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Conclusion

All data that we currently have access to favour initiation of reperfusion therapy in ST-elevated myocardial infarction as early as possible. This applies to PPCI as well as to thrombolysis. Pre-hospital thrombolysis provides the earliest causal therapeutic option, a fact that was already realised in the early stages of systemic short-term lysis. Pre-hospital thrombolysis is independent of location, time, and even almost independent of the practitioner's experience. With the convincing potential of modern, highly effective thrombolytics and improved adjunct therapies, we see a challenge, which has not yet been sufficiently accepted. This book is intended to encourage the reader to successfully face this challenge.

In order to effectively and reasonably establish pre-hospital thrombolysis in acute ST-elevation myocardial infarction, a number of important prerequisites should be implemented. Some of them form the general basis of an appropriate and guideline-orientated care for patients with an acute coronary syndrome.

First of all, organisational requirements have to be considered. One aspect is to provide more intensive education of the population in order to improve the awareness about the impact and danger of an acute myocardial infarction. An essential point of public education is to make clear, that in case of acute chest pain, the only adequate contact is the emergency medical services (EMS) and not private transport to a hospital or a delayed visit from the general practitioner.

At the emergency services dispatching centre, suspected acute coronary syndrome must be given the highest priority. Accordingly, the centre has to alert a qualified emergency team, equipped with at least a defibrillator and a 12-lead ECG, and trained in advanced life support and cardiopulmonary resuscitation. Specific training and/or the use of specific questionnaires for the staff in the emergency services dispatching centre or the presence of a physician at the centre ensures the recognition of an acute coronary syndrome during an emergency call.

In addition to a defibrillator and a 12-lead ECG, another fundamental requirement for appropriate care of ST-elevation myocardial infarction is the ability to correctly interpret the ECG. This can be achieved in various ways – either the EMS staff are trained to interpret the ECG, or the ECG data are directly transmitted to the hospital by telemedicine, including additional information, for example, about potential contraindications for thrombolysis. In the hospital, a physician can decide about the indication for thrombolysis. Likewise, computerised ECG interpretation programmes are also suited for assisting emergency staff with a pre-hospital diagnosis. 12-lead ECG registration is not only important for the indication for pre-hospital thrombolysis, but also provides essential basic information to prepare the catheter lab and alert the intervention team in case of primary PCI.

Pre-hospital thrombolysis is an essential component of reperfusion therapy. It should be embedded in a network structure consisting of EMS and hospitals with and without PCI-facilities. Saving time and restoring blood flow as quickly as possible is the most relevant advantage of pre-hospital thrombolysis. The resulting benefit increases exponentially with a shorter time from symptom onset. If pre-hospital lysis, and of course early lysis in peripheral hospital is being used appropriately, the time advantage has to be calculated. This time factor consists of the time for the transfer to hospital and the anticipated in-hospital time delay in the PCI clinic. Likewise, the time of treatment at the emergency scene has to be calculated. Moreover, the EMS needs information about the treatment capacities of the hospitals within the network. It also cannot be ignored that the decision for PPCI specifically in case of a weak infrastructure may lead to a lack of availability of emergency services due to long transportation times to distant hospitals (including the return journey). Finally, it has to be considered, which adjuvant medication should be applied either in conjunction with thrombolysis or in preparation for a planned PPCI. Consultations between network participants should take these issues into account and lead to optimal decisions.

The crucial step in making the decision for reperfusion therapy – if necessary, together with a hospital-based physician via telephone or pager - is to choose the treatment method which will provide the patient with the most benefit, taking into account the risk-benefit ratio. The typical pre-hospital thrombolysis patients are < 65 years, with an anterior infarction or a posterior infarction involving the right ventricle, and a symptom duration < 120-180 minutes. Since, from the EMS perspective, the expected time between first patient contact and performance of PCI regularly exceeds 60 minutes (even in urban areas with good PCI infrastructures), this patient group is ideally suited to receive pre-hospital thrombolysis, with maximum benefit and minimum risk.

The success of lysis can be easily measured by the grade of resolution of the initial ST-elevation on the ECG printed approximately 90 minutes after initiation of thrombolysis. Rescue PCI is indicated if ST-resolution is not sufficient. If the initial therapy is successful, delayed angiography and possibly additional interventions (which are used with early and above all pre-hospital thrombolysis) can and should be incorporated into the broader concept of a pharmaco-invasive strategy.