Serum glucose potassium ratio

Last update: 04/03/2020

Serum glucose and potassium ratio (GPR) was found to be related with aneurysmal subarachnoid hemorrhage outcome [1) 2) 3)].

A retrospectively study was to investigate the association of serum GPR with mortality in severe traumatic brain injury (sTBI).

Clinical data were retrospectively reviewed of isolated sTBI patients admitted within 12 h after trauma between January 2014 and January 2019. They analyzed relationships between admission serum GPR and post-traumatic 30-day mortality in addition to admission Glasgow coma scale (GCS) scores. Discriminative ability was evaluated using area under the receiver operating characteristic (AUC).

A total of 146 patients, of whom 37 (25.3%) died within 30 days following trauma, were included. Admission serum GPR emerged as an independent predictor for 30-day mortality (odds ratio, 5.256; 95% confidence interval (CI), 1.111-14.856) and overall survival (hazard ratio, 4.822; 95% CI, 1.157-12.870), with an AUC of 0.777 (95% CI, 0.693-0.835), which was equivalent to that of GCS scores (AUC, 0.831; 95% CI, 0.760-0.888; P =0.179). There was a significant correlation between admission serum GPR and GCS scores (r2=0.293).

Serum GPR in cases of sTBI is substantially associated with trauma severity and 30-day mortality. Therefore, the potential value of serum GPR for predicting short-term mortality of sTBI patients is favorable [4)].

Matano et al. studied 333 of 535 aneurysmal SAH patients treated between 2006 and 2016 (123 males, 210 females; mean age 59.7 years; range 24-93). We retrospectively analyzed the relationship between cerebral vasospasm grade and clinical risk factors, including serum glucose/potassium ratio.

Postoperative angiography revealed cerebral vasospasm in 112 patients (33.6%). Significant correlations existed between the ischemic complication due to cerebral vasospasm and glucose/potassium ratio (P < .0001), glucose (P = .016), and potassium (P = .0017). Serum glucose/potassium ratio was elevated in the cerebral vasospasm grade dependent manner (Spearman's r = 0.1207, P = .0279). According to the Glasgow Outcome Scale (GOS) score at discharge, 185 patients (55.5%) had a poor outcome (GOS scores 1-3). Serum glucose/potassium ratio was significantly correlated between poor outcome (GOS scores 1-3) and age (P < .0001), serum glucose/potassium ratio (P < .0001), glucose (P < .0001), potassium (P = .0004), white blood cell count (P = .0012), and cerebral infarction due to cerebral vasospasm (P < .0001). Multivariate logistic regression analyzes showed significant correlations between cerebral infarction due to cerebral vasospasm and serum glucose/potassium ratio (P = .018), glucose (P = .027), and potassium (P = .052).

Serum glucose/potassium ratio in cases of aneurysmal SAH was significantly associated with cerebral infarction due to cerebral vasospasm and GOS at discharge. Therefore, this factor was useful to predict prognosis in patients with cerebral vasospasm and aneurysmal SAH [5)].

Zhang et al.retrospectively analyzed 198 patients with aSAH who were admitted within 24 hours of hemorrhage to a single academic hospital from June 2016 to September 2017. The following determinations were recorded: aSAH severity on admission, assessment by the World Federation of Neurosurgical Societies grading scale (WFNS), Fisher score defined according to the computed tomography results, and 3-month outcome assessed by the Glasgow Outcome Scale. A statistical analysis of the clinical and laboratory risk factors of poor outcome was conducted.

Admission serum glucose-phosphate ratio was increased in a WFNS grade-dependent manner and was higher in patients who had a poor outcome than in those who had a good outcome 3 months after aSAH. Multiple binomial logistic regression analysis showed that serum glucose-phosphate ratio, along with age, WFNS grade, and intraventricular hemorrhage, was associated with 3-month poor outcome after aSAH when we controlled for Fisher score, acute hydrocephalus, delayed cerebral ischemia, symptomatic cerebral vasospasm, serum glucose and phosphate levels, and glucose-potassium ratio. Receiver operating characteristic analysis showed that the area under the curve for glucose-phosphate ratio was significantly higher than age and intraventricular hemorrhage.

The study shows that the glucose-phosphate ratio is a potential biomarker that can reflect disease severity and prognosis in aSAH patients [6].

Fujiki et al. retrospectively reviewed the records of 565 patients with aneurysmal SAH between 2006 and 2016. The patient group comprised 208 men and 357 women (mean age 61.5 years, range 10-95 years). A statistical analysis was conducted of the clinical and laboratory risk factors of poor outcome, including the serum glucose/potassium ratio.

On estimation of the initial assessment using Hunt and Kosnik (H-K) grading, 233 patients (41.2%) were classified as the severe SAH group (H-K Grade IV or V). There were significant correlations between the severe SAH group and serum glucose/potassium ratio ($p < 0.0001$). Serum glucose/potassium ratio was elevated in an H-K grade-dependent manner (Spearman's $r = 0.5374$, $p < 0.0001$). With the estimation of the Glasgow Outcome Scale (GOS) score at discharge, 355 patients (62.8%) were classified as poor outcome (GOS score 1-3). The serum glucose/potassium ratio was elevated in a GOS score at discharge-dependent manner (Spearman's $r = 0.4006$, $p < 0.0001$), and was significantly elevated in the poor outcome group compared with the good outcome group (GOS score 4 or 5; $p = 0.0245$). There were significant correlations between poor outcome and serum glucose/potassium ratio ($p < 0.0001$), age ($p < 0.0001$), brain natriuretic peptide levels ($p = 0.011$), cerebral infarction due to vasospasm ($p < 0.0001$), and H-K grade ($p < 0.0001$). Multivariate logistic regression analyses showed significant correlations between poor outcome and serum glucose/potassium ratio ($p = 0.009$).

In this study, the serum glucose/potassium ratio of patients with aneurysmal SAH at admission was significantly correlated with H-K grade and GOS score at discharge. Therefore, this ratio was useful for predicting prognosis of aneurysmal SAH, especially in severe cases [7].

References

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