

## Localization of Intracerebral Hemorrhage on Risk of Vascular Dementia: A 10-year Retrospective Study

Ryan Harmelink<sup>1</sup>, Aditi Ravikumar<sup>1</sup>, Matthew Tobin<sup>2</sup>, Bradley Bohnstedt<sup>2</sup>

<sup>1</sup>Indiana University School of Medicine

<sup>2</sup>Indiana University School of Medicine, Department of Neurosurgery

**Background & Hypothesis:** Intracerebral hemorrhage (ICH) can be devastating to cognition and constitutes 13% of all stroke cases. Owing to its disproportionate incidence relative to outcome severity, spontaneous ICH accounts for more than two-thirds of all-stroke mortality. Approximately one-third of spontaneous ICH patients develop vascular dementia but the etiological link remains undercharacterized. The aim of this study is to elucidate how ICH locality and volume relate to the disease.

**Project Methods:** A 10-year retrospective chart review was conducted on patients with their first ICH at IU Methodist (01/2014-01/2024). Patient demographics and stroke characteristics were abstracted from IU Health Cerner and charted in REDCap. Using Synapse radiology PACS, hematoma size and location were calculated while referencing neuroradiological reports (ABC/2 estimation). Cognitive characteristics such as duration to develop dementia or MCI, dementia type, and independence metrics were collected. All data were analyzed in RStudio.

**Results:** Of 30 patients meeting inclusion criteria, 5 had a pre-existing dementia (16.7%) and 1 with pre-existing MCI (3.33%), 10 (33.3%) with dementia and 8 (26.7%) with MCI at ICH discharge, and 4 patients had downstream dementia (13.3%) while 2 had MCI (6.67%). Of the 19 dementia patients, the average hematoma volume was significantly higher (21.6 mL) compared to MCI patients (12.2 mL,  $p < 0.05$ ). There were no significant differences between lobar ICH patients ( $n=13$ ), non-lobar ICH ( $n=13$ ), or both ( $n=4$ ) in time-to-diagnosis ( $p=0.863$ ), however, ICHs in both locations had significantly larger hematomas ( $p=0.02$ ).

**Conclusion & Potential Impact:** ICH location and volume may not be associated with differential dementia outcomes despite correlatory volumetric differences between dementia groups. This study may guide clinicians in prognosticating and counseling high acuity patients and serve to pilot larger power characterizations of the ICH-dementia relationship.