Stereotactic Radiofrequency Ablation for Movement Disorder

Radiofrequency lesions through DBS electrodes allow the creation of small and localized lesions. Its effectiveness and low-risk profile, in addition to its low cost, make this procedure suitable and a possible alternative in the therapeutic repertoire for the surgical treatment of movement disorders [1].

During the past 2 decades, deep brain stimulation (DBS) took over the position of radiofrequency (RF) lesioning of thalamic or pallidal targets for control of movement disorders. Superiority of DBS over RF lesioning is widely accepted, and most neurosurgeons even regard RF lesioning to be old-fashioned and dangerous. Such concepts emerged from the data of old stereotactic operations with ventriculography and without computerized planning. Hardware-related complications are not negligible in long-term DBS therapy, and DBS only controls the symptoms. Living with an implanted device is also a burden for patients. With modern stereotactic techniques, RF lesioning is safe and effective. Indication of RF lesioning includes various types of tremor, focal hand dystonia, and even generalized or segmental dystonias. Neurosurgeons armed with both the procedures can choose the best treatment modality for patients [2].

One of the greatest concerns associated with radiofrequency ablation isintracerebral hemorrhage (ICH). However, the majority of previous studies have mainly evaluated Parkinson's disease patients with ablation of the globus pallidus internus (GPi).

Horisawa et al. investigated the hemorrhagic risk associated with radiofrequency ablation using ventro-oral (Vo) nucleus,ventral intermediate nucleus (Vim), GPi, and pallidothalamic tracts.

Radiofrequency ablations for movement disorders from 2012 to 2019 at the Department of Neurosurgery, Neurological Institute, TokyoWomen's Medical University, Tokyo, Japan. were retrospectively analyzed. Multivariate analyses were performed to evaluate associations between potential risk factors and ICH.

A total of 558 patients underwent 721 stereotactic radiofrequency ablations for movement disorders. Among 558 patients, 356 had dystonia, 111 had essential tremor, and 51 had Parkinson's disease. Among 721 procedures, the stereotactic targets used in this study were as follows: Vo: 230; Vim: 199; GPi: 172; pallidothalamic tract: 102; Vim/Vo: 18. ICH occurred in 37 patients (5.1%, 33 with dystonia and 4 with essential tremor). Symptomatic ICH developed in 3 Vo nuclei (1.3%), 3 Vim nuclei (1.5%), and 2 GPi (1.2%). Hypertension (odds ratio = 2.69, P = .0013), higher number of lesions (odds ratio = 1.23, P = .0221), and younger age (odds ratio = 1.04, P = .0055) were significant risk factors for ICH associated with radiofrequency ablation.

The present study revealed that younger age, higher number of lesions, and history of hypertension were independent risk factors for ICH associated with stereotactic radiofrequency ablation [3]

1)
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2)

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3)

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