Predicting abnormal coagulation in ischemic stroke

Gottesman et al. identified a simple historical screen that, when applied to stroke patients, predicted elevated prothrombin time/partial thromboplastin time 100% of the time. These results could be applied to tissue-plasminogen activator (t-PA) candidates and could reduce potential delays.

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Eliminating delay in rt-PA administration

Commentary by Leslie Lee, MD

Until there are new treatments for acute stroke, it is essential to optimize the timely delivery of well-established thrombolytic therapies to all appropriate candidates. However, only 3%-8.5% of patients who experience an ischemic stroke receive intravenous or intra-arterial rt-PA.[1] This statistic mandates continued re-evaluation of the practical obstacles that are faced, both in the community setting and emergency room, since timing is essential for safe and effective delivery of thrombolytics. Public awareness of stroke symptoms and the accessibility of prerequisite hospital facilities are two significant rate-limiting factors in acute stroke care.[2]

Factors delaying tPA administration also deserve closer attention. Gottesman et al. identify the waiting time required for coagulation studies as one such obstacle that potentially delays the prompt administration of IV tPA, as abnormalities in PT/PTT clotting times are relative contraindications to treatment.

The prothrombin time (PT) assesses the extrinsic and common pathways of coagulation, while the activated partial thromboplastin time (PTT) measures the integrity of the intrinsic and common pathways of coagulation. Acquired causes of PT prolongations include liver dysfunction and warfarin use, whereas heparin use and lupus anticoagulants tend to prolong the PTT.

My informal telephone survey of university hospital coagulation lab directors in Rochester and Boston found similarities in the standard time required for analysis of PT/PTT clotting times. Under optimal conditions, once a "STAT" specimen is received in the lab, 10 minutes is required for centrifugation, and an additional 8 minutes for processing. There is a "super-STAT" option which may generate results in 15 minutes. Generally, though, a turnaround time of 25 to 30 minutes is expected. In the future, point-of-care (POC) instruments may be more widely used at the bedside for rapid assay of clotting times, potentially yielding results within several minutes. However, data regarding the reliability and reproducibility of these methods are needed.[3]

Patients in the National Institute of Neurological Disorders and Stroke trial who were treated within 90 minutes of symptom onset had a more favorable response to tPA than those treated between 91 and 180 minutes.[4] The extent to which waiting for PT/PTT results ultimately impacts the delivery of IV tPA therapy in clinical practice is uncertain. The alternative strategy of rapidly screening for bleeding diatheses could reduce the "onset to needle time" of thrombolytic administration.

Gottesman et al. emphasize the importance of ascertaining specific information regarding warfarin or heparin use, abnormal liver function, antiphospholipid syndrome, and end-stage renal disease, as the absence of these may confer a greater degree of confidence to the clinician prior to starting an infusion of tPA. Any measure that could potentially expedite the delivery of thrombolytics to appropriate candidates would be of benefit in salvaging brain tissue that may fall in the penumbra of ischemic injury.

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