Increased plasma copeptin concentrations are related to poor prognosis after aneurysmal subarachnoid hemorrhage (aSAH). The aim of this study was to assess prognostic significance of plasma copeptin detection compared with glial fibrillary astrocyte protein, myelin basic protein, S100B, phosphorylated axonal neurofilament subunit H, neuron-specific enolase, tau and ubiquitin carboxyl-terminal hydrolase L1 in aSAH.

Zheng et al., detected plasma concentrations of the aforementioned biomarkers in 105 healthy controls using ELISA. Their predictive ability for symptomatic cerebral vasospasm and 6-month poor outcome (Glasgow Outcome Scale score of 1-3) were compared.

Plasma concentrations of the preceding biomarkers were highly correlated with World Federation of Neurological Surgeons subarachnoid hemorrhage scale (WFNS) scores as well as were significantly higher in patients with symptomatic cerebral vasospasm than in those without symptomatic cerebral vasospasm and in patients with poor outcome than in those with good outcome. In terms of area under receiver operating characteristic curve, their predictive value for symptomatic cerebral vasospasm and 6-month poor outcome was in the range of WFNS scores. Plasma copeptin concentration, but not plasma concentrations of other biomarkers, statistically significantly improved the predictive performance of WFNS scores.

Copeptin in plasma might have the potential to be a useful prognostic biomarker for aSAH [1)].

Eighteen consecutive patients with aSAH had plasma copeptin levels measured with a validated chemiluminescence sandwich immunoassay. The primary endpoint was the association of copeptin levels at admission with the World Federation of Neurological Surgeons (WFNS) grade score after resuscitation. Levels of copeptin were compared across clinical and radiological scores as well as between patients with ICH, intraventricular hemorrhage, hydrocephalus, vasospasm and ischemia.

RESULTS: Copeptin levels were significantly associated with the severity of aSAH measured by WFNS grade ($P=0.006$), the amount of subarachnoid blood ($P=0.03$) and the occurrence of ICH ($P=0.02$). There was also a trend between copeptin levels and functional clinical outcome at 6-months ($P=0.054$). No other clinical outcomes showed any statistically significant association.

CONCLUSIONS: Copeptin may indicate clinical severity of the initial bleeding and may therefore help in guiding treatment decisions in the setting of aSAH. These initial results show that copeptin might also have prognostic value for clinical outcome in aSAH [2)].

In the setting of aneurysmal subarachnoid hemorrhage (SAH), elevated serum copeptin levels correlate with vasospasm, inpatient mortality, mortality at 1 year, and poor functional outcome at 1 year. The potential role of serum copeptin levels in the management of patients with aneurysmal SAH is promising and should be explored further [3)].

In this retrospective study, 303 consecutive patients were included. Upon admission, plasma copeptin levels were measured by enzyme-linked immunosorbent assay. The end points were mortality after 1 year, in-hospital mortality, cerebrovasospasm and poor functional outcome (Glasgow Outcome Scale score of 1-3) after 1 year.

RESULTS: Upon admission, plasma copeptin level in patients was statistically significantly higher than that in healthy controls. A multivariate analysis showed that plasma copeptin level was an independent predictor of poor functional outcome and mortality after 1 year, in-hospital mortality and cerebrovasospasm. A receiver operating characteristic curve showed that plasma copeptin level on admission predicted poor functional outcome and mortality after 1 year, in-hospital mortality and cerebrovasospasm of patients statistically significantly. The area under curve of the copeptin concentration was similar to those of World Federation of Neurological Surgeons (WFNS) score and modified Fisher score for the prediction of poor functional outcome and mortality after 1 year, and in-hospital mortality, but not for the prediction of cerebrovasospasm. In a combined logistic-regression model, copeptin improved the area under curve of WFNS score and modified Fisher score for the prediction of poor functional outcome after 1 year, but not for the prediction of mortality after 1 year, in-hospital mortality, and cerebrovasospasm.

CONCLUSIONS: Copeptin level is a useful, complementary tool to predict functional outcome and mortality after aneurysmal subarachnoid hemorrhage [4)].

1)
Zheng YK, Dong XQ, Du Q, Wang H, Yang DB, Zhu Q, Che ZH, Shen YF, Jiang L, Hu W, Wang KY, Yu WH. Comparison of plasma copeptin and multiple biomarkers for assessing prognosis of patients with aneurysmal subarachnoid hemorrhage. Clin Chim Acta. 2017 Dec;475:64-69. doi: 10.1016/j.cca.2017.10.009. Epub 2017 Oct 13. PubMed PMID: 29037840.
2)
Fung C, De Marchis GM, Katan M, Seiler M, Arnold M, Gralla J, Raabe A, Beck J. Copeptin as a marker for severity and prognosis of aneurysmal subarachnoid hemorrhage. PLoS One. 2013;8(1):e53191. doi: 10.1371/journal.pone.0053191. Epub 2013 Jan 11. PubMed PMID: 23326397; PubMed Central PMCID: PMC3543451.
3)
Tamargo RJ. Copeptin in aneurysmal subarachnoid hemorrhage. Crit Care. 2012 Jan 10;16(1):103. doi: 10.1186/cc10594. PubMed PMID: 22236394; PubMed Central PMCID: PMC3396223.
4)
Zhu XD, Chen JS, Zhou F, Liu QC, Chen G, Zhang JM. Detection of copeptin in peripheral blood of patients with aneurysmal subarachnoid hemorrhage. Crit Care. 2011;15(6):R288. doi: 10.1186/cc10575. Epub 2011 Nov 29. PubMed PMID: 22126444; PubMed Central PMCID: PMC3388690.