

The Effect of Diabetes on the Risk of Intracranial Hemorrhage Following Head Injury in Geriatric Patients

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Study Objectives: Diabetes disproportionately affects the elderly; one-fourth of adults in the United States over the age of 65 have diabetes, and one-half have prediabetes. Diabetes further compounds the physiological changes associated with normal aging and is one of the main predictors of fall risk and, by extension, trauma in older adults. While prior studies have shown a correlation between age, diabetes, and risk of spontaneous intracranial hemorrhage (ICH), there has been limited study on the association between these contributing factors and traumatic ICH (tICH). Patients over the age of 45 are five times more likely to experience tICH following head injury, suggesting that age-related changes such as cerebral atrophy cause impairment of the tamponading effect of younger brains. As similar cerebral atrophy is seen in diabetic patients, these individuals may also experience higher rates of tICH. We therefore hypothesize that diabetes increases the risk of tICH following head injury in geriatric patients.

Methods: This is a prospective cohort study of consecutive patients age ≥ 65 years with blunt head trauma from August 2019 to August 2020 presenting to the emergency departments of two level one, university affiliated trauma centers serving the same county in Florida. Exclusion criteria included transfers from outside hospitals and penetrating head injuries. Patients were screened daily for inclusion and had chart review performed for past medical history and CT head results. The primary study outcome was occurrence of acute tICH, which was compared between diabetic and non-diabetic patients. ICHs were further classified as an acute (found on initial head CT) or delayed (found after initial negative head CT). Secondary outcome measures were in-hospital and 90-day mortality.

Results: A total of 5253 patients were enrolled in the study, 957 with diabetes and 4296 without. In patients with diabetes versus those without, there was no statistically significant difference in acute (8.0% vs 7.5%, $p=0.544$) or delayed tICH (0.2% vs 0.5%, $p=0.209$). Furthermore, there was no difference in in-hospital mortality (0.9% vs 1.0%, $p=0.815$) or 90-day mortality (13.2% vs 11.9%, $p=0.267$).

Conclusions: Though there is theoretical reason to believe that diabetes could correlate with higher rates of tICH, this study found no statistically significant differences. Future research could examine situational factors (lightheadedness, hypoglycemic episode) that may have precipitated the patients' head injuries, and thus, any resulting tICH.