

Category : **Brain: cerebro-vascular accidents**

**A24 - Machine learning and heart rate variability to detect cerebral ischemia**

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### **Introduction:**

Detecting delayed cerebral ischemia (DCI) in patients with aneurysmal subarachnoid haemorrhage (aSAH) is challenging for the clinician. The lack of precise monitoring in these patients plays a major role in the delayed identification of DCI. The main objective of this study is to analyse heart rate variability (HRV) data from SAH patients for further analysis, using machine-learning to aid us in identifying imminent DCI. We hypothesize that machine learning, may detect incipient DCI using HRV trends.

### **Methods:**

HRV data from a previous study underwent comprehensive analysis. The HRV material was collected prospectively from a cohort of 64 patients with aSAH admitted to the neurointensive care unit at Sahlgrenska University Hospital, Gothenburg, Sweden, 2015-2016. HRV data was cleaned from noise, quantified and labelled in multiple steps and analysed using the Random Forest supervised machine learning algorithm

### **Results:**

HRV data was obtained in 55 patients. After excluding 19 patients due to low quality data, a total of 36 patients remained, 12 of which developed DCI. The machine learning algorithm was able to identify 71% of patients with DCI. Nevertheless, DCI was also detected in non-DCI patients, demonstrating a specificity of 57%

### **Conclusion:**

This study implies that processing of HRV, using machine learning can be helpful in patients susceptible to DCI. The results display an adequate sensitivity; however, the specificity was low. Our data supports further investigation, correlating HRV and cerebral ischemia. More studies are needed to further evolve a secure method to detect cerebral ischaemia using dynamic HRV values