

Danger of Treatment Protocols

To the Editor:

A recent AHA Scientific Statement on medication errors in acute cardiovascular care suggested that streamlined protocols and standardized order forms may be useful in reducing medical errors.¹ We would like to draw attention to a potential danger of such measures, namely the erroneous application of tPA treatment protocols for acute myocardial infarction (MI) to patients with acute stroke. We report a case of such a misapplication that possibly contributed to development of an intracerebral hemorrhage (ICH).

A 68-year-old man with a history of aortic valve replacement presented to an emergency department 90 minutes after onset of aphasia and right hemiparesis. Initial head CT and laboratory studies were normal. The patient was treated with intravenous tPA according to the NINDS stroke thrombolysis protocol.² The treating neurologist wrote orders consistent with this protocol, including avoidance of antithrombotic or anticoagulant therapies for 24 hours. Unfortunately, the nursing staff caring for the patient erroneously implemented the hospital's standardized prewritten acute MI thrombolysis protocol, and the patient was given a bolus of intravenous heparin followed by a maintenance infusion. One hour later the error was noted and heparin was discontinued. A repeat head CT was immediately performed and showed a new left thalamic ICH as well as early signs of left temporal-parietal infarction. Over the next 24

hours, the patient's right-sided weakness improved significantly, although he remained markedly aphasic. The patient was transferred to our institution where subsequent evaluation revealed a high-grade left carotid stenosis. Follow-up head CT showed a stable left thalamic hemorrhage and radiographically evolving left temporal-parietal infarction (Figure).

ICH is the most feared complication of thrombolytic therapy. Increased risk of ICH has been associated with anticoagulation following thrombolysis and higher doses of thrombolytics in both MI and stroke patients.³⁻⁵ Given the particularly high risk of ICH in stroke patients, the NINDS stroke thrombolysis protocol specifically prohibits use of anticoagulation or antithrombotic therapies within 24 hours of tPA administration, in distinct contrast to the standard treatment approach for patients with MI. Further, a lower dose of tPA is used in treatment of stroke compared with MI. While standardized order forms and treatment protocols have been proposed as a means to reduce medical errors, these protocols may in certain circumstances contribute to, rather than reduce, such errors. Heightened awareness of the potential for confusion between written tPA protocols for MI and acute stroke is urgently needed. Measures to reduce the potential for error might include redesign of treatment protocols to incorporate warnings verifying the indication for thrombolysis, improved communication between health care providers, and increased education regarding acute stroke therapy.

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Head CT performed 2 days after symptom onset demonstrates left thalamic hemorrhage and left temporal-parietal hypodensity consistent with subacute ischemic stroke.

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