndrome patients randomized to either 5 mg of i.v. morphine or placebo, followed by 180 mg of ticagrelor. Morphine significantly lowered the total exposure to ticagrelor and its active metabolite by 36% and 37%, respectively, with a concomitant delay in maximal plasma concentration of ticagrelor of 4 h vs. 2 h with placebo. Platelet reactivity showed a stronger antiplatelet effect of...
ticagrelor in the placebo compared with the morphine group. The clinical implications of these novel findings are critically discussed in an Editorial by Dan Atar from the Oslo University Hospital in Norway. 16

In spite of the widespread use of pPCI, many patients with acute coronary syndrome are left with some degree of left ventricular dysfunction that may lead to remodelling 17 and eventually heart failure. 19 Cell-based therapy raised high hopes in this context. 21 Indeed, some, 22 but not all, clinical trials 23 suggest that intracoronary delivery of autologous bone marrow mononuclear cells early after STEMI may slightly improve left ventricular function. In the clinical research paper entitled “A randomized double-blind control study of early intracoronary autologous bone marrow cell infusion in acute myocardial infarction: the REGENER-ATE-AMI clinical trial,” Anthony Mathur and colleagues from the Queen Mary University of London sought to determine in 100 patients with STEMI whether intracoronary autologous bone marrow mononuclear cells when delivered within 24 h of successful reperfusion will improve left ventricular function. At 1 year, left ventricular ejection fraction increased when compared with baseline in both groups. However, the between-group difference favouring bone marrow mononuclear cells was only 2.2%. Nevertheless, the myocardial salvage index was significantly greater in those treated with bone marrow mononuclear cells. The authors conclude that early infusion of intracoronary bone marrow mononuclear cells following pPCI in anterior STEMI with regional wall motion abnormality is critically discussed in depth in an Editorial by Samer Mansour from the Centre Hospitalier de l’Université de Montréal in Quebec, Canada. 25

With all the progress made in the management of acute coronary syndromes, regularly updated guidelines for practising clinicians are very important. The editors of the European Heart Journal are therefore proud to present the ‘2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation’ 26 in this issue. As the guideline is very complete and comprehensive, the Ten Commandments of this year’s version are summarized as a take-home message for fast readers in the CardO Pulse section of this issue.

The editors hope that this issue of the European Heart Journal will be of interest to its readers.

References
7. Sato T, Abdel-Wahab M, Richard G. Very late thrombosis observed on optical coherence tomography 26 months after the implantation of a polymer-based biolimus eluting vascular scaffold. Eur Heart J 2015;36:1273.


25. Mansour S. Autologous bone marrow mononuclear stem cells for acute myocardial infarction: is it only about time? *Eur Heart J* 2016; 37: 264–266.