

When clinical experiences clashes against evidence based medicine: the case of aspiration thrombectomy in primary percutaneous coronary intervention (PCI)

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Deciding when to apply a procedural technique, during a primary percutaneous coronary intervention (PCI) in the setting of a ST-elevation myocardial infarction (STEMI) is a matter of “know how” for the interventional cardiologist, from decision of correct antiaggregant/anticoagulation to choice of complete *vs.* not revascularization and, among the most debated, thrombus aspiration (1-3).

But deciding when to apply a technique on which efficacy is not clear is more than a matter of knowledge, it is what we usually call experience: it is the sixth sense that derives from the path you know because you walked it a lot of time. Finally, it is what differ the work of a craftsman made with the rule of the art from a simple and just technical approach to the problem. Obviously decision passes not only trough experience but always need deep knowledge of the problem: from this point of view meta-analysis help to extract strong message from published literature and to empower recommendations (4).

Deciding when to apply thrombectomy and the use of GpIIb-IIIa inhibitors directly mirror this situation. Both of them are well-known and widely diffused guns in the belt of the interventional cardiologists, that could bring to you a lot of satisfaction when correctly applied, but that nowadays have not reached a clear evidence-based verification.

Despite the first positive results of small single-centre studies such as the thrombus aspiration during percutaneous coronary intervention in acute myocardial infarction study (TAPAS) trial and subsequent meta-analyses (3,5), other studies adequately powered for clinical outcome including the trial of routine aspiration thrombectomy with PCI versus PCI alone (TOTAL) and the thrombus aspiration in

ST-elevation myocardial infarction in Scandinavia (TASTE) trial observed no positive effect of aspiration thrombectomy on all-cause mortality (6,7). As a consequence of TASTE, current European guidelines downgraded the recommendation for thrombus aspiration in STEMI to a class IIb A indication (8).

The meta-analysis by Elgendy *et al.* (9) about the use of aspiration thrombectomy in patients undergoing primary PCI is the newest sum of published evidence. Its main strengths are the inclusion of a large larger number of patients and events, as well as a greater number of sites and operators, making the results more generalizable. They conclude that aspiration does not provide clinical benefit. However, a lot of experienced interventional cardiologists still consider useful this technique in selected patients.

The presence of thrombus is a phenomenon ubiquitously present in STEMI patients, but the benefits of aspiration of a small thrombus burden may not be sufficient to counterbalance the drawbacks of delivering bulky equipment. From the same point of view the benefits of its pharmacological treatment might not counterbalance the haemorrhagic risk. These reasons may explain the discordance between published studies and clinical practice. We also must remember that current management of STEMI patients has reduced hospital mortality to less than 5%, making it difficult to register mortality differences when randomizing new techniques.

The belief that aspiration thrombectomy or glycoprotein IIb/IIIa inhibitors would be useful in every STEMI patients is like sustaining that IABP would be useful for every patient in shock or parachute may be helpful for every kind

of fall! Good sense—or as we like to call it when talking about patients—good clinical sense, should guide decision through different scenarios.

Starting from this assumption, the excellent work made by Elgendy *et al.* could be fully esteemed: in this analysis of 17 randomized trials, they demonstrated that aspiration thrombectomy did not significantly reduce the risk of all-cause mortality, reinfarction, the combined outcome of mortality or reinfarction, MACE, or stent thrombosis when compared with conventional PCI.

In addition, aspiration thrombectomy was associated with a nonsignificant increase in the risk of stroke. Moreover, the concomitant administration of intravenous glycoprotein IIb/IIIa inhibitors or ischemic time did not influence (i.e., reduce) the risk of mortality, reinfarction, the combined outcomes of mortality or reinfarction, MACE, or myocardial reperfusion markers in STEMI patients who underwent aspiration thrombectomy before primary PCI.

Regarding the glycoprotein IIb/IIIa inhibitors usage, the meta-analysis encloses the results from the intracoronary abciximab and aspiration thrombectomy in patients with large anterior myocardial infarction (INFUSE-AMI) trial and finally shares them (10). The use of this pharmacologic help is probably not a standardisable approach and remains to be evaluated in each situation. The trend toward a synergistic approach of the two strategies reflect the common pathophysiology on which they work, but again stress the need for a tailored strategy: aspiration thrombectomy and glycoprotein IIb/IIIa inhibitors are tricks of trade, that probably today just experienced cardiologist could appropriately prescribe.

There are some intrinsic limitations because of data derived from different trials with different inclusion criteria, designs and populations and variable follow-up durations. In particular follow up in these studies is important, because it was just 3.7 ± 2.7 months.

Furthermore, due to the difficulty to obtain mortality differences because of the presence in studies of unselected STEMI populations and the difficulty to carry on trial with only higher risk patients (i.e., those with large thrombus), further analyses of additional end points such as left ventricular function, heart failure events, recurrent angina and long term mortality rates or procedural benefits such as ability to perform direct stenting or reduced stent length were not examined in the studies enclosed, and in future could be helpful to improve the understanding of the effects of aspiration thrombectomy and on myocardial perfusion and function in patients with STEMI.

In conclusion, we think that the message we could bring to home is that currently routine use of aspiration thrombectomy with or without the glycoprotein IIb/IIIa inhibitors usage is not supported by guidelines. It is not a routine technique but an ultra-specialistic approach to a particular subset of patients presenting with STEMI and a large thrombus burden, carrying not only potential benefits but also potential harms. Its use must be limited to patients in which could be useful, and this decision could be taken only after the angiography and not on a randomized fashion.

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Footnote

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