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Thrombus aspiration during percutaneous coronary intervention

Pieter Vlaar and colleagues' TAPAS study (June 7, p 1915)[1] is the first to suggest that thromboaspiration in patients with ST-elevation myocardial infarction (STEMI) has an effect on mortality. However, we would like to raise a cautionary note about a major limitation in the study's methods, which might have affected the results.

This study compared a strategy of aspiration plus direct stenting versus balloon predilatation followed by stenting. The use of balloon predilatation only in the control group, including patients with thrombosis in myocardial infarction (TIMI) grade 2 and 3 flow before percutaneous coronary intervention, is a flaw because previous studies have shown that direct stenting alone is superior to balloon predilatation followed by stenting in STEMI patients, irrespective of aspiration. Loubeyre and colleagues[2] showed that direct stenting decreases the rate of no-reflow and improves microvascular reperfusion compared with balloon predilatation followed by stenting. As confirmed by the TAPAS study,[3] these surrogates of flow are strong predictors of short-term and long-term clinical outcome. Therefore, whether the mortality differences between the two groups can be attributed solely to thromboaspiration remains unanswered since the difference in outcome could be explained by the differences in the rate of direct stenting.

Although we believe and have published on the fact that aspiration or thrombus removal is beneficial in the setting of STEMI,[4] we would like to emphasise that the results of the TAPAS study cannot be attributed to aspiration alone; a well designed, randomised study with equal use of direct stenting in both groups is warranted to determine the role of aspiration in the reduction of mortality in patients with STEMI.

We declare that we have no conflict of interest.

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Pieter Vlaar and colleagues[1] show that thrombus aspiration before percutaneous coronary intervention (PCI) improves the 1-year clinical outcomes in patients with ST-elevation myocardial infarction.

Distal blockage is known to induce microvascular obstruction—ie, the "no reflow" phenomenon and to result in suboptimum reperfusion. In addition to thrombus aspiration, upstream administration of a glycoprotein IIb/IIIa inhibitor, nicorandil treatment, ischaemic postconditioning after coronary stenting, and deployment of an embolic protection device are known to reduce microvascular obstruction.[2] Periprocedural glycoprotein IIb/IIIa inhibitors are particularly known to improve microvascular flow and reduce the infarct area after coronary occlusion and reperfusion.[3,4]

So treatment with glycoprotein IIb/IIIa inhibitors might be an important confounder in Vlaar and colleagues' analysis. In the Methods section (p 1916), Vlaar and colleagues mention that patients received a weight-adjusted glycoprotein IIb/IIIa inhibitor (abciximab) during the procedure unless contraindicated, but we could not see how many patients were thus treated in the conventional PCI group and the thrombus-aspiration group and whether there are any significant differences between groups. Could they provide these data?

We declare that we have no conflict of interest.

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Authors' reply

We appreciate Laurent Bonello and colleagues' comment with regard to the difference in direct stenting between the two treatment groups. This issue is often brought up when the results of TAPAS are discussed.

Our interventional strategy always starts with establishment of brisk antegrade flow in the infarct-related vessel (followed by intracoronary nitroglycerine) to allow selection and placement of a stent of appropriate length and diameter. In TAPAS, thrombus aspiration reduced the source of distal embolisation by removing atherothrombotic material exposed to the lumen. After aspiration, coronary flow was established in most patients. Consequently, balloon predilatation

was often not necessary and a stent could be directly implanted ("direct stenting"). In the conventional group, most patients needed predilatation.

Patients randomised to aspiration had improved myocardial perfusion and clinical outcome compared with the conventional group.[1,2] However, is there evidence to suggest that the higher rate of direct-stenting in the aspiration group has augmented these results?

As shown by Loubeyre and colleagues,[3] direct stenting can be safe and effective in selected patients undergoing primary percutaneous coronary intervention (PCI). However, in unselected patients with ST-elevation myocardial infarction (STEMI), direct stenting has never been shown to improve myocardial perfusion or clinical outcome compared with predilatation.[4] Direct stenting in patients without adequate flow leads to the risk of undersized stenting, which is the most important predictor of restenosis. This problem is illustrated by a trial comparing direct stenting with predilatation in unselected STEMI patients: in-stent restenosis rate at 1-year angiographic follow-up was significantly higher in the direct stenting group.[4]

Finally, the use of predilatation in TAPAS was not limited to patients randomised to conventional PCI. Predilatation was done in 207 of 502 (41·2%) of the patients randomly assigned aspiration. There were no differences between patients with and without predilatation in rates of cardiac death (7/207 [3·4%] *vs* 8/295 [2·7%], respectively; p=0·67), nor in cardiac death or non-fatal reinfarction (10/207 [4·8%] *vs* 16/295 [5·4%], respectively; p=0·77). This finding indicates that predilatation is not associated with impaired clinical outcome.

Jaewon Oh and colleagues raise the important issue of the value of platelet inhibitors during primary PCI. In TAPAS, all patients were pretreated with clopidogrel, aspirin, and heparin. During the procedure, abciximab was given routinely to 469 of 502 (93·4%) in the thrombus-aspiration group and 452 of 503 (89·9%) in the conventional PCI group (p=0·12).[1]

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Secondary prevention of stroke

Geoffrey Donnan and colleagues, in their Seminar on stroke (May 10, p 1612),[1] mention cholesterol reduction with statins among the proven secondary prevention strategies. However, although statin treatment might be effective in the prevention of stroke in patients with known coronary-artery disease but without a history of cerebrovascular disease, its role in the secondary prevention of stroke raises some serious concerns.

Indeed, the SPARCL study[2] found that, compared with placebo, the use of 80 mg atorvastatin per day in patients who had a stroke or transient ischaemic attack was associated with a non-significant 13% relative risk reduction of non-fatal stroke during a 5-year follow-up, without improving survival, and with a 66% increase in the relative risk of haemorrhagic stroke among patients receiving high-dose statin. Furthermore, a review[3] found that, in the secondary prevention of cerebrovascular events, statin therapy decreases the occurrence of ischaemic stroke but that this effect is counterbalanced by an increase in the occurrence of haemorrhagic stroke.

Lower LDL cholesterol concentrations with or without statin treatment have also been shown to be strongly and independently related to a higher risk of symptomatic haemorrhagic transformation after ischaemic stroke thrombolysis.[4]

Finally, an inverse relation has been shown between stroke severity and cholesterol concentrations.[5] Higher total serum cholesterol favours the development of minor stroke, and, owing to selection, major strokes are more often seen in patients with lower total serum cholesterol concentrations.[5] Therefore, it is also plausible that statin therapy might decrease only milder stroke subtypes.

We declare that we have no conflict of interest.

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