

Transsylvian approach for radical resection of insular gliomas : emphasizing the importance of the transsylvian approach for elderly patients with Zone II and III insular gliomas

Kumabe T, Toyoda M, Shibahara I
Department of Neurosurgery, Kitasato University School of Medicine



<Background> Insular gliomas present significant challenges due to their deep-seated location and proximity to critical structures, including sylvian veins, middle cerebral arteries (MCAs), lenticulostriate arteries, long insular arteries, and functional cortices and white matter tracts. The Berger-Sanai classification categorizes them into four Zones (I-IV), providing a framework for understanding insular gliomas. The key factors for successful insular glioma removal are achieving the greatest insular exposure and surgical freedom. There are two main types of approach methods, such as transsylvian approach with meticulous wider dissection of the sylvian fissure and transcorticosubcortical approach with intraoperative functional brain mapping under awake surgery to remove the functionally silent cortices and white matter tracts. Because splitting the distal sylvian fissure is more challenging, a transcortical approach through the parietorolandic operculum in awake patients had been reported to be more effective access to the posterior insular gliomas (Zone II and III) in the dominant hemisphere.

<Methods> We retrospectively analyzed our experiences with radically resected insulo-opercular gliomas. Basically, we pursue the transsylvian approach for resecting insular gliomas without removal of any normal brain.

<Results> Motor pathways run beneath the parietorolandic operculum can be damaged by ischemia caused by sacrificing the medullary arteries (MAs) arising from the pial arteries of the M3 and M4 portions of the MCA (Acta Neurochir, 2021). Motor deficit after resection of this area was significantly found in the elderly patients. This phenomenon might be described by the age-associated decreasing the vascular reserve capacity. Autopsy brains showed that the sclerotic rate of the MAs increased with age and hypertension. Even with the intraoperative functional brain mapping, we cannot avoid the ischemic complication caused by sacrificing the MAs during stepwise removal of the functionally silent cortices and white matter tracts.

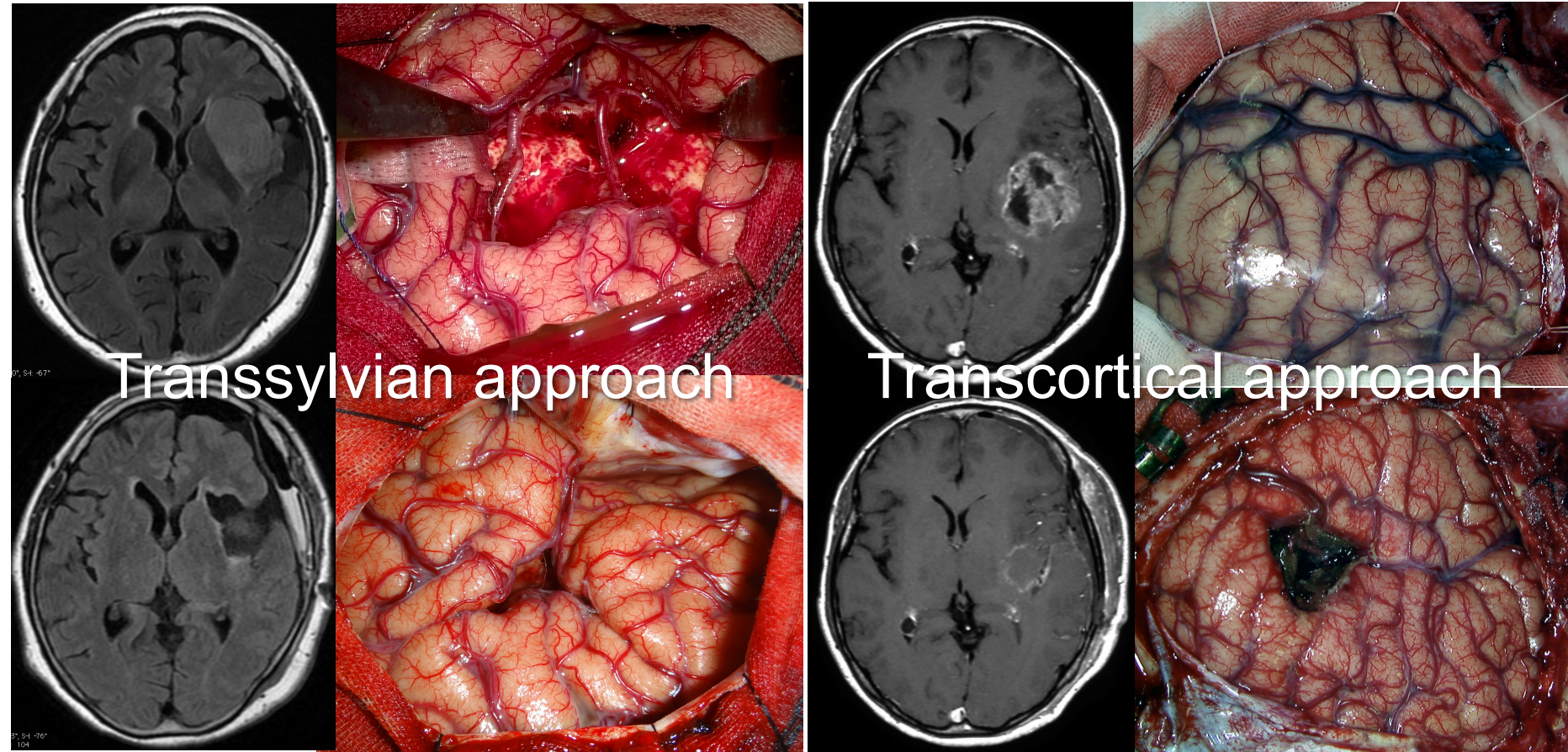
<Conclusion> We make a suggestion not to remove the parietorolandic operculum in elderly patients with insular gliomas located at Zone II and III. Distal transsylvian approach should be applied.

