

Percutaneous Coronary Intervention in Acute Myocardial Infarction [67]

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Intervenção Coronária Percutânea no Enfarte Agudo do Miocárdio

Palavras-Chave

Enfarte agudo do miocárdio; Angioplastia coronária

Key words

Acute myocardial infarction; PTCA

Reperfusion of the infarct-related artery (IRA) by percutaneous coronary intervention (PCI) limits the size of the infarct and preserves left ventricular (LV) function. In the 1980s, various randomized trials using thrombolytics that enrolled thousands of patients with acute myocardial infarction with ST-elevation (STEMI) demonstrated the clear superiority of these agents over placebo in terms of major cardiac events and survival. Initially used as an alternative method of reperfusion therapy in patients with contraindications to thrombolysis, various clinical trials in the 1990s subsequently established a niche for primary PCI in patients with STEMI. Today there is unequivocal evidence demonstrating PCI of the IRA as the optimal mode of therapy for STEMI.

Studies by Weaver et al. and Zilstra published in the last decade first addressed the comparative efficacy of the two primary reperfusion strategies used today. In a group of 2606 patients, the mortality of PTCA was 4.4 % compared to 6.2 % in those who received thrombolysis ($p < 0.02$). When the composite end-point of mortality and non-fatal MI was, considered the difference, was even more significant (7.2 % vs 11.9 % for thrombolysis and PTCA respectively, $p < 0.01$). At this time operator experience and the availability of facilities were the major limiting factors. Similar conclusions were drawn from the study of Zilstra in 395 patients comparing PTCA with streptokinase, also demonstrating a long-term benefit in favour of PTCA. The

results of the MITRA-MIR, study with 9906 patients, added to the evidence while demonstrating a sustained survival benefit compared to thrombolysis over a period of five years in all subgroups of patients and especially in the high-risk ones. The NRMI-2, purportedly reflective of the real world, also showed a significant difference in favour of PTCA, in cardiogenic shock patients.

With the superiority of mechanical reperfusion therapy firmly established, the next step was the optimization of results and this has been achieved by 1) the utilization of stents during PCI of STEMI 2) better adjuvant therapy and 3) decrease in the time to reperfusion and 4) logistic improvements in the provision of the service.

Let us begin with the first issue – the utilization of stents. The BENESTENT trial had confirmed the superiority of stents over balloon angioplasty (BA) in elective clinical situations and although it seemed logical to extrapolate these findings to STEMI, there had been no randomized trials confirming this premise. An analysis published by Antoniucci, composed of “trials” that compared PCI with and without stents in STEMI, concluded that there was a highly favorable outcome with the use of stents, when the end-point included death, re-infarction or target-vessel revascularisation (TVR) over a 6-month follow-up period. Among these trials, the one with the largest number of patients, PAMI-STENT which had 900 patients, showed a highly significant difference ($p < 0.003$) during seven

months of follow-up.

An analogous situation existed with the use of glycoprotein IIb/IIIa inhibitors, which were found to be beneficial in patients undergoing elective PCI. STOPAMI and ADMIRAL were studies that assessed these patients in PCI during STEMI. The results of STOPAMI suggested greater myocardial salvage (using Tc-99 Sestamibi), with a concomitant decrease in the number of events in comparison to those receiving thrombolysis (rtPA). Besides, in ADMIRAL, more patients who received abciximab had patency of the IRA at the time of PCI, and fared better than those who received only a stent. This study enrolled 300 patients and all received stents, with or without abciximab.

If it is evident that the utilization of stents along with abciximab improves the short- and long-term results of PCI in STEMI, another equally important factor that must be considered is the time to treatment after symptoms begin.

In the results published by Cannon, which was an observational study involving 661 community hospitals and tertiary-care centers in the United States, a few interesting conclusions can be drawn. On the one hand, although no increase in mortality was seen with an increase in the time interval between the onset of symptoms and the first balloon inflation, a considerable increase in mortality was seen when the door-to-balloon time exceeds two hours. This door-to-balloon time is in the hands of the medical team and can be considered an indicator of the quality of services provided at any particular institution. However, the door-to-balloon time should not be the only factor that drives the choice of PCI as the preferred therapeutic modality in AMI. In the PRAGUE study, there were three distinct treatment arms – 1) thrombolysis at the admitting hospital, 2) thrombolysis during transport to a hospital with facilities for PCI, and 3) direct transfer for urgent catheterization and PCI. The combined end-point included death, CVA, re-infarction and complications of the therapeutic procedure. The results at 30 days demonstrated the safety of direct transfer for PCI while demonstrating the superiority of this strategy compared to the other two.

Another factor purported to improve the results of PCI is the experience of the site that provides the service. In the study by Cannon, multivariate analysis demonstrated better

results in those centres which performed more than three primary PCIs a month compared to those sites that performed between one and three, or fewer.

These studies show that, although the presence of on-site cardiac surgery may be desirable, in its absence, primary PCI is still a valuable life-saving procedure for many patients. It is possible that the current recommendations of the ACC/AHA will undergo further modifications based on these recent advances. The recommendations for centers without on-site cardiac surgery are as follows: 1) the patient could be transferred to a cardiac surgical facility, if necessary, in a period less than one hour; 2) the procedure should be reserved for patients with STEMI or new left bundle branch block; 3) the door-to-balloon time should not exceed 90 ± 30 minutes; 4) it should be performed in centers that perform more than 36 PCIs for STEMI per year; 5) operators should perform more than 75 PCIs/year as the primary operator.

In our center, due to logistic limitations and limited human resources, we are unable to offer this procedure to all patients and we have defined subsets of patients who will be offered this procedure. They include 1) patients in cardiogenic shock, 2) patients with extensive anterior wall MI as defined by the admitting ECG/echocardiogram, and 3) young patients. If it is clear that primary PCI is the optimal reperfusion therapy for STEMI, neither the use of the best stents and glycoprotein IIb/IIIa inhibitors, nor the most experienced operator can produce the best results if patients present late, and this is an important element that requires consideration.

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