The Relationship Between Autonomic Response Variability and Clinical Outcomes in Ischemic Stroke Patients

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Background

- Ischemic stroke is an interruption of the blood supply to the brain due to a blockage in the arteries.
- Current research suggests the high blood pressure variability (BPV) post stroke leads to worse clinical outcomes, possibly, due to dysautonomia.
- No research has been done on the relationship of increased variability in autonomic responses, such as temperature, BPV, and pupillary light reflexes, to stroke outcomes.

Methods

- The objective is to determine the relationship between clinical outcomes in patients post stroke and autonomic response variability.
- We are performing a prospective study on new stroke patients to determine if autonomic response variability is associated with worse clinical outcomes post stroke.
- Data collection:
 - Non-Invasive Blood Pressure (NIBP) Finger Photoplethysmographer
 - Pupilometer
 - Temporal Thermometer



Non-Invasive Blood Pressure (NIBP) finger photo plethysmography

NIBP provides continuous measurement of blood pressure. Patients are to remain in a supine position with limited movement over a 10 minute period. Results are recorded LabChart, where any artifact is excluded and data can be analyzed.



Pupilometer

Measures pupil reactivity to a light stimuli after stroke. Measurement of both eyes is conducted, with light control in room patient resides in.

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Figure 2. Modern portable pupilometer.

Results

- Collection of data and analysis is in an early stage.
- Retrospective collection of patients modified Rankin Scale (mRS)



Increased blood press acute ischemic stroke of death: A secondary Virtual International S

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Previous Research

Table 2. Mean \pm SD values of BPV indices compared between patients who died or survived in the 90 days after ischemic stroke onset.

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BPV variable	Alive at day 90 (n=1614)	Dead at day 90 (N=277)	p-Value	ls-permissions)04019856496 :om/home/cvd
SBP SD	13.4 ± 6.6	15.9 ± 8.9	<0.001	(\$)SAGE
SBP CV	9.1 \pm 4.3	10.6 ± 6.0	<0.001	
SBP ARV	14.5 ± 7.9	17.6 ± 9.9	<0.001	
SBP SV	17.1 ± 9.0	$\textbf{20.5} \pm \textbf{11.3}$	<0.001	
SBP VIM	13.9 ± 7.0	16.0 ± 10.0	<0.001	
SBP rSD	12.0 ± 7.0	14.3 ± 8.7	<0.001	
SBP mean	148.5 \pm 19.5	$\textbf{151.8} \pm \textbf{20.5}$	0.011	
DBP SD	9.2 ± 5.0	$\textbf{10.0} \pm \textbf{5.0}$	0.017	
DBP CV	11.9 ± 6.7	12.9 \pm 6.7	0.015	
DBP ARV	$\textbf{10.0} \pm \textbf{5.9}$	11.0 ± 6.1	0.008	
DBP SV	11.8 ± 6.7	13.0 ± 6.8	0.010	
DBP VIM	$\textbf{9.5} \pm \textbf{5.6}$	$\textbf{10.4} \pm \textbf{5.6}$	0.017	
DBP rSD	8.3 ± 5.1	8.9 ± 5.1	0.053	
DBP mean	79.0 ± 12.2	$\textbf{78.6} \pm \textbf{I3.2}$	0.623	

Note: DBP n = 1889 (1613 vs. 276). SD: standard deviation; CV: coefficient of variation; ARV: average real variability; SV: successive variation; VIM: variation independent of mean; rSD: residual SD; SBP: systolic blood pressure; DBP: diastolic blood pressure.

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Blood Pressure Variability and Cardiovascular Outcomes in Patients With Prior Stroke A Secondary Analysis of PRoFESS

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Previous Research

Figure 1. Scatter plot of SBP SD on y-axis and maximum constriction velocity on the xaxis in 45 patients with AIS.



Autonomic Nervous System Dysfunction Correlates with Increased Blood Pressure Variability after Acute Ischemic, but not Hemorrhagic, Stroke

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Conclusion

- Previous research shows correlation between blood pressure variability and worsening clinical outcomes.
- Current research suggests correlation between pupillary light responses and blood pressure variability.
- Continuation of research could lead to determining the relationship between clinical outcomes and autonomic responses variability.