Quantitative endoscopic comparison of contralateral interhemispheric transprecuneus and transtentorial transcollateral sulcus approaches to the atrium

Xiaochun Zhao, MD 1
Leandro Borba Moreira, MD 1
Claudio Cavallo, MD 1
Evgenii Belykh, MD 1,2
Sirin Gandhi, MD 1
Mohamed A. Labib, MD 1
Ali Tayebi Meybodi, MD 1
Celene B. Mulholland, MD 1
Brandon D. Liebelt, MD 1
Michaela Lee, MD 1
Peter Nakaji, MD 1
Mark C. Preul, MD 1

1 Department of Neurosurgery, Barrow Neurological Institute, St. Joseph’s Hospital and Medical Center, Phoenix, Arizona
2 Department of neurosurgery, Irkutsk State Medical University, Irkutsk, Russia
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Introduction

• The contralateral interhemispheric transprecuneus approach (CITP) and the supracerebellar transtentorial transcollateral sulcus approach (STTC) are two novel approaches to access the atrium of the lateral ventricle. The study quantitatively compared the two approaches.
Methods

• Both approaches were performed on 6 sides of fixed and color-injected human cadaver heads. Steps and 6 landmarks were predefined to standardize the approaches. Microsurgical dissections were performed with the assistance of 0° and 30° rigid endoscopes. We defined 6 targets in the atrium for measurement. Using a navigation system, the working distance, cortical transgression, angle of attack, area of exposure, and surgical freedom were quantitatively measured.
Schematic illustration of two approaches accessing the atrium of the right ventricle.

Contralateral interhemispheric transprecuneus (CITP)

Atrium of right ventricle

Supracerbellar transtentorial transcollateral sulcus (STTC)
Comparison of the surgical freedom (mm²) to the lateral wall of the atrium for CITP (left panel) and STTC (right panel). A gradient color map representing the surgical freedom (Points A, B, C, D, E, and X, as defined in Fig. 2) is imposed on photographs of the cadaveric specimen. Green represents greater surgical freedom; red represents less surgical freedom.
Results:

• The working distances of the CITP (mean [± SD] 67 ± 5 mm) are higher than the STTC (mean [± SD] 57 ± 4 mm) P< 0.05.

• The cortical transgression length of the CITP (mean [± SD] 27 ± 3 mm) was higher than that of the STTC (mean [± SD] 21 ± 7 mm, P = 0.03).

• The CITP showed a wider rostrocaudal angle of attack compared to the STTC (p = 0.01), whereas the STTC showed a wider mediolateral angle of attack than the CITP (P < 0.01).

• No significant difference was found for surgical freedom of any target except for point E, to which the SITP had larger surgical freedom. The area of exposure did not differ between the two approaches (P = 0.07).
Surgical trajectory and step by step dissection for contralateral interhemispheric transprecuneus approach.
Figure 6. Surgical trajectory and step by step dissection for supracerebellar transtentorial trans-collateral sulcus approach.
Conclusions

• Both approaches were shown to be feasible for obtaining access to the atrium of the lateral ventricle. The STTC provided a shorter working distance than the CITP. The CITP had a wider rostrocaudal angle of attack, and STTC provided a wider mediolateral angle of attack. CITP offered better exposure and maneuverability to the anterior and superior part of the atrium, whereas the STTC was more favorable for the inferior and posterior regions.