

4038329 RACS/ M : MAJOR : CLINICAL SCIENCE : M.Sc. (CLINICAL SCIENCE)

KEY WORD : SUBTHALAMIC NUCLEUS, PARKINSON'S DISEASE, AC-PC LINE,

PATARAVIT RUKSKUL : CONSISTENCY OF SUBTHALAMIC NUCLEUS COORDINATE USING MAGNETIC RESONANCE IMAGING IN THAI PEOPLE WITH CLINICAL APPLICATIONS. THESIS ADVISORS : VEERASAK THEERAPANCHAROEN, M.D., JIRAPORN LAOTHAMATAS, M.D. 63 P. ISBN 974-663-316-3

Surgical ablation and deep brain stimulation are popular for Parkinson's disease treatment. The subthalamic nucleus (STN) became a new target which interests neurosurgeons as STN stimulation is able to relieve rigidity and dyskinesia in monkeys. In the study, MRI (T-1 weighted and Inversion Recovery Sequence) and computer assisted stereotactic neurosurgical planning devices have been used to locate the STN in Thai people.

From 1 December 1998 to 31 March 1999, 15 subjects (9 males and 6 females) were selected prospectively by using the inclusion criteria (age ≥ 40 years, Thai nationality, and no anatomical imaging distortion). The average age of the selected subjects was 56.07 years (minimum : 40 years, maximum : 80 years). The researchers brought the brain MR image to measure intercommissural (AC-PC) distance, distance from left and right STN to AC-PC line in 3 planes (AP, lateral and vertical), and distance from third ventricular wall to the AC-PC line. Then, the researchers used statistical methods to find the relationship between various points.

The result shows the left STN is located 10.28-12.18 mm lateral to the midline, 0.94-2.54 mm posterior to the midcommissural point, and 2.74-3.92 mm below the AC-PC line. The right STN is located 9.40-10.90 mm lateral to the midline, 0.42-1.70 mm posterior to the midcommissural point, and 2.42-3.60 mm below the AC-PC line. There is no statistical difference in measurement between left and right in the AP and the vertical planes ($p = 0.05$ and 0.01 respectively), but there is a statistical difference in the lateral planes ($p = 0.11$). There is also a difference between the measurement from the software atlas and the actual measurement on the average of 1.94 mm (the maximum of 2.96 mm in the left AP plane). There is a positive relationship between the size of the third ventricle and the STN location, but of no statistical significance ($r = 0.15$, $p = 0.6$). The AC-PC distance is an average length of 26.05 mm.

In this study, the researchers show that MRI-based initial targeting of the STN, based on direct visualization of the target, is useful to improve target accuracy over that of purely indirect software atlas targeting. The STN, although a small structure, may be visualized on MR images. Initial targeting of the STN was reliably accomplished by direct visualization. However, there remained sufficient variability that the final target location required intraoperative electrophysiological mapping for treatment.

The study is part of the development of functional neurosurgery in Parkinson's disease patients. The study also aims to open a new horizon in the development of Thai Parkinsonian treatment in the future.