

***Daniel C. Link, MD**
Richard G. Bach, MD

*Washington University
Division of Oncology
660 South Euclid
Campus Box 8007
Saint Louis, Missouri 63110
E-mail: dlink@im.wustl.edu

doi:10.1016/j.jacc.2007.01.055

REFERENCES

- Güven H, Shepherd RM, Bach RG, Capoccia BJ, Link DC. The number of endothelial progenitor cell colonies in the blood is increased in patients with angiographically significant coronary artery disease. *J Am Coll Cardiol* 2006;48:1579-87.
- Leor J, Marber M. Endothelial progenitors: a new Tower of Babel? *J Am Coll Cardiol* 2006;48:1588-90.
- Yoder MC, Mead LE, Prater D, et al. Re-defining endothelial progenitor cells via clonal analysis and hematopoietic stem/progenitor cell principals. *Blood* 2006 Oct 19; [E-pub ahead of print].
- George J, Goldstein E, Abashidze S, et al. Circulating endothelial progenitor cells in patients with unstable angina: association with systemic inflammation. *Eur Heart J* 2004;25:1003-8.
- Sandri M, Adams V, Gielen S, et al. Effects of exercise and ischemia on mobilization and functional activation of blood-derived progenitor cells in patients with ischemic syndromes: results of 3 randomized studies. *Circulation* 2005;111:3391-9.

Adjunctive Thrombectomy in Acute Myocardial Infarction: For Some but Not for All

We read with interest the report by Silva-Orrego et al. (1) regarding the effects of thrombus aspiration on myocardial reperfusion in the setting of primary angioplasty. The study reported a significant enhancement in myocardial reperfusion by a strategy of manual thrombus aspiration before stenting on top of abciximab administration. However, in our opinion some concerns exist about the results of this study. First, the investigators randomized patients with acute myocardial infarction (MI) to a conventional stent-assisted primary angioplasty versus a strategy applying manual aspiration device before stent, regardless of angiographic appearance of thrombus. Early studies evaluating the feasibility of thrombectomy in the setting of thrombus-containing lesion and acute MI clearly reported on the efficacy of thrombectomy devices in reducing thrombus burden at target lesion, consequently limiting distal embolization and no-reflow phenomenon (2,3).

Unfortunately, Silva-Orrego et al. (1) did not provide data concerning thrombus burden at baseline angiography, nor on thrombus removal after device use. Thus, the reported reduction in distal embolization rate may not be univocally ascribed to the device effect, as other factors may affect this result, such as differences in thrombus burden of culprit lesions.

Second, the researchers found a rate of postprocedural myocardial blush grade (MBG) 2/3 in both arms, which is surprisingly higher than expected, based on Thrombolysis In Myocardial Infarction (TIMI) flow achieved after the intervention, and on

time-to-treatment reported in this cohort. In the largest study validating the angiographic reperfusion, MBG was strongly affected by epicardial flow, being that patients showing TIMI flow grade <3 very rarely reached an adequate blush (4). Indeed, it has been shown that the effectiveness of myocardial reperfusion after primary angioplasty, as assessed by ST-segment resolution and MBG is clearly time-dependent (5).

In conclusion, to avoid conflicting results, we believe that future studies evaluating thrombectomy as adjunctive strategy in the setting of primary angioplasty should enroll only patients with angiographically documented thrombus at the lesion site, and that reperfusion findings should be carefully evaluated according to time-to-treatment.

***Massimo Napodano, MD**
Angelo Ramondo, MD
Sabino Iliceto, MD, FACC

*Department of Cardiac, Thoracic, and Vascular Sciences
University of Padova
2 via Giustiniani
35128 Padova
Italy
E-mail: massimo.napodano@sanita.padova.it

