Evaluation of Nitric Oxide in Lacunar Stroke and Young Healthy during Cerebrovascular Reactivity by Support Vector Machine

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Authors:
Yutthana Phimthong-Ngam, Kannakorn Intharakham, Kesorn Suwanprasert

Abstract

Lacunar stroke (LS) is known as lacunar infarction, which presents minor deficit in neurological finding but it actually causes stroke recurrent and death. High risk of stroke such as chronic hypertension is closely associated with LS. In this study, vasodilatory stimulus through cerebrovascular technique (30 sec breath-holding) was used to activate the vasomotor tone of cerebral arteries. Then, plasma nitric oxide as neurovascular mediator maintaining cerebral blood flow was assessed. The objective of this study is to determine the effective procedure for nitric oxide (NO) classification and to distinguish NO in young healthy and in LS. NO concentration was real time monitored by using electrochemistry method. Collected NO data are characterized and used as training data for classification model study. Effective model will be used for prediction of high risk, recurrent and follow up stroke as well as recovery from any intervention treatment. The classifier performance by each single kernel function presents that only radial basis function (RBF) has highest performance (94 % classified accuracy) compared with those in linear, polynomial, and sigmoid functions in experiment phase. Combined with
highest performance, the hybrid model was developed and given 96% accuracy. This novel model is the best classifier for NO as neurovascular biomarker in LS. The findings suggest that low values of right parameters ( and ( are able to improve performance of NO classification in LS. The novel hybrid model is the best giving the greatest classification accuracy for NO that plays a novel role as neuromodulator and neurovascular biomarker.

References


**Index Terms**

Computer Science  
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**Keywords**

Lacunar Stroke, Nitric Oxide, Cerebrovascular Reactivity, Support Vector Machine