

Disputes & Debates: Editors' Choice

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Editors' Note: Benefits and Risks of Epilepsy Surgery in Patients With Focal Cortical Dysplasia Type 2 in the Central Region

In the research article entitled "Benefits and Risks of Epilepsy Surgery in Patients With Focal Cortical Dysplasia Type 2 in the Central Region," Chassoux et al. described their findings from a retrospective review of preoperative and postoperative data for 60 patients with focal cortical dysplasia type 2 (FCD2) in the central region who underwent surgical resection. They reported that surgical resection led to seizure freedom in 88% of patients, and although 87% had early transitory postoperative deficits, 40% of these patients had total recovery. Abe noted that patients with FCD2 can experience neurologic deficits due to the location of the dysplasia and asked the authors to describe preoperative neurologic deficits for patients included in this study. Chassoux reported that 18% of patients experienced a preoperative deficit that was either permanent or fluctuating and they all experienced transitory worsening of this deficit postoperatively, but 36% subsequently had functional improvement. Chassoux also noted that 84% of patients with a normal neurologic examination preoperatively experienced a postoperative deficit.

Ariane Lewis, MD, and Steven Galetta, MD, FAAN
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Reader Response: Benefits and Risks of Epilepsy Surgery in Patients With Focal Cortical Dysplasia Type 2 in the Central Region

Kazuo Abe (Osaka, Japan)
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I read the article by Chassoux et al.¹ with interest, and I have some questions that may be outside the focus of their study. The authors described that resections were associated with minor/moderate deficits and total recovery was observed in 40% of patients. Did any of these patients have neurologic deficits before resections? For example, the patient demonstrated in the MRI images showed focal cortical dysplasia near the precentral knob. Injury to this area has been reported to show isolated motor palsy in the hand, mimicking a peripheral nerve palsy.^{2,3} Can the authors please comment on the neurologic findings of these patients?

1. Chassoux F, Mellerio C, Laurent A, Landre E, Turak B, Devaux B. Benefits and risks of epilepsy surgery in patients with focal cortical dysplasia type 2 in the central region. *Neurology*. 2022;99:e11-e22.
2. Kim JS. Predominant involvement of a particular group of fingers due to small, cortical infarction. *Neurology*. 2001;56:1677-1682.
3. Komatsu K, Fukutake T, Hattori T. Isolated shoulder paresis caused by a small cortical infarction. *Neurology*. 2003;61:1457.

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Author Response: Benefits and Risks of Epilepsy Surgery in Patients With Focal Cortical Dysplasia Type 2 in the Central Region

Francine Chassoux (Paris)

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We are grateful for the opportunity to respond to the comments by Dr. Abe on our research.¹ As described in the Results section of the article, 11 patients had a preoperative deficit that was either permanent (including a spastic component in 2 and arm atrophy in 1) or fluctuating, according to the seizure frequency (clumsiness or hemineglect). Postoperatively, all of them had a transitory worsening (which was major in 5 patients), and then, a recovery included functional improvement in 4. Among the 49 patients with normal preoperative examination, 41 had a postoperative deficit (which was major in 14).

Whatever the preoperative status, major deficits only occurred after resections of the primary motor cortex (PMC) or supplementary motor area (SMA). PMC resections were followed by pure motor deficits involving a limb or a part of limb with a central topography. Resections performed near the hand knob induced a brachial deficit predominant on the hand, but without selective involvement of fingers. SMA resections were followed by massive hemiplegia with proximal predominance and speech disturbances. A total or subtotal recovery occurred in most patients. Minor to moderate deficits included mild hand clumsiness, slow finger tapping, or a limitation for carrying heavy loads. Permanent major deficits occurred in 3 patients, who presented with central characteristics including spasticity. Contrasting with the observations based on small cortical infarctions, none of the postoperative motor deficits mimicked a peripheral nerve palsy.

1. Chassoux F, Mellerio C, Laurent A, Landre E, Turak B, Devaux B. Benefits and risks of epilepsy surgery in patients with focal cortical dysplasia type 2 in the central region. *Neurology*. 2022;99(1):e11-e22. doi:10.1212/WNL.0000000000200345.

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Editors' Note: Association of Diabetes and Hypertension With Brain Structural Integrity and Cognition in the Boston Puerto Rican Health Study Cohort

In the research article entitled “Association of Diabetes and Hypertension With Brain Structural Integrity and Cognition in the Boston Puerto Rican Health Study Cohort,” Guan et al. reported that comorbid diabetes and hypertension is associated with a greater degree of brain structural disruptions than hypertension alone. Kawada commented that comorbid diabetes and hypertension was not associated with a greater degree of structural or functional impairment than diabetes or hypertension alone in a study by Newby et al. Koo and Guan responded that the relationship between diabetes and hypertension and brain structural integrity and cognition may vary across cohorts due to modification by social determinants of health. Kawada also noted that there is a bidirectional relationship between diabetes and dementia that should be considered when interpreting results of the study conducted by Guan et al., to which Koo and Guan replied that while they do not have data on β -amyloid and dementia for this cohort, this could be a future research direction.