doi:10.1016/j.jacc.2007.01.056

REFERENCES

- Silva-Orrego P, Colombo P, Bigi R, et al. Thrombus aspiration before primary angioplasty improves myocardial reperfusion in acute myocardial infarction: the DEAR-MI study. *J Am Coll Cardiol* 2006;48:1552-9.
- Silva JA, Ramee SR, Choen DJ, et al. Rheolytic thrombectomy during percutaneous revascularization for acute myocardial infarction: experience with the Angiojet catheter. *Am Heart J* 2001;141:353-9.
- Napodano M, Pasquetto G, Saccà S, et al. Intracoronary thrombectomy improves myocardial reperfusion during direct angioplasty for acute myocardial infarction. *J Am Coll Cardiol* 2003;42:1395-402.
- van't Hof AWJ, Liem A, Suryapranata H, Horntje JCA, de Boer MJ, Zijlstra F on behalf of the Zwolle Myocardial Infarction Study Group. Angiographic assessment of myocardial reperfusion in patients treated with primary angioplasty for acute myocardial infarction: myocardial blush grade. *Circulation* 1998;97:2302-6.
- De Luca G, van't Hof AW, de Boer MJ, et al. Time-to-treatment significantly affects the extent of ST-segment resolution and myocardial blush in patients with acute myocardial infarction treated by primary angioplasty. *Eur Heart J* 2004;25:1009-13.

Reply

We appreciated the comments by Dr. Napodano and colleagues and would like to address their concern. The DEAR-MI (De-thrombosis to Enhance Acute Reperfusion in Myocardial Infarction) study (1) included consecutive randomization of acute myocardial infarction (AMI) patients fulfilling the inclusion criteria regardless of angiographic evidence of thrombus based on the assumption that thrombus is always present in AMI. Compared with angiography, the presence of intracoronary thrombus is significantly underestimated by angiography (2). In our randomized population, 73% of controls and 81% of patients undergoing aspiration showed an occluded vessel with Thrombolysis In Myocardial Infarction (TIMI) flow grade 0/1 at the initial angiogram,

which is a good indicator of the presence of thrombus. Macroscopic thrombus retrieval was observed in 95% of patients undergoing aspiration; moreover, at the multivariate analysis, thrombus removal, but not the presence of occluded vessel, was predictive of myocardial reperfusion. Thus, our results cannot be ascribed to differences in thrombus burden, in our opinion.

The low prevalence of TIMI flow grade 3 in both groups seems to depend on the rigid lecture method we applied rather than a poor epicardial reperfusion, as demonstrated by the very favorable corrected TIMI frame count representing a more objective measure of epicardial flow.

We also acknowledge that the rate of myocardial blush (MBG) grade 2 + 3 observed in the control group of our study is higher than previously reported (3,4). However, both stenting and glycoprotein IIb/IIIa inhibitors were not consecutively used in previous studies; in addition, patients with previous infarction, or by pass-grafting, and cardiogenic shock were not included in our study. In any event, the difference between MBG grades 2 and 3, representing the key point of the issue, was significantly more favorable among patients undergoing aspiration.

Finally, the ischemic time was similar in the 2 groups of our study. Therefore, although we are aware of the importance of this variable in achieving a good reperfusion, we do not believe it affected the results of our study.

***Pedro Silva-Orrego, MD**
Paola Colombo, MD, PhD
Riccardo Bigi, MD

*Niguarda Hospital
via Bizzoni 5
Milan, 20125
Italy
E-mail: pedrosilva@tiscali.it

doi:10.1016/j.jacc.2007.01.057

REFERENCES

1. Silva-Orrego P, Colombo P, Bigi R, et al. Thrombus aspiration before primary angioplasty improves myocardial reperfusion in acute myocardial infarction: the DEAR-MI study. *J Am Coll Cardiol* 2006;48:1552-9.
2. White CJ, Ramee SR, Collins TJ, et al. Coronary thrombi increase PTCA risk. *Circulation* 1996;93:253-8.
3. van't Hof AWJ, Liem A, Suryapranata H, Horntje JCA, de Boer MJ, Zijlstra F, for the Zwolle Myocardial Infarction Study Group. Angiographic assessment of myocardial reperfusion in patients treated with primary angioplasty for acute myocardial infarction: myocardial blush grade. *Circulation* 1998;97:2302-6.
4. Sorajja P, Gersh BJ, Costantini C, et al. Combined prognostic utility of ST-segment recovery and myocardial blush after primary percutaneous coronary intervention in acute myocardial infarction. *Eur Heart J* 2005;26:667-74.