RESEARCH LETTER

Risk of Tinnitus After Medial Temporal Lobe Surgery

Tinnitus is a phantom auditory percept in the absence of external acoustic stimulation. Its prevalence in the United States increases with age from 5% for young adults to 14% after age 65 years. Typically, tinnitus is viewed as having an exclusively auditory origin. However, recent brain imaging studies suggest that nonauditory brain structures could be involved in the genesis of tinnitus. In this respect, Rauschecker et al proposed that tinnitus might be the result of a dysfunctional neural “noise-cancellation” mechanism. They postulated that a peripheral deafferentation (eg, aging) generates a tinnitus-related activity that is normally blocked at the level of the medial geniculate nucleus via amygdalar inhibitory projections. However, no clinical evidence has supported this hypothesis to date. To clarify the role of the medial temporal lobe (MTL) structures (eg, amygdala and hippocampus) in tinnitus, we compared the prevalence of tinnitus among patients who underwent unilateral MTL resection encroaching on the amygdala with that among matched controls and participants with self-reported epilepsy (SRE) but no surgery. The surgical cases were expected to have increased difficulty in inhibiting the tinnitus signal and therefore a higher prevalence of tinnitus.

Methods | This study received approval from the institutional review board of the Ile-de-France VI Ethics Committee. The committee stated that no written or oral informed consent was required from patients.

Cases. Using medical records from July 15, 1991, through October 31, 2014, we mailed a letter announcing our survey to 247 consecutive surgical patients who had undergone unilateral MTL resection encroaching on the amygdala for the relief of medically intractable epilepsy. Among the 213 patients with a valid address, 166 (77.9%) responded to our health questionnaire.

Referent Controls. Using a simple random sampling method without replacement, we matched the 166 surgical patients by age and sex to 332 controls (2:1 ratio) and 332 participants with SRE, all of whom were recruited from the NutriNet-Santé Study cohort (N = 93 756). We used a multivariate logistic regression to investigate the risk of tinnitus across surgical cases and controls.

Results | Consistent with previous reports, the prevalence of tinnitus was found to increase with age in all groups. The prevalence among the surgical patients (39 [23.5%]) was significantly higher than among the matched controls (33 [9.9%]) and participants with SRE (39 [11.7%]; P < .001; Figure). A sensitivity analysis, assuming that patients who did not return their questionnaires had no tinnitus, did not affect the result. However, the prevalence of self-reported hearing loss was not significantly different between groups (surgical patients, 9 [5.4%]; participants with SRE, 24 [7.2%]; and controls, 24 [7.2%]). The Table shows the clinical characteristics of the surgical patients, both with and without tinnitus.

Discussion | The present study showed that the prevalence of tinnitus in MTL removal cases was more than 2 times the rate observed in matched controls and participants with SRE, suggesting an association between MTL removal and tinnitus. One possible hypothesis is that the MTL resection encroaching on the
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da disrupts a noise-cancellation system in the central nervous system, which then increases the likelihood of tinnitus. The surgical patients with tinnitus were older and reported a higher incidence of insomnia and hypersensitivity to noise compared with the patients without tinnitus. They were also more likely to be taking antiepileptic medications, indicating that they were at greater risk of continued seizures. Altogether, these data point to a specific group of patients with medically intractable epilepsy who present a particular susceptibility to developing tinnitus after MTL surgery. Additional studies, however, are necessary (1) to better understand the pathophysiological factors underlying the occurrence of tinnitus in nearly 1 in 4 patients with unilateral MTL resection and (2) to determine whether the surgical approach by itself, along with the MTL resection, contributed to the higher risk of tinnitus. The results of the present study provide evidence that the surgical resection of the MTL for the relief of intractable epilepsy is associated with an increased risk of tinnitus.

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Accepted for Publication: July 28, 2017.

Published Online: October 9, 2017. doi:10.1001/jamaneurol.2017.2718

Author Contributions: Drs Paquette and Samson had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.
Study concept and design: Paquette, Fournier, Dupont, Galan, Samson.
Acquisition, analysis, or interpretation of data: All authors.
Drafting of the manuscript: Paquette, Fournier, Szabo de Edelenyi, Galan, Samson.
Critical revision of the manuscript for important intellectual content: All authors.
Statistical analysis: Paquette, Szabo de Edelenyi, Galan, Samson.
Obtained funding: Paquette, Galan.
Administrative, technical, or material support: Dupont, Samson.
Study supervision: Dupont, Samson.
Conflict of Interest Disclosures: None reported.
Funding/Support: The present study is funded in part by the Canadian Institutes of Health Research (CIHR), by a Frederick Banting and Charles Best Canada Graduate Scholarships Doctoral Award and a Michael Smith Foreign Study Supplement from the CIHR to Dr Paquette, and by an award from the Institut Universitaire de France to Dr Samson. The Nutrinet-Santé study is supported by the French Ministry of Health, the Institut de Veille Sanitaire, the Institut National du Prévention et d’Éducation pour la Santé, the Institut National de la Santé et de la Recherche Médicale, the Institut National de la Recherche Agronomique, the Conservatoire National des Arts et Métiers, and the University of Paris 13.

Role of the Funder/Sponsor: The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Additional Contributions: D. Omigie, PhD, Max-Plank-Institute, and P. Voss, PhD, McGill University, provided helpful comments on previous versions of the manuscript. Staff at the epilepsy unit of Pitié-Salpêtrière Hospital, including V. Masson, and I. Barbera, assisted with data access. They were not compensated for their help.

COMMENT & RESPONSE

Mild Traumatic Brain Injury and Mental Health
To the Editor
Mac Donald et al2 propose possible unmeasured covariates as a potential limitation to their study on long-term clinical outcomes among patients with combat-related mild traumatic brain injuries (mTBIs). We believe it is important to clarify the extent to which recall bias and confounding variables may have affected the conclusions of the study, specifically pertaining to psychiatric conditions.
There are published guidelines2 to assist clinicians with treating patients with mTBI within the US Department of Veteran’s Affairs or US Department of Defense health care systems. These guidelines direct primary care clinicians to screen for comorbid psychiatric conditions including major depressive disorder, posttraumatic stress disorder, substance use disorders, and suicidal ideation. At each follow-up visit for mTBI, patients are screened with Patient Health Questionnaire 2 or 9, the Generalized Anxiety Disorder scale, and a posttraumatic stress disorder screen. Any patient who receives positive results from a screening is referred to a mental health specialist for additional care. Moreover, patients with ongoing postconcussive symptoms who are unresponsive to treatment are directed to a mental health specialist for further evaluation regardless of whether they report depressive or anxiety-type symptoms.2 Furthermore, the US Department of Defense has more than 200 programs that address the psychological health of service members who experienced an mTBI.3 These programs are independent of clinical care services, nonclinical care services (eg, chaplain or family support centers), and mental health resources.
We propose that the repeated exposure of the group with an mTBI to mental health services influences the assessment of their own mental health in several ways. First, this increased awareness of resources allows individuals to seek out...