SURGICAL VIDEO

Trans-Sylvian and Transanterior Ascending Ramus Approach for Insular Gliomas at Zone I: 2-Dimensional Operative Video

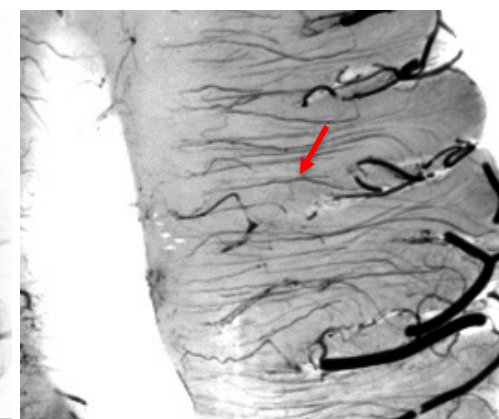
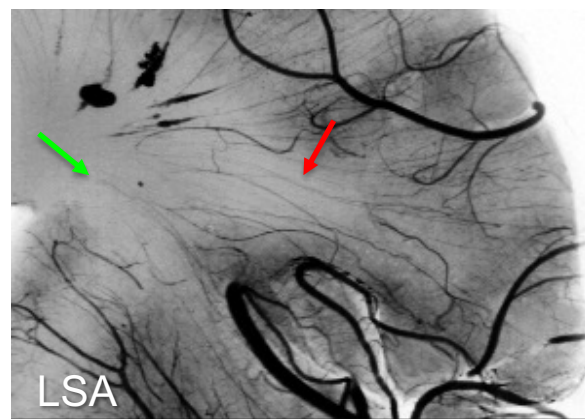
2024

Mariko Toyoda, MD, Ichiyo Shibahara, MD, PhD, Toshihiro Kumabe, MD, PhD
Department of Neurosurgery, Kitasato University School of Medicine, Sagamihara, Kanagawa, Japan



Long insular arteries (LIAs)

