Clinical pathology selected abstracts

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Intensive versus standard blood pressure control with cerebral white matter lesions

November 2019—The effect of intensive systolic blood pressure control on brain health is uncertain, despite its efficacy for reducing cardiovascular morbidity and mortality. However, hypertension is a primary risk factor for cerebral small vessel ischemic disease (SVID), especially in developing white matter lesions (WML). The pathogenesis of Alzheimer disease and related dementia is known to be associated with SVID and cognitive decline. As many as 30 to 60 percent of patients with Alzheimer disease and related dementias have vascular findings that contribute to their cognitive impairment. Data supporting a beneficial effect of antihypertensive treatment in slowing the progression of SVID in the brain are limited. In this study, investigators tested the hypothesis that the increase in white matter lesion volume, a measure of SVID progression, would be lower in patients randomized to intensive systolic blood pressure control (less than 120 mm Hg) compared with standard systolic blood pressure treatment (less than 140 mm Hg). Change in total brain volume was also analyzed as a secondary outcome. The SPRINT MIND (Systolic Blood Pressure Intervention Trial) investigators conducted a substudy of a multicenter randomized clinical trial of hypertensive adults 50 years or older, who did not have a history of diabetes or stroke, at 27 sites in the United States. Baseline brain magnetic resonance imaging was performed on 670 participants, and 449 of them had a follow-up MRI approximately four years later. Patients in the intensive systolic blood pressure treatment group had a mean white matter lesion volume increase from 4.57 to 5.49 cm^3 (difference, 0.92 cm^3), while patients in the standard systolic blood pressure treatment group went from 4.40 to 5.85 cm^3 (difference, 1.45 cm^3). The intensive systolic blood pressure treatment group also had a significantly greater decrease in total brain volume compared with the standard treatment group. The significance of this outcome in the intensive systolic blood pressure treatment group is unclear. In conclusion, the investigators demonstrated that targeting systolic blood pressure of less than 120 mm Hg versus less than 140 mm Hg among hypertensive adults resulted in a smaller increase in cerebral white matter lesion volume and a greater decrease in total brain volume. However, the authors noted that the differences among the two intervention groups were small. Additional studies are needed to investigate differential regional associations and differences between therapies.

The SPRINT MIND investigators for the SPRINT Research Group. Association of intensive vs standard blood pressure control with cerebral white matter lesions. *JAMA.* 2019;322(6):524–534.

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Predicting major adverse events in patients with acute myocardial infarction

Acute chest pain plays an important role in the early detection of acute myocardial infarction because of the high mortality within the first few hours and the ability of effective treatment to intervene in outcomes for major adverse cardiac events (MACE) within 30 days. Risk stratification is based on three diagnostic criteria: detailed clinical assessment, 12-lead electrocardiogram (ECG), and cardiac troponin (cTn) as a biomarker of cardiac injury. Troponin assays with higher analytical sensitivity (hs-cTn) performed at presentation and after one hour have substantially increased the early diagnostic accuracy for acute myocardial infarction (AMI). The European Society of Cardiology (ESC) hs-cTn–based testing strategies have a very high safety and efficacy for ruling in or out AMI in the early stages. The authors performed a pilot study to assess how to combine the hs-cTnT 0/1 h algorithm with clinical assessment and electrocardiogram findings—that is, the extended algorithm—to most accurately predict

MACE. The goal was to validate, in a large prospective multicenter study, the performance of the extended algorithm in predicting short-term MACE versus that of the standard ESC hs-cTnT 0/1 h algorithms. The authors studied patients presenting to an emergency department with suspected AMI for whom the primary endpoint was MACE, including all-cause death, cardiac arrest, AMI, cardiogenic shock, sustained ventricular arrhythmia, and high-grade atrioventricular block within 30 days, including index events. They also studied a secondary endpoint of patients with MACE plus unstable angina receiving early (24 hours or less) revascularization. Among the 3,123 patients, the ESC hs-cTnT 0/1 h algorithm ruled out AMI in significantly more patients than the extended algorithm, while maintaining similar 30-day MACE rates (60 versus 45 percent). The ESC hs-cTnT 0/1 h algorithm also ruled in fewer patients compared with the extended algorithm (16 versus 26 percent), although it had a higher positive predictive value. The ESC hs-cTnT 0/1 h algorithm had a higher positive predictive value for ruling in 30-day MACE plus unstable angina, and the extended algorithm had a higher negative predictive value for ruling it out. The authors concluded that the ESC hs-cTn 0/1 h algorithm did a better job of balancing efficacy and safety in predicting MACE, although the extended algorithm is preferred for ruling out 30-day MACE plus unstable angina. The authors suggested that detecting unstable angina is important and that the extended algorithm is a valuable tool for that purpose.

Nestelberger T, Boeddinghaus J, Wussler D, et al. Predicting major adverse events in patients with acute myocardial infarction. *J Am Coll Cardiol.* 2019;74(7):842–854.

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