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Predictors of Intraventricular Extension of Intracerebral Hemorrhage Confounded by Antithrombotic Medication Exposure

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To the Editor

We read with interest the article by Kim et al, regarding the association between white matter lesions (WML) and intraventricular extension (IVH) of intracerebral hemorrhage (ICH), which appeared in the May issue of *Critical Care Medicine*.⁽¹⁾ The extent of WML was markedly different between cases with and without IVH, yet several additional characteristics differed greatly between those groups that are known to impact disease severity and may also account for the observed relationship between WML and IVH. The authors appropriately sought to address confounding by those factors using multivariable analysis, although other crucial exposures have not been addressed. Leukoaraiosis, the predominant term for WML in the neurologic literature, is substantially more prevalent in patients with atrial fibrillation and other vascular risk factors that are routinely treated with antithrombotic medications.^(2, 3) Antithrombotic medications, in turn, increase the incidence of ICH, and more importantly for this study, increase the likelihood and volume of associated IVH.^(4, 5) Warfarin use, for example, is noted in over 25% of ICH cases, and is one of the strongest predictors of IVH beyond hematoma volume and hemorrhage location.⁽⁴⁾

Emerging data suggests that leukoaraiosis is a potent, independent predictor of outcome after ICH, even after adjustment for IVH.⁽⁶⁾ The pathophysiology by which WML impacts functional outcomes in patients after ICH is not clearly known, and further study of WML in this population is very important. We would urge caution, however, in asserting a relationship between WML and IVH based on data that have not been adjusted for antithrombotic medication exposure, one of the clearest risk factors for IVH.

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