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Risk Factors for Symptomatic Intracranial Hemorrhage After Intravenous Thrombolysis for Acute Stroke

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Background: Recent studies have shown that chronic use of warfarin or antiplatelets prior to administration of IV tPA for acute stroke is associated with an increased risk of post-tPA symptomatic intracranial hemorrhage (SICH). Our study examines these risk factors for post-tPA SICH at our institution.

Methods: With IRB approval, we reviewed 800 patient records from our thrombolytic database who received IV tPA at our institution between 2002 and 2010. We excluded patients who were treated outside the 4.5 hour time window, underwent intraarterial intervention, had IV tPA protocol violations, or were enrolled in experimental trials. SICH was defined as an increase in NIHSS score by > 4 points or neurologic decline that is associated with ICH on imaging. Logistic regression analysis followed by multivariate analysis was carried out on several potential risk factors for post-tPA SICH: single antiplatelet use, dual antiplatelet therapy, warfarin use, statin use, and pre-treatment INR. We used the same statistical model to analyze other pre-treatment risk factors such as NIHSS score, blood pressure, and serum glucose, and also baseline risk factors such as hypertension and diabetes.

Results: In total, 676 patient records that met inclusion criteria were analyzed. Antithrombotic use was as follows: ASA (193/29.2%), clopidogrel (32/4.84%), ASA + clopidogrel (39/5.9%), warfarin (65/9.83%). We noted a non-significant trend toward increased rate of SICH in aspirin-only users (OR = 2.81, 95% CI = 0.76-10.39, p = 0.122) and warfarin users (OR = 4.46, 95% CI = 0.87-22.76, p = 0.072), but not in clopidogrel-only users. Pre-treatment INR > 1.2 and < 1.8 was also not an independent predictor of SICH (p = 0.30). In multivariate analysis, chronic dual antiplatelet therapy was associated with increased risk of post-tPA SICH (OR = 11.95, 95% CI = 2.46-57.99, p = 0.002) in addition to pre-treatment systolic blood pressure (OR = 1.02, 95% CI = 1.01-1.04, p = 0.008), early CT changes (OR = 5.21, 95% CI = 1.08-25.17, p = 0.04), and history of diabetes (OR = 4.06, 95% CI = 1.46-11.30, p = 0.007).

Conclusions: At our institution, we found that pre-treatment use of dual antiplatelet agents was an independent predictor of post-tPA SICH, which is consistent with the findings from prior SITS-ISTR studies. However, in contrast to prior studies, chronic use of warfarin and pre-treatment INR > 1.2 were not associated with an increased risk of post-tPA SICH.