



Contents lists available at SciVerse ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

The American Journal of Emergency Medicine

Correspondence

Simultaneous thrombosis of 2 vascular territories: is thrombolytic therapy a better option?

We have read with great interest the article by Akyuz and colleagues [1] in the *American Journal of Emergency Medicine* and congratulate them for their observation. Their case exemplifies the concurrent occurrence of ST-segment elevation myocardial infarction (STEMI) and posterior circulation stroke that was eventually managed with thrombolytic therapy. Simultaneous thrombosis of 2 distant vascular territories is a rare and complicated clinical scenario. In these instances, there is usually an underlying cause linking both thrombotic events rather than being a mere coincidence. We have previously described the myocardial infarction (MI)–stroke association, as was evident in our case by an acute inferoposterior and right ventricular STEMI together with massive infarction involving the brain stem, both cerebellar hemispheres and occipital lobes. We labeled this presentation as “cardiocerebral infarction” and provided suggested explanations for this association [2,3]. We also described the pulmonary embolism (PE)–stroke association in a patient with patent foramen ovale who had a postoperative PE causing shunt reversal and subsequent paradoxical cerebral embolism [4]. Various other scenarios of simultaneous vascular thrombosis have been reported, including simultaneous pulmonary and coronary thrombosis [5] and simultaneous systemic thromboembolism during atrial fibrillation [6] or secondary to left ventricular thrombus [7]. Simultaneous vascular thrombosis can be synchronous (thrombosis of 2 vessels at the same time) or metachronous (thrombosis of one vessel precedes the other). In case of metachronous presentation, it is obvious that immediate care will be directed without delay toward the initial event, according to standard practice guidelines (eg, percutaneous coronary intervention in a patient with an initial presentation of STEMI). However, in case of synchronous presentation, there are no clear recommendations for ideal management because of the rarity of this scenario. Focusing on the independent management of one thrombosed territory can be associated with delayed management of the other thrombosed vascular bed, unless the management modality for both pathologies is the same (eg, thrombolytic therapy). For example, in cases with simultaneous STEMI and ischemic stroke, undergoing primary percutaneous coronary intervention will salvage the myocardium, but the delayed management of the stroke may cause a permanent disability. It is therefore reasonable that in cases with synchronous presentation, thrombolytic therapy is an option for the benefit of curing both pathologies—if both are within the recommended time frame for administration and in the absence of contraindications. However, there is a lack of randomized trials or societal guidelines to support this opinion. Of the various thrombolytic therapies available, alteplase (tissue plasminogen activator) is the best option in these instances

owing to its favorable adverse effect profile; besides, it is the only thrombolytic that can be administered in patients with ischemic stroke. A main obstacle to this strategy is the varying guideline recommendations for thrombolytic therapy in cases with acute arterial occlusion according to the site of thrombosis (coronary, pulmonary, or cerebral). Thrombosis of different sites is managed with different dosages and duration of thrombolytic therapy. Also, the time frame during which thrombolytic therapy is beneficial is variable according to the site of thrombosis. The lack of trials to study a safe standardized thrombolytic regimen in these instances adds to the complexity of this decision and invites controversies. Table illustrates the alteplase dose, duration of administration, and time frame for initiating therapy in case of ischemic cerebrovascular stroke, STEMI, and PE. Notice the differing total dose of alteplase (100 mg in STEMI and PE vs 90 mg in ischemic stroke), duration of therapy (1 hour in STEMI and ischemic stroke vs 2 hours in PE), way of administration (how the dose is distributed during the delivery period), and the time frame during which therapy can be given (3 hours in ischemic stroke vs up to 12 hours in STEMI). We believe that in cases of simultaneous 2-vessel occlusion, thrombolytic therapy is a reasonable option. Further research is needed for the ideal management modality that provides the best outcome in this rare and devastating clinical scenario.

Table

The varying alteplase dose, duration, and method of administration and time frame for initiating therapy in case of acute ischemic cerebrovascular stroke, STEMI, and PE

	Dose and duration of TPA	Time frame for administration
Ischemic cerebrovascular stroke	0.9 mg/kg (maximum of 90 mg) infused for 60 min with 10% of the total dose administered as an initial intravenous bolus for 1 min	Within 3 h of symptom onset ^a
STEMI	The recommended dose administered is 100 mg as a 15-mg intravenous bolus, followed by 50 mg infused over the next 30 min, and then 35 mg infused over the next 60 min. ^b	Up to 12 h
PE	100 mg infused for 2 h with 10 mg given as a bolus	Longer duration ^c

^a This period can be extended to 4.5 hours unless any of the following exclusion criteria are present: patients older than 80 years, patients taking oral anticoagulants regardless of the international normalized ratio, patients with baseline NIHSS score higher than 25, and patients with a history of stroke and diabetes.

^b For patients weighing 67 kg or less, 15 mg is given as intravenous bolus, followed by 0.75 mg/kg infused over the next 30 minutes not to exceed 50 mg, and then 0.50 mg/kg over the next 60 minutes not to exceed 35 mg.

^c Some studies show that thrombolytic therapy remains to be effective up to 2 weeks after primary embolization.

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<http://dx.doi.org/10.1016/j.ajem.2013.05.046>