Assessment of Coupling and Correlation between Cerebral Autoregulation and Baroreflex in Stroke Patients

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Stroke, one of the cardiovascular diseases, has been the leading causes of mortality in Taiwan, even in the world for decades. According to previous research, the causes of cardiovascular diseases are highly related to the change of physiological parameters. Stroke can be resulted from unstable cerebral blood flow due to the cerebral autoregulation (CA) and baroreflex mechanisms being unable to work in effect. CA and baroreflex are important mechanisms for protection in human body. However, the relationship or function between CA and baroreflex is not clear in the past studies. Therefore, if the related physiological parameters cab be monitored as well to make the coupling between CA and baroreflex clear, it would be helpful for diagnosing of stroke in clinical practice. The main purpose of this research is to integrate the analysis of blood pressure, cerebral blood flow and heart rate to evaluate coupling effect. There are 10 stroke patients (56 ± 10.6 years) included in this study. Results of blood pressure and cerebral blow velocity values in stroke are lower than those in healthy persons ($p<0.05$). Low frequency power of blood pressure and cere-bral flow velocity are also decreased more than those in healthy subjects ($p<0.05$), it might be the effect of sympathetic nerve system. K2 means chaoticness. K2 values of cerebral flow velocity and mean heart rate in stroke subjects are higher than those in healthy subjects significantly ($p<0.05$), it might indicate cerebral flow and heart rate in stroke are more chaotic. The values of baroreflex sensitivity in healthy subjects are also higher significant ($p<0.05$). The values of independence of complexity and predictability of blood pressure, cerebral flow and heart rate between 0 and 1 indicate they are highly coupled. Therefore, if the correlation of blood pressure, cerebral flow and heart rate can be observed simultaneously, and the coupling degree of cerebral autoregulation and baroreflex can be investigated, the effect of diag-nosis of cardiovascular diseases can be improved.