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Primary PCI: how can we improve outcome?

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The outcome of patients with ST-elevation myocardial infarction (STEMI) has improved during the last decades. Interventional cardiologists have contributed to this success story with the introduction and fine tuning of primary percutaneous coronary intervention (PCI) and by optimising the adjunctive medical therapy. According to European and US Guidelines, primary PCI is a IA recommendation in patients with STEMI if it can be performed by an experienced team within 90-120 minutes after first medical contact[1-3]. However, improving outcomes in STEMI patients is not all about using the best tools and skills in the catheterisation laboratory. Another important goal is to improve pre-hospital logistics, and guidelines therefore recommend the establishment of STEMI centres focusing on early pre-hospital diagnosis and immediate transfer in order to reduce time delays[1-3]. System delay is related to outcomes such as heart failure[4] and mortality[5]. Furthermore, optimal pre-hospital, periprocedural and post-interventional medical therapy is important. We should run awareness programmes and educate our patients and the population to adopt a healthy lifestyle and a better understanding of cardiovascular disease. This will hopefully urge future patients to call a common phone number in case of symptoms indicating myocardial infarction, thus reducing patient delay.

However, setting up pre-hospital logistics and providing timely access for all patients to primary PCI is not an easy task and the use of primary PCI as reperfusion therapy varies across Europe[6]. The Stent for Life initiative hosted by ESC, EAPCI and EuroPCR has been successful in supporting the implementation of primary PCI in ten ESC countries[7]. The barriers for implementation are multiple and vary from country to country[7,8]. The Stent for Life initiative has therefore used a specific tailored national approach, and the experiences from France, Italy, Serbia, Spain, Bulgaria, Egypt, Greece, Portugal, Romania and Turkey have recently been reported in a supplement of our journal[9]. Regarding the cost-effectiveness of primary PCI, the evidence from randomised trials suggests that this treatment provides good value for money but more studies, including studies on all-comers, are needed[10].

In the current issue of EuroIntervention, an important substudy from the landmark HORIZONS trial reports differences in outcomes after primary PCI in the United States compared to non-US countries[11]. The

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rate of bleeding, reinfarction and mortality was higher in US patients compared to non-US patients after three years of follow-up. The HORIZONS trial was performed from 2005-2007 and showed as the main result that patients treated with bivalirudin had a better outcome than patients treated with heparin plus glycoprotein IIb/IIIa inhibitors (GPI)[12]. In the substudy, the reason(s) for the poorer outcome in patients enrolled in the US is not clearly understood. US patients had more complex coronary disease and also a higher rate of comorbidity such as diabetes. The radial approach was used less frequently in the US, and non-US patients were discharged more often on beta-blockers and statins. These differences may partly explain the differences in outcome. On the other hand, time delay to treatment was shorter in the US and in the non-US patients aspiration thrombectomy and closure devices were used less often. Accordingly, there are important differences in systems of care and treatments between the US and the rest of the world. However, although the data analysis was adjusted for several possible confounders, there might still be unknown players involved.

The routine use of thrombectomy and the optimal peri-interventional antithrombotic strategy in STEMI is discussed in another interesting paper in this issue. Dr Russo and co-workers performed an international

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on-line survey on current clinical practice that was distributed to 1,607 interventional cardiologists from North America, Europe and other countries[13]. Of the 461 respondents, the majority were from Europe or North America. Current guidelines give aspiration thrombectomy

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a IIaB recommendation[1-3] based on the single-centre randomised TAPAS trial that showed better rates of myocardial blush and ST-segment resolution and, as a secondary endpoint, improved 30-day mortality, which was still significant after one year[14,15].

As the results of other trials on thrombectomy are conflicting[16] it might not be surprising that only 36% of responding interventionalists used thrombectomy routinely, whereas selective use was reported by 60%. One out of four respondents reported to have experienced a severe complication using thrombectomy and the vast majority (89%) agreed that confirmatory randomised trials are needed to elucidate if routine thrombectomy will improve outcome in STEMI patients. Indeed, large randomised trials with inclusion of 4,000-7,000 patients are currently ongoing, and the results are expected to be reported within the next one to two years.

The ESC STEMI guidelines recommend that radial access should be preferred over femoral access if performed by an experienced radial operator (IIaB)[2]. The survey revealed that 56% of operators use the femoral access, while 44% prefer a radial route. There was a stronger preference for radial access in Europe compared to North America and other regions.

The survey of clinical practice during primary PCI also somewhat unexpectedly reported a 36% routine and 53% selective use of GPIs[13]. The use of GPIs was higher in North America than in Europe. Bivalirudin was used routinely and selectively by 13% and 19% of operators, respectively. Routine use of bivalirudin was more common in North America than in Europe. After publication of the HORIZONS study, guidelines now recommend bivalirudin as routine therapy (IB), whereas GPIs are recommended in high-risk patients with a IIaA recommendation for abciximab and a IIaB for eptifibatide/tirofiban, respectively[1-3,17]. In conclusion, this interesting survey illustrates that recommendations in the guidelines are not always translated into clinical practice and underlines the need for focusing on implementation of the recommended therapy.

The authors of the HORIZONS substudy[11] raise another important issue that might explain the differing result between US and non-US sites. Even in a well-conducted randomised trial it might be possible that cross-country differences in thresholds for event reporting and documentation could partly explain the difference in outcome. Randomised, well-monitored studies probably have the highest quality of event reporting. The patients in these studies are often highly selected and large high-quality registers on all-comers are required in order to report quality and outcome of therapy in everyday clinical practice. Due to the lack of such registries in the majority of European countries, our knowledge of the current use of the recommended management and of the outcome after STEMI is rather poor. However, the NRMI registry from the US, the MINAP registry from UK and in particular the SWEDEHEART registry from Sweden are examples to follow. As European cardiologists we should contribute to set up a European ACS register hosted by the ESC and hopefully in part funded by the EU, as valid information on outcome data and the use of therapy will be a major step forward to improve outcome in STEMI patients.

In conclusion, we need randomised studies in STEMI assessing the value of new drugs and devices. However, at the moment implementation of evidence-based management and documentation of the quality of therapy in well-monitored registries are at least as important in order to understand how to improve patient outcome.

Conflict of interest statement

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