

## Letters

### TO THE EDITOR

## Is Coronary Wedge Pressure a Technique to Identify High-Risk Patients Who May Benefit From Alternative Treatment in Acute Myocardial Infarction?

### Is This The Next Step?



We read with interest the paper by Patel et al. (1) about the OxAMI (Oxford Acute Myocardial Infarction) study. The paper shows how zero-flow pressure (Pzf) measured immediately after the primary percutaneous coronary intervention for ST-segment elevation predicts the extent of the myocardial infarction at 6 months.

The study shows an interesting result: Pzf was significantly lower in the group with normal surrogate parameters of microvascular obstruction (MO) and smaller infarct size. The invasive coronary measurements were performed after revascularization, and in this case Pzf reflects the MO, which is the result of embolization that occurred before the procedure and after thrombus aspiration and stenting. It would be interesting to know the differences in size and composition of the thrombus between the 2 groups. High thrombus burden and old age thrombus are associated with pre-procedural MO. Older thrombus requires a longer period of nonocclusive formation on the unstable coronary plaque or erosion. During this phase, the platelet-rich thrombus is unstable and is prone to embolize into the distal microcirculation even before primary percutaneous coronary intervention (2).

The determination of Pzf after revascularization is probably time-consuming, and it is based on an extrapolation from the pressure-velocity loops. Furthermore, this study highlights only a prognostic issue and not an immediate therapeutic one.

However, determination of the coronary wedge pressure (CWP) before revascularization is a very simple method of microvascular function

assessment. In acute myocardial infarction, the vessel is usually totally occluded and the CWP determination is easy to do. In such cases, the mean pressure distal to the occlusion is nothing other than the CWP and depends on the collateral flow, which “unfortunately” is modest, especially if no collaterals are seen on angiography. Pzf is the distal coronary pressure when, theoretically, the flow in a coronary artery is zero and no functional collaterals exist.

So, in this setting of MO, because the pressure-flow relation without collateral flow is linear at physiological pressures (3), Pzf and CWP are similar parameters, although they are different in way of determination. It has been proven that higher CWPs are caused by extensive microvascular dysfunction and impeded drainage of the pre-capillary compartment (4). CWP could be determined by using a thin infusion catheter, and if the pressure is high, reflecting a pre-procedural MO, downstream administration of some drugs like glycoprotein IIb/IIIa inhibitors or thrombolytics could be beneficial (5).

In our experience, we have found the a CWP value of 30 mm Hg as a cutoff for MO in acute anterior myocardial infarction and no collateralized left anterior descending artery occlusion, and this was similar to other studies (4). Downstream eptifibatid administration in the group of patients with CWP higher than this cutoff was effective regarding the post-procedural surrogate parameters of MO.

In the downstream drug administration, issues of both distal embolization and lack of contact between the distal platelet-rich embolized thrombus and the glycoprotein IIb/IIIa inhibitors or thrombolytics are addressed. By doing so, the CWP evaluation opens a new therapeutic approach in this yet unresolved issue of MO, thus getting closer to the future.

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## REPLY: Is Coronary Wedge Pressure a Technique to Identify High-Risk Patients Who May Benefit From Alternative Treatment in Acute Myocardial Infarction?

### Is This The Next Step?

We would like to thank Prof. Iancu and colleagues for their comments about our recent publication (1). They raise 3 important points:

1. Which patient and procedural factors impact on microvascular function (MF) after primary angioplasty (PPCI)? We have not analyzed thrombus size and composition, but we agree that this could provide insights into the mechanisms of MF observed at the completion of PPCI. MF is multifactorial in this situation, reflecting a combination of ischemic injury, prior and procedure-associated distal embolization, and patient factors such as age and diabetes. We have recently addressed the specific effect of coronary stent implantation on MF, and identified that the most important determinants of change in MF are lesion location, thrombus burden, implanted stent volume, and baseline MF (2).
2. Use of coronary wedge pressure (CWP): There are a number of indices of MF available. The specific aim of our study was to compare Doppler and thermodilution-derived indices. We agree that offline analysis is time-consuming, but we do not believe that this finding provides only prognostic

information. We have previously shown that final myocardial salvage is related to both end-of-procedure MF and how MF changes over the subsequent day, suggesting that identification of patients with impaired MF at the completion of PPCI could identify an especially high-risk group in which additional interventions maybe most beneficial (3).

3. Assessment of CWP before coronary stenting: CWP provides a simple measure, but in patients with collateral flow especially, it is maybe less reliable than a number of alternative indices. Ultimately, however, an enhanced understanding of the coronary microcirculation at the time of PPCI and the utility of different measures is essential if we are to achieve better outcomes from reperfusion for all of our patients.

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## Personalized Antiplatelet Therapy



### The Odyssey Continues

We read with great interest the RECLOSE 3 (REsponsiveness to CLOpidogrel and Stent Thrombosis 3) study reported by Valenti et al. (1) in which