Comment on "A Novel Sequential Percutaneous Radiofrequency Treatment Strategy for Drug-refractory Trigeminal Neuralgia: A Propensity Score-matched Study"

To the Editor:

We have read with great interest the article titled "A Novel Sequential Percutaneous Radiofrequency Treatment Strategy for Drug-refractory Trigeminal Neuralgia: A Propensity Score–matched Study" by Ren et al (1). This study addresses an important clinical challenge in the management of drug-refractory trigeminal neuralgia (TN), comparing the effectiveness of sequential radiofrequency (RF) treatment with conventional RF treatment. While the authors provide valuable insights, we have identified several key issues that we believe warrant further discussion to improve the study's robustness and generalizability.

One major concern is the absence of detailed information regarding treatment parameters such as the specific doses and time durations of the RF treatments. These factors could have substantial effects on treatment outcomes and introduce variability that the propensity score matching (PSM) methodology did not account for. Previous studies (2,3) have demonstrated that individualized RF parameters, such as lesion temperature and treatment time, can influence efficacy. Incorporating these variables into the propensity score model would have provided more reliable conclusions, as they are crucial confounders in determining treatment success. We recommend that future analyses include these factors to mitigate their potential confounding effects.

In the current study, patients who received sequential RF treatment were grouped together without differentiating between those who received only pulsed RF and those who received both pulsed RF and conventional RF. However, evidence suggests that the combination of pulsed RF followed by conventional RF might produce different outcomes compared to pulsed RF alone (4,5). Given this variability, we believe that a stratified analysis is necessary to evaluate the differences between these subgroups. This would clarify whether the efficacy and safety profiles of sequential RF treatment are consistent across different treatment strategies.

The authors performed PSM to balance baseline characteristics between treatment groups. However, this resulted in a significant reduction of the sample size, particularly in the matched cohort (from 2,087 patients to 124 pairs). The reduction of sample size can decrease statistical power and limit the generalizability of the findings. To address this issue, we recommend the use of propensity score weighting methods, such as Inverse Probability of Treatment Weighting (IPTW). IPTW can help retain all patient data by assigning different weights based on propensity scores, improving the balance between groups while preserving statistical power and reducing bias (6,7).

While the PSM method used in this study is appropriate for controlling confounders, several additional statistical methods could further strengthen the findings. For example, conducting sensitivity analyses using methods such as the E-value would help quantify the impact of unmeasured confounding variables (8). Additionally, the use of double robust estimation (combining propensity score matching with outcome regression adjustment) could reduce bias from both unmeasured confounders and model misspecifications (9).

In conclusion, while the study by Ren et al (1) offers important contributions to the treatment of drug-refractory TN, addressing the unmeasured confounding variables, stratifying sequential treatment groups, applying IPTW to mitigate sample size reductions, and considering advanced statistical techniques would further enhance the study's validity and reliability. We commend the authors for their work and look forward to future studies that address these concerns.

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