

Highlights of Analytical Chemistry in Switzerland

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Copeptin: A New Prognostic Stress-Marker in Ischemic Stroke

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Stroke is the third leading cause of death and the primary cause of long term disability. Thus, there is need to develop a credible evidence base of prognostic information for outcomes that is meaningful to patients and clinicians, including the level of independency.

Every bodily disruption – such as an ischemic stroke – evokes a stress response, which serves to restore homeostasis and to facilitate adaptation. Essential to the stress response are corticotropin-releasing hormone (CRH) with its cosecretagogue arginin-vasopressin (AVP) and other neuropeptides that drive the activity of the hypothalamic-pituitary-adrenal (HPA) axis. These stress hormones serve as a sort of on-site monitoring, and allow the endogenous information system of our body to be tapped into that accurately assesses the severity of damage and thus prognosis. An accurate prognostic assessment has the potential to guide interventions and effectively plan and monitor rehabilitation, thus optimizing the management of patients.

Unfortunately, the measurement of circulating AVP levels and CRH is challenging. Until now these stress hormones could

not be used as reliable prognostic markers in stroke. However, copeptin, a glycopeptide derived from the vasopressin precursor hormone together with neurophysin II, is released in an equimolar ratio to AVP. It is more stable in the circulation and easy to determine due to a new sandwich immunoassay.

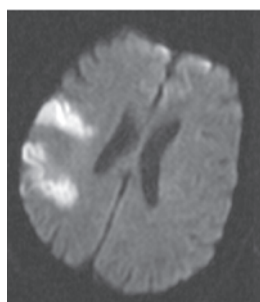
We therefore conducted a prospective cohort study at the University Hospital Basel, Switzerland, over one year. Patients presenting with an acute ischemic cerebrovascular event were included and 362 patients with an ischemic stroke were analysed. In this study, we found copeptin to be a novel, strong, and independent prognostic marker for functional outcome and death in patients with ischemic stroke. The prognostic accuracy of copeptin in stroke patients was superior to that of other commonly measured laboratory parameters. The combination of the gold standard clinical score (the National Institute of Health Stroke score) with the biomarker revealed a significantly better prognosis.

Copeptin appears to have interesting potential as a new prognostic biomarker. This may allow improved risk-stratification and allocation of targeted therapies for stroke patients in the future. A more tailored allocation of health care resources to patients at-risk is arguably the prerequisite for high quality health care in an era of limited health care resources.

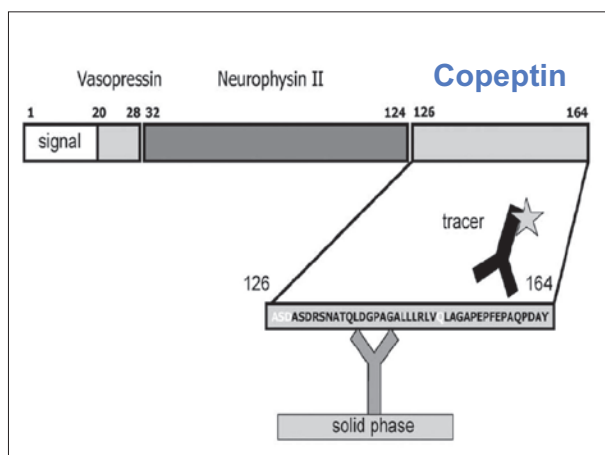
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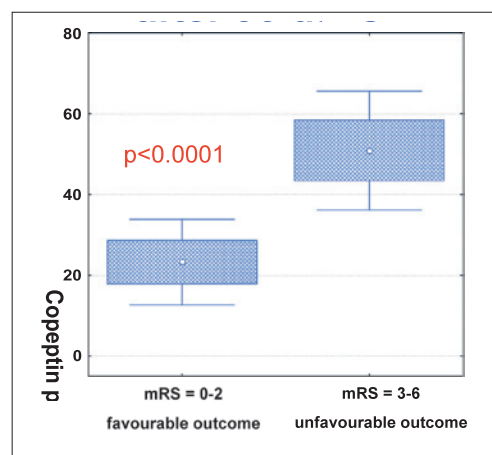
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Diffusion-weighted image showing in white the ischemic area of a stroke.



Immunoassay for copeptin (figure is partially adapted from J. Struck, N. G. Morgenthaler, A. Bergmann, *Peptides* **2005**, *26*, 2500).



Copeptin concentration in patient plasma and functional outcome after 90 days.

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