

Hyperglycemia is independently associated with decreased survival after aneurysmal subarachnoid hemorrhage in Mexican patients

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Supplementary material

Table S1. Systematic review of studies of association glycemia and SAH (1993-2017 years)

Year	Author	Sample size (n)	Primary aim	Related results
1993	Lazino et al. ³	616	– Prospective analysis: to determine the role of admission hyperglycemia in aSAH prognostic	– Hyperglycemia (> 120 mg/dL) predicted poor outcome in comparison with normal glucose levels: in good recovery 53.7% versus 70.2% (p = 0.002) and death rate 19.9% versus 6.7% (p = 0.001)
2000	Alberti et al. ⁵	99	– Prospective analysis: to demonstrate hyperglycemia as a sign of central metabolic disturbance linked with different brain injury degree appearances on CT scans in spontaneous SAH	– Patients with mild CT findings (n = 10) had a lowest glucose level (mean ± SD) (8.9 ± 1.8 mmol/l; p = 0.0082), whereas a higher glucose level (11.4 ± 3.5 mmol/l; p = 0.011) were associated with severe CT findings
2001	Capes et al. ³²	32 studies	– Meta-analysis: to demonstrate the association between stroke (ischemic and/or hemorrhagic) with admission serum glucose level	– An admission glucose level > 6-8 mmol/L (108-144 mg/dL) represents an RR of 3.07 for in-hospital 30-day mortality in non-diabetic patients and of 1.30 in diabetic patients
2003	Mees et al. ¹²	337	– Cohort study: to investigate the relationship between blood glucose levels, baseline characteristics, and outcome in SAH	– Blood glucose level was higher in patients with poor condition on admission – The multivariate analysis did not show relation of glucose levels as an independent poor outcome predictor
2004	Claassen et al. ¹⁸	413	– Consecutive cohort study: to determine the effect of acute physiologic derangements on outcome after SAH	– Serum glucose > 180 mg/dL (OR 2.8, 95% CI, 1.6-4.8) was independently associated with death or disability (shown as mRS 4-6, at 3 months)
2005	Juvela et al. ⁴	175	– Prospective analysis: to test whether hyperglycemia, overweight, and hypertension affect patient outcomes and the occurrence of cerebral infarction after SAH	– The glucose levels at admission predicted a poor outcome (per mmol/L), the OR was 1.24 with 95% CI of 1.02-1.51
2005	Badjatia et al. ¹⁷	352	– Retrospective observational study: to determine the relationship between blood glucose levels and occurrence of symptomatic vasospasm and clinical outcomes after aSAH	– Mean admission blood glucose (176 ± 40.3 mg/dL vs. 162.3 ± 47.8, p = 0.01) and inpatient blood glucose (166.2 ± 24.7 mg/dL vs. 155.8 ± 29.7, p = 0.001) levels were higher in patients with clinical vasospasm – Hyperglycemia was associated with poorer outcome at discharger (mRS > or = 3: 58.9% vs. 18.8%; p < 0.001)
2006	Frontera et al. ¹⁹	281	– Cohort study: to demonstrate whether the mean glucose burden (GB) (defined as an average peak daily glucose level > 5.8 mmol/L) contributes to in-hospital complications and poor outcome after SAH	– GB was associated with an increased intensive care unit length of stay (p = 0.0003) and other complications: congestive heart failure, respiratory failure, pneumonia, and brain stem compression from herniation (all p > 0.05) – GB was an independent predictor of death (OR 1.10/ mmol/L; 95%, CI, 1.01-1.21; p = 0.027)
2007	McGirt et al. ¹⁶	97	– Prospective analysis: to clarified whether a single hyperglycemic event or persistent hyperglycemia is predictive of poor outcome after aSAH	– Isolated hyperglycemic levels did not predict poor outcome – Patients with persistent hyperglycemia were 7-fold more likely to have a poor outcome a mean 10 months after aSAH
2008	Kruyt et al. ¹⁵	265	– Prospective database analysis: to assess whether levels of mean fasting glucose within the 1 st week of admission predict poor outcome and delayed cerebral ischemia (DCI) in SAH patients	– The OR intervals for poor outcome were 1.9-1.6 for high admission glucose and 3.5-2.5 for high mean fasting glucose (95% CI). – The HR intervals for DCI were 1.7-1.4 for high admission glucose and 2.0-1.7 for high mean fasting glucose
2009	Kruyt et al. ²⁸	17 studies (4095 patients)	– Meta-analysis: to investigate the relation between admission hyperglycemia and outcome after SAH	– The mean admission glucose level was 9.3 mmol/L (range, 7.4-10.0 mmol/L) and the median proportion of patients with hyperglycemia was 69% (range 29-100%) – The pooled OR (8 studies) was 3.1 (95% CI, 2.3-4.3) for poor outcome associated with hyperglycemia
2010	Helbok et al. ¹³	28	– Prospective consecutive study with multimodality monitoring of comatose SAH patients: to determine if metabolic crisis (MC) and lactate-pyruvate ratio (LPR) are associated with reductions in serum glucose	– Reductions in serum glucose of 25% or more were associated with new onset MC (OR 3.5, 95% CI, 2.2-6.0) and with an LPR rise (OR 1.6, 95% CI, 1.1-2.4) – The brain energy metabolic crisis and LPR elevation may be associated with poor-grade SAH patients
2012	Sayantani et al. ⁷	2000	– Retrospective study from a prospective database: to determine the relationship between serum and cerebrospinal fluid (CSF) glucose levels and outcome in aSAH	– Serum glucose > 151.58 mg/dL (95% CI, 141.36-160.63) and CSF > 77.83 mg/dL (95% CI, 75.05-80.61) were associated with worse outcome. – The OR for a poor outcome with per 1 mg/dL increase of the serum glucose level on admission was 1.015 (95% CI, 1.013-1.017) and of 1.0175 (95 CI, 1.015-1.02) for death – The OR for a poor outcome with per 1 mg/dL increase in the CSF glucose levels was of 1.087 (95% CI, 1.078-1.096) and of 1.048 (95% CI, 1.041-1.055) for death
2017	Beseoglu et al. ²⁹	87	– Prospective analysis: to demonstrate the influence of glycated hemoglobin (HbA1c) on outcome of patients with aSAH	– HbA1c levels did not correlate with initial neurological status (p = 0.338, r = 0.104), the occurrence of delayed cerebral ischemia (p = 0.400), or outcome at 6 months (using mRS) (p = 0.790)

aSAH: aneurysmal subarachnoid hemorrhage; CI: confidence interval.