

Bilateral transient olfactory bulb edema during COVID-19–related anosmia

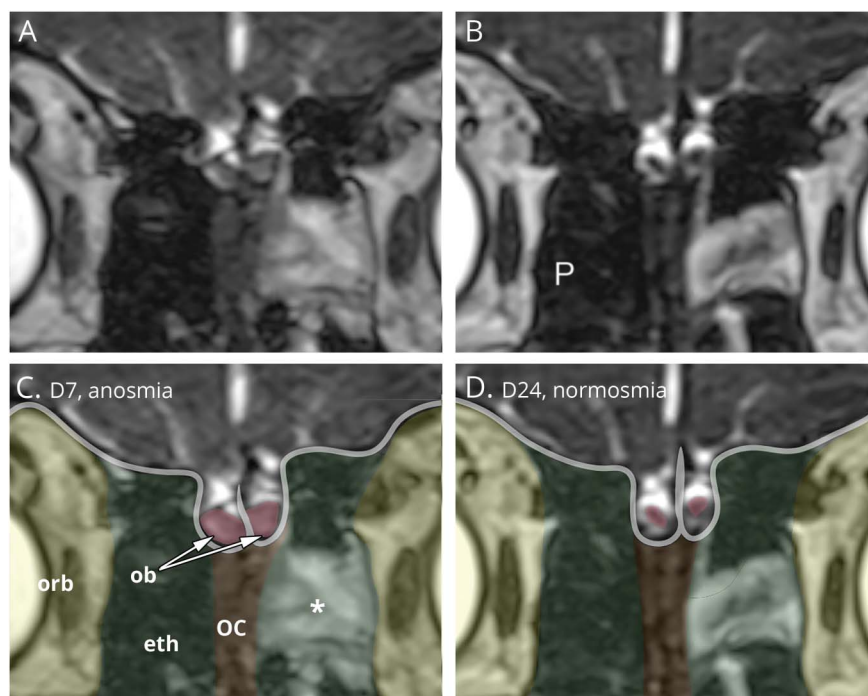
Thomas Laurendon, MD, Thomas Radulesco, MD, PhD, Justine Mugnier, MD, Mélanie G rault, PhD, Christophe Chagnaud, MD, PhD, Ahmed-Ali El Ahmadi, MD, and Arthur Varoquaux, MD, PhD

Neurology   2020;95:224–225. doi:10.1212/WNL.0000000000009850

Correspondence

Prof. Varoquaux
arthur.varoquaux@ap-hm.fr
or Arthur@Varoquaux.com

Figure Transient olfactory bulb edema



Coronal 3D constructive interference in steady-state T2-weighted imaging (1.5T) during anosmia (day 7; A, C) compared to recovery (day 24; B, D). MRI shows olfactory bulb (ob; pink) transient volume and signal increase, olfactory cleft edema (OC; brown), and focal left ethmoid (eth; green) sinusitis (*), and normal cranial fossa (gray line) and orbit (orb; yellow).

An asymptomatic 27-year-old man was diagnosed with coronavirus disease 2019 (COVID-19) by occupational medicine after contagion (reverse transcription polymerase chain reaction [RT-PCR]). Four days after the diagnosis, he experienced complete anosmia and dysgeusia.¹ On day 7, 1.5T MRI showed signs of bilateral olfactory bulb edema on 3D constructive interference in steady state T2-weighted imaging, demonstrated by severe enlargement² (left: 73 mm³, right: 64 mm³) and an abnormally high signal intensity (figure). Olfactory clefts showed mild edema. The olfactory pathways, including the cortical projections (fluid-attenuated inversion recovery and diffusion-weighted imaging not shown), were normal. Sensory recovery and negative RT-PCR (positive on days 1, 2, and 10) appeared on day 14.

MORE ONLINE

COVID-19 Resources

For the latest articles, invited commentaries, and blogs from physicians around the world
[NPub.org/COVID19](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7400000/)

From the Departments of Medical Imaging (T.L., J.M., C.C., A.-A.E.A., A.V.) and ENT Surgery (T.R.), Conception University Hospital, and Center for Magnetic Resonance in Biology and Medicine (C.C., A.V.), UMR 7339, La Timone University Hospital, Aix-Marseille University, France; and Department of Earth, Atmospheric and Planetary Sciences (M.G.), Massachusetts Institute of Technology, Cambridge.

Go to [Neurology.org/N](https://www.neurology.org/N) for full disclosures. Funding information and disclosures deemed relevant by the authors, if any, are provided at the end of the article.

MRI on day 24 confirmed the normalization of olfactory bulb signal and volumes (left: 22 mm³, right: 17 mm³).

Study funding

No targeted funding reported.

Disclosure

The authors report no disclosures relevant to the manuscript. Go to [Neurology.org/N](https://www.neurology.org/N) for full disclosures.

Appendix Authors

Name	Location	Contribution
Thomas Laundon, MD	Department of Medical Imaging, Conception University Hospital, Aix-Marseille University, Marseille, France	Traced the patient's entire history, including biological history and management, wrote the manuscript
Thomas Radulesco, MD, PhD	Department of ENT surgery, Conception University Hospital, Aix-Marseille University, Marseille, France	Examined the patient and performed sensory testing, corrected the manuscript
Justine Mugnier, MD	Department of Medical Imaging, Conception University Hospital, Aix-Marseille University, Marseille, France	Performed the bibliography and image analysis (volume and signal intensities), corrected the manuscript
Mélanie Gérault, PhD	Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge	Supervised manuscript corrections and provided substantial mathematical help in checking the volume calculations by triple checking with Horos program, oro.dicom under R statistics, and geometrical length model

Appendix (continued)

Name	Location	Contribution
Christophe Chagnaud, MD, PhD	Department of Medical Imaging, Conception University Hospital, Aix-Marseille University; Center for Magnetic Resonance in Biology and Medicine, La Timone University Hospital, Aix-Marseille University, Marseille, France	Department Chief; took part in ethical considerations, corrected the manuscript
Ahmed-Ali El Ahmadi, MD	Department of Medical Imaging, Conception University Hospital, Aix-Marseille University, Marseille, France	Responsible for image acquisitions, editorial, manuscript correction, took part in the submission process
Arthur Varoquaux, MD, PhD	Department of Medical Imaging, Conception University Hospital, Aix-Marseille University; Center for Magnetic Resonance in Biology and Medicine, La Timone University Hospital, Aix-Marseille University, Marseille, France	Supervised work, took part in ethical consideration, acquisition parameters, manuscript correction and submission

References

1. Lechien JR, Chiesa-Estomba CM, De Siati DR, et al. Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (COVID-19): a multicenter European study. *Eur Arch Otorhinolaryngol* Epub 2020 Apr 6. Available at: link.springer.com/10.1007/s00405-020-05965-1.
2. Abolmaali ND, Hietschold V, Vogl TJ, Hüttenbrink KB, Hummel T. MR evaluation in patients with isolated anosmia since birth or early childhood. *Am J Neuroradiol* 2002; 23:157-164.

NEW EPISODE



Neurology[®]

PODCAST

August 4, 2020

CME Opportunity: Listen to this week's *Neurology* Podcast and earn 0.5 AMA PRA Category 1 CME Credits™ by completing the online Podcast quiz.

Wisdