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Letter to Editor

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Letter to Editor: Impact of Obesity on Subarachnoid Hemorrhage-Induced Cerebral Vasospasm: An Experimental

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Dear Editor,

I've read Alpergin et al.'s article with keen interest (1). This study contains crucial findings and will be helpful to clinical and preclinical researchers interested in the subject. The main finding is that the authors reported that obesity may affect the degree of cerebral vasospasm following subarachnoid hemorrhage and that cerebral vasospasm may exacerbate the process in the presence of obesity (1). This letter aims to underscore the potential advantages of using neurobehavioural tests in conjunction with histological and molecular studies in subarachnoid haemorrhage research.

This correspondence intends to offer methodological insights into the study addressed here. Neurobehavioral assessments may be used to evaluate functional alterations in the subarachnoid hemorrhage model.

1. Open Field test

The open-field test is frequently used to assess general locomotor activity (4). Behavioral changes are recorded in the open-field test in models that affect the central nervous system (4,7). An open-field test can be performed to determine whether vasospasm has occurred in the subjects before they are sacrificed. It has been shown that the distance traveled by the subjects in the open field test decreases, mainly due to the early-stage (up to 2 weeks) vasospasm effect (3). Therefore, an essential finding of early vasospasm is reduced locomotor activity. Alpergin et al. terminated the experiment seven days after inducing subarachnoid hemorrhage; thus, an open-field test can be beneficial for observing vasospasm-related cues.

2. Rotaroad test

Rotarod is utilized for the quantitative assessment of motor function (7). It involves the rat or mouse maintaining balance and walking on a rotating experimental apparatus that spins around its own axis (6). The animal must maintain coordinated movement continuously to avoid falling. This is used to measure parameters, such as motor coordination, balance, endurance, and motor learning (6,7).

3. Neurobehavioral assessments that can be used to measure muscle strength in a subarachnoid hemorrhage model: Grip strength test, Kondziella inverted screen test, and Weight test

The grip strength test is a behavioral assay designed to assess the muscle strength of the hind and forelimbs of rodents (7). The Kondziela reverse screen test is used to assess the grip strength of rodents' forelimbs and hindlimbs. In this test, subjects grasp a wire apparatus with all four paws. The wire is then turned upside down. The time it takes for subjects to fall onto a pile of safe materials such as straw or wood shavings is recorded to evaluate muscle strength (5). The weight test is conducted to assess the grip strength of rodents' forelimbs. The subjects' weight-holding times are scored (5).

4. Neurological scoring and reflex examinations

The Neuroscore test assessment consists of the following components: the forelimb flexion test, hindlimb flexion test, hind paw grasping reflex test, visually triggered placing test, and contact-triggered placing test (5).

5. Cognitive tests: Morris water maze, Y maze, T maze, elevated plus maze, radial arm maze, Vanderwolf wolf swimming test

Spatial learning and memory may be assessed through various behavioral paradigms. The Morris water maze and the Vanderwolf swimming test can be used for this purpose (2,7). Waterless maze systems, such as the T-maze, radial arm maze, and elevated plus maze, may also be employed to evaluate cognitive functions.

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Future Directions

The significant advantage of neurobehavioral tests is that they are easy, cost-effective, and largely reproducible. Before euthanasia of the subjects, researchers will be provided with a wide range of data, including motor coordination, endurance, muscle strength, locomotor activity, and cognitive patterns.

Another essential advantage of neurobehavioral tests is that anxiety-like behaviors can be examined simultaneously with locomotor activity during the 5-minute measurement in the open field test (4). Anxiety-like behaviors may similarly be assessed using the elevated plus maze test, which is employed to examine cognitive parameters by modifying the test duration and application protocol (2).

Although these tests are relatively easy to implement following established protocols in behavioral research in the field of behavior, their most significant disadvantage is that interpreting the test results may require scientists working in this field, such as physiologists or pharmacologists. This challenge can be resolved through multidisciplinary studies.

Declarations

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Availability of data and materials: The datasets generated and/or analyzed during the current study are available from the corresponding author by reasonable request.

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AUTHORSHIP CONTRIBUTION

The author (HC) confirm responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

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