Medullary arteries



Cadaver microangiogram kindly provided by Dr. Shoki Takahashi



Acta Neurochirurgica
https://doi.org/10.1007/s00701-021-04737-y

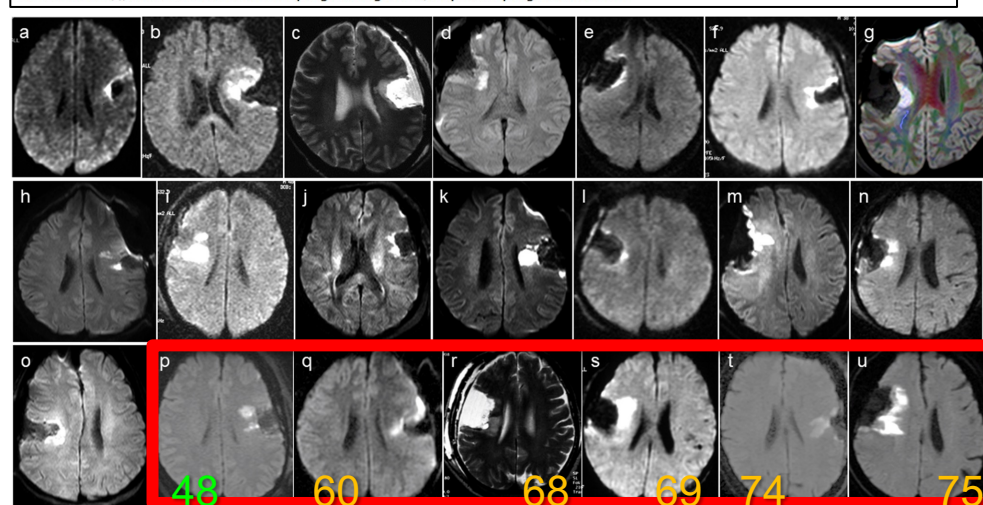
ORIGINAL ARTICLE - TUMOR - GLIOMA

2021

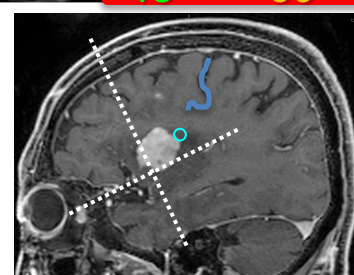
Postcentral gyrus resection of opercular gliomas is a risk factor for motor deficits caused by damaging the radiologically invisible arteries supplying the descending motor pathway

Ichiyo Shibahara¹, Sumito Sato¹, Takuichiro Hide¹, Ryuta Saito², Masayuki Kanamori², Yukihiro Sonoda³, Teiji Tominaga², Toshihiro Kumabe¹

Received: 23 September 2020 / Accepted: 26 January 2021
© The Author(s), under exclusive licence to Springer-Verlag GmbH, AT part of Springer Nature 2021

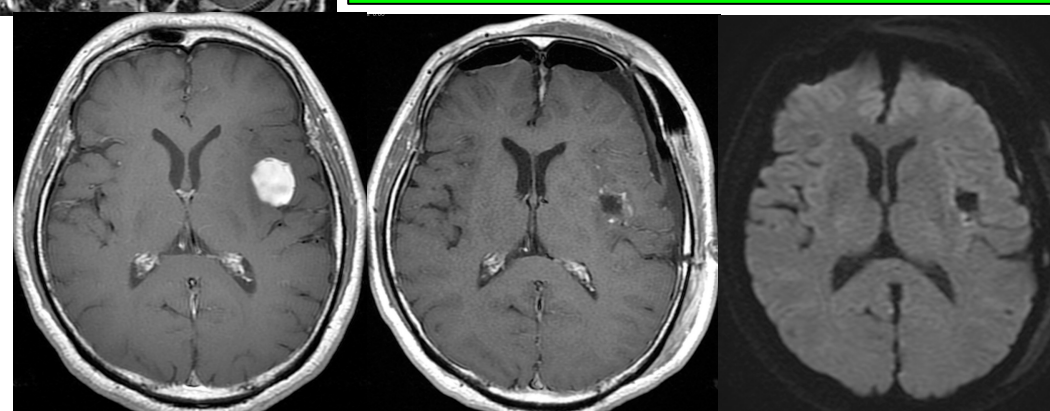


Motor deficit



Zone II

Distal transsylvian approach



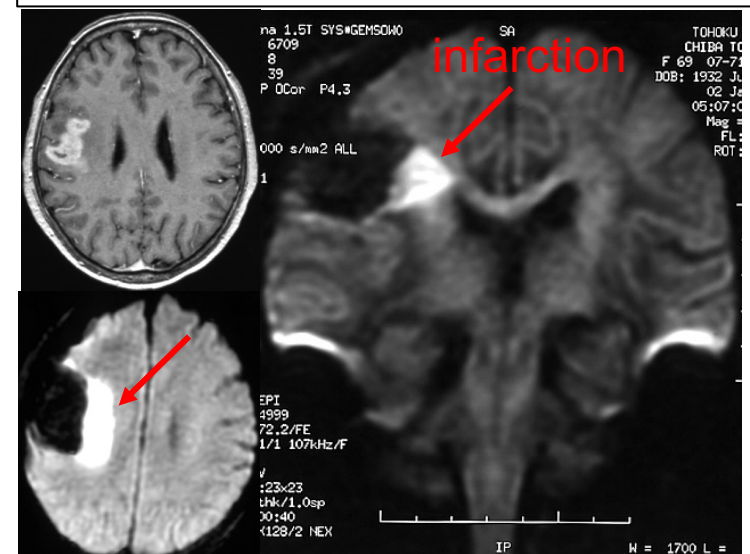
2007

J Neurosurg 106:263-269, 2007

Ischemic complications associated with resection of opercular glioma

TOSHIHIRO KUMABE, M.D.,¹ SHUICHI HIGANO, M.D.,² SHOKI TAKAHASHI, M.D.,² AND TEIJI TOMINAGA, M.D.¹

Departments of ¹Neurosurgery and ²Diagnostic Radiology, Tohoku University Graduate School of Medicine, Sendai, Japan



The ages of patients with permanent motor disturbance after the resection of post central gyrus were significantly higher than those without permanent motor disturbance.

