Pathomechanism

Pathomechanism (plural pathomechanisms) (pathology) pathological mechanism; the mechanism by which a pathological condition occurs.

Robust preclinical models are inevitable for researchers to unravel pathomechanisms of subarachnoid hemorrhage (SAH). For the mouse filament perforation model of SAH, the goal of a meta-review was the determination of variances in mortality, SAH severity grade, and vasospasm, and their experimental moderators, as many researchers are facing incomparable results. Alpdogan et al. searched the databases PubMed, Embase, and Web of Science for articles describing in vivo experiments using the SAH perforation mouse model and measuring mortality, SAH grade, and/or vasospasm. After screening, 42 articles (a total of 1964 mice) were included in a systematic review and meta-analysis. Certain model characteristics were insufficiently reported, e.g., perforation location (not reported in six articles), filament (material (n = 15) and tip texture (n = 25)), mouse age (n = 14), and weight (n = 10). Used injective anesthetics and location of perforation showed large variation. In a random-effects meta-analysis, the overall animal mortality following SAH was 21.3% [95% CI: 17.5%, 25.7%] and increased with longer observational periods. Filament material significantly correlated with animal mortality (p = 0.024) after the exclusion of hyperacute studies (time after SAH induction < 24 h). The reported mean SAH grade was 10.7 [9.6, 11.7] on the scale of Sugawara (J Neurosci Methods 167:327-34, 2008). Furthermore, the mean diameter of large cerebral arteries after SAH was reduced by 27.6% compared to sham-operated non-SAH mice. Uniforming standards of experimental procedures and their reporting are indispensable to increasing overall comparability [1].

1)

Alpdogan S, Sander T, Zhang R, Khan D, Li X, Zhou H, Li K, Nickel AC, Zheng B, Skryabin A, Schieferdecker S, Hofmann BB, Donaldson DM, Cornelius JF, Hänggi D, Muhammad S. Meta-review on Perforation Model of Subarachnoid Hemorrhage in Mice: Filament Material as a Possible Moderator of Mortality. Transl Stroke Res. 2022 Nov 23. doi: 10.1007/s12975-022-01106-4. Epub ahead of print. PMID: 36422813.