

IMAGES IN MEDICINE

Thromboaspiration of Heavy Thrombotic Load Salvages Myocardium and Prevents the No-Reflow Phenomenon in Acute Myocardial Infarction

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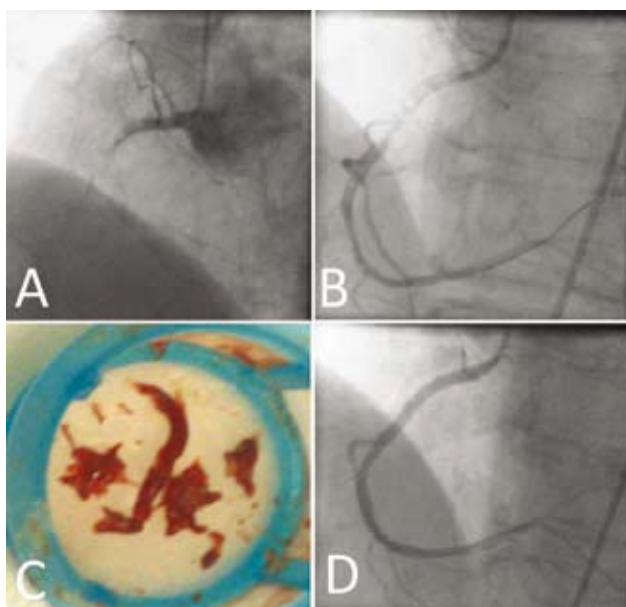
ABSTRACT

An 84-year-old lady, admitted with acute inferior wall myocardial infarction (STEMI), was subjected to emergent coronary angiography and percutaneous coronary intervention (PCI) of a totally occluded right coronary artery (RCA). When the occlusion was crossed with an angioplasty wire and dilated with a small balloon, it became apparent that the artery had markedly reduced flow as it was filled with thrombi, which were successfully removed with use of a thromboaspiration catheter. Thromboaspiration, subsequent stenting and a IIB/IIIa antiplatelet agent led to full mechanical recanalization and complete restoration of TIMI 3 blood flow to the artery. This interventional strategy prevented distal embolization of the intracoronary thrombi and thus the no-reflow phenomenon, which would have otherwise developed in this complex PCI case with such a heavy thrombotic load.

CASE

An 84-year-old lady, ex-smoker, hypertensive and hypercholesterolemic, was admitted via the emergency room with complaints of chest pain, recurring over the preceding 2 days. She was found to have ECG changes of a recent ST-elevation acute inferior wall myocardial infarction (STEMI). She was subjected to emergent coronary angiography, which revealed a total occlusion of the right coronary artery (RCA) (Panel A). During the same session, percutaneous coronary intervention (PCI) was attempted. The occlusion was successfully crossed with an angioplasty wire and dilation with a small balloon restored partial blood flow, when it became apparent that the artery was filled with clots (intraluminal defects) (Panel B). At this point a 6F thromboaspiration catheter (Export AP aspiration catheter, Medtronic, Minneapolis, Minnesota), was employed and an impressive amount of thrombotic material was aspirated (Panel C).

The combination of thromboaspiration, subsequent stenting and use of a IIB/IIIa antiplatelet agent (tirofiban) led to full mechanical recanalization and complete restoration of TIMI 3 blood flow to the artery (Panel D). This interventional strategy prevented distal embolization of the intraluminal thrombi and thus aborted the no-



reflow phenomenon, which would have otherwise developed in this complex PCI case with such a heavy thrombotic load.

DISCUSSION

Thromboaspiration or thrombectomy in patients with STEMI undergoing mechanical reperfusion via PCI has been shown not only to be associated with better myocardial reperfusion and obviation of the no-reflow phenomenon, but also to reduce infarct size and significantly improve the clinical outcome of these patients and its effect may be additional to that of IIb/IIIa-platelet inhibitors.¹⁻⁷

In the TAPAS trial, among 1060 patients the benefit of thromboaspiration extended out to one year.⁶ Cardiac death at 1 year was 3.6% in the thrombus aspiration group and 6.7% in the conventional PCI group (hazard ratio [HR] 1.93; $p=0.020$). One-year cardiac death or non-fatal reinfarction occurred in 5.6% of patients in the thrombus aspiration group and 9.9% of patients in the conventional PCI group (HR 1.81; $p=0.009$). In a more recent, single-center study (EXPIRA), among 175 patients with STEMI, manual thromboaspiration prevented thrombus embolization and preserved microvascular integrity reducing infarct size, as assessed by contrast-enhanced magnetic resonance imaging.⁴

Finally, a metaanalysis of 9 trials of thromboaspiration with different devices, demonstrated that, among 2417 patients with STEMI undergoing primary PCI, thromboaspiration was associated with better myocardial perfusion and less distal embolization, leading to significant improvement in 30-day

survival.⁷ More recently, an individual patient-data pooled analysis of 11 trials showed that among 2686 STEMI patients with a median follow-up of one year, thromboaspiration led to significantly lower all-cause mortality ($P = 0.049$), fewer major adverse cardiac events (MACE) ($P = 0.011$) and lower death plus myocardial infarction rate during the follow-up ($P = 0.015$).² Subgroup analysis showed that thromboaspiration was associated with improved survival in patients treated with IIb/IIIa-inhibitors ($P = 0.045$) and that the survival benefit was confined to patients treated in manual thrombectomy trials ($P = 0.011$).

Based on all this evidence, one can recommend that manual thromboaspiration, if anatomically and technically feasible, should be routinely added to our therapeutic armamentarium in STEMI patients undergoing primary PCI, as an adjunct to mechanical reperfusion and to the use of IIb/IIIa-inhibitors, as this simple therapeutic modality further improves late clinical outcome. It seems imperative that this recommendation should be incorporated in future clinical guidelines.

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