Ariane Lewis, MD, and Steven Galetta, MD, FAAN

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Reader Response: Association of Diabetes and Hypertension With Brain Structural Integrity and Cognition in the Boston Puerto Rican Health Study Cohort

Tomoyuki Kawada (Tokyo)

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The research by Guan et al.¹ reports that older patients with type 2 diabetes (T2D) and hypertension (HTN) comorbidity presented with increased brain structural change and advanced cognitive impairment. I have a few comments.

First, Newby et al.² reported the increased risk of brain damage and cognitive impairment in patients with T2D and HTN. The adverse change in the pallidum was predominant in patients with T2D and HTN comorbidity. By contrast, total gray volume and verbal-numerical reasoning were disturbed in patients with only T2D, and the symbol digit substitution task was disturbed in patients with only HTN. Comorbidity of T2D and HTN did not always present greater brain damage and functional impairment than in participants with HTN or T2D alone.

Second, Gottesman et al.³ evaluated metabolic risk and amyloid β (A β) burden with subsequent dementia. The adjusted hazard ratios of midlife HTN with late life T2D and A β deposition for dementia incidence significantly increased. Shigemori et al.⁴ reported that A β was found to be secreted from β -cells of the pancreas, along with insulin, on glucose stimulation. A bidirectional relationship between T2D and dementia should be considered for the analysis.

1. Guan Y, Ebrahimzadeh SA, Cheng CH, et al. Association of diabetes and hypertension with brain structural integrity and cognition in the Boston Puerto Rican Health Study cohort. *Neurology*. 2022;98(15):e1534-e1544.
2. Newby D, Garfield V. Understanding the inter-relationships of type 2 diabetes and hypertension with brain and cognitive health: a UK Biobank study. *Diabetes Obes Metab*. 2022;24(5):938-947.
3. Gottesman RF, Wu A, Coresh J, et al. Associations of vascular risk and amyloid burden with subsequent dementia. *Ann Neurol*. 2022;92(4):607-619.
4. Shigemori K, Nomura S, Umeda T, Takeda S, Tomiyama T. Peripheral A β acts as a negative modulator of insulin secretion. *Proc Natl Acad Sci USA*. 2022;119(12):e2117723119.

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Author Response: Association of Diabetes and Hypertension With Brain Structural Integrity and Cognition in the Boston Puerto Rican Health Study Cohort

Bang-Bon Koo (Boston) and Yi Guan (Boston)

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We appreciate the comment on our article.¹ We agree that participants who presented with type 2 diabetes (T2D) or hypertension (HTN) alone may show unique brain structural changes compared with those with both comorbidities. The reader's conclusion that worse brain and cognitive outcomes in comorbid individuals is consistent with our findings. Moreover, we wish to emphasize 2 points.

First, the effects of T2D and HTN vary significantly between different cohorts. The outcome of T2D can be influenced by race, ethnicity, and social factors.² In the study conducted by Newby and Garfield,³ the UK Biobank population consists of primarily non-Hispanic White individuals, whereas our Boston Puerto Rican Health Study cohort consists of all Hispanic individuals. Second, we are also interested in studying the effects of T2D on brain imaging measures, but we were limited by sample size, as mentioned in our article. We are collecting more MRI scans and will apply our analytical framework to a larger sample in the future. Studying the association between T2D, dementia, and underlying mechanisms related to A β will be valuable for

Author disclosures are available upon request (journal@neurology.org).

integrating cardiovascular risk factors into dementia biomarker research. Our current sample does not contain information regarding A β and dementia diagnosis, but we will consider your suggestion in the future.

1. Guan Y, Ebrahimzadeh SA, Cheng CH, et al. Association of diabetes and hypertension with brain structural integrity and cognition in the Boston Puerto Rican Health Study cohort. *Neurology*. 2022;98(15):e1534-e1544.
2. Walker RJ, Strom Williams J, Egede LE. Influence of race, ethnicity and social determinants of health on diabetes outcomes. *Am J Med Sci*. 2016;351(4):366-373.
3. Newby D, Garfield V. Understanding the inter-relationships of type 2 diabetes and hypertension with brain and cognitive health: a UK Biobank study. *Diabetes Obes Metab*. 2022;24(5):938-947.

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CORRECTIONS

Neuropathologic Features of Antemortem Atrophy-Based Subtypes of Alzheimer Disease

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In the Research Article “Neuropathologic Features of Antemortem Atrophy-Based Subtypes of Alzheimer Disease” by Mohanty et al.,¹ the abbreviation for “Mini-Mental State Examination” should read “MMSE.” The authors regret the error.

Reference

1. Mohanty R, Ferreira D, Frerich S, et al. Neuropathologic features of antemortem atrophy-based subtypes of Alzheimer disease. *Neurology*. 2022;99:e323-e333.

Association of Lower Extremity Peripheral Nerve Impairment and the Risk of Dementia

Bringing the Peripheral Nervous System Closer to Center

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In the Editorial “Association of Lower Extremity Peripheral Nerve Impairment and the Risk of Dementia: Bringing the Peripheral Nervous System Closer to Center” by Shuman Paretsky et al.,¹ Dr. Shuman Paretsky’s degree should appear as “PhD.” The authors regret the error.

Reference

1. Shuman Paretsky M, Roman G. Association of lower extremity peripheral nerve impairment and the risk of dementia: bringing the peripheral nervous system closer to center. *Neurology*. 2022;98:741-742.

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Neuropathologic Features of Antemortem Atrophy-Based Subtypes of Alzheimer Disease

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