Addressing the research deficiencies in selective brain cooling methods in prehospital care for stroke patients

Sir,

I am writing to offer some insights on the paper titled "Research progress of selective brain cooling methods in prehospital care for stroke patients A narrative review" published in Brain Circulation Journal,[1] I commend the authors for their work in advancing therapeutic hypothermia (TH) and selective brain cooling for acute ischemic stroke (AIS). However, in light of the limited available research, it is essential to acknowledge the gaps in information within this study, emphasizing the need for future research to address these gaps and enhance the overall applicability of these neuroprotective strategies.

First, while the research focuses on preclinical and laboratory data, there is a gap in substantial clinical trial support for selective TH methods in prehospital AIS care. For instance, Ferreira *et al*.'s pilot study[2] effectively used clinical trial data to assess a nasopharyngeal catheter for targeted brain cooling in traumatic brain injury patients, serving as a positive example of leveraging clinical trial data for practical insights. This highlights the potential of clinical trials in providing valuable insights into the practical efficacy and safety of selective TH methods. Acknowledging such instances is crucial for recognizing the ongoing necessity of clinical research efforts to better understand successful selective brain cooling implementation in the real-world scenarios.

Second, while the paper provides valuable insights into different noninvasive brain cooling methods including the use of intranasal cooling devices, surface brain cooling, and specialized helmets, it lacks a comprehensive assessment of the *pros and cons* associated with each technique, a feature well-explored in the study "Selective Brain Cooling: A New Horizon of Neuroprotection,[3]" published in the "Frontiers of Neurology." Due to the proprietary nature of most cooling devices, a thorough examination of economic implications, encompassing device costs, maintenance, and scalability, becomes indispensable to determine the practicality of widespread deployment.

Moreover, the paper lacks a detailed discussion on the challenges of achieving and maintaining the desired depth of hypothermia during prehospital transit. A more nuanced exploration of the factors such as ambient temperature, patient-specific variations, and the duration of transportation could provide more valuable insights into the practicality of implementing selective hypothermia during transit.

Similarly, the review highlights the importance of initiating hypothermia in the prehospital phase but does not delve into the complexities of seamlessly transitioning this treatment to in-hospital care, a crucial aspect for therapeutic continuity and ensuring that prehospital efforts complement subsequent in-hospital treatments.

In addition, while the paper under review posits the potential synergies of combining physical cooling methods, with pharmacological hypothermia as adjuvant treatments to reperfusion therapy, it is essential to address the scarcity of research in this particular area. The assertion that the combination of these therapeutic approaches can lead to better cooling efficacy and superior clinical outcomes is intriguing, yet the literature is notably deficient in substantiating these claims. Unlike this, the study in the *European Journal of Physical and Rehabilitation Medicine* has demonstrated the benefits of multidisciplinary rehabilitation, significantly improving lung function and physical performance, with persisting effects at the 6-month follow-up assessment.[4]

Finally, the study has not discussed the criteria for selecting patients for such therapies.[1] For example, another paper,[5] in the journal "Brain," provides criteria for selecting patients for intravenous thrombolysis as they discuss metric-based patient stratification and also suggests a review of the literature on choosing patients for intravenous thrombolysis.[5]

Overall, I found the article to be informative and well-written.[1] I believe that it will be of interest to researchers, clinicians, and policymakers working in the field of stroke care. I am confident that my critique will serve as the supplement to shortcomings of this research paper and will prompt readers and researchers to further investigate the aforementioned suggestions, for advancement and in-depth understanding of this

significant area of research. On a final note, the insight provided by the authors of this publication is valuable and highly appreciated.

Author contributions

KR: Concepts, definition of intellectual content, literature search and manuscript preparation; MS and MS: Literature search, manuscript editing and manuscript review; AA: Concepts, definition of intellectual content, manuscript editing and manuscript review.

Ethical statement

Not applicable.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Access this article online

Quick Response Code:

Website: http://www.braincirculation.org

DOI: 10.4103/bc.bc_90_23

How to cite this article: Rehman K, Sohail M, Saleem M, Akhtar A. Addressing the research deficiencies in selective brain cooling methods in prehospital care for stroke patients. Brain Circ 2024;10:188-9.

Submission: 04-10-2023, Revised: 22-02-2024,
Accepted: 08-03-2024, Published: 26-06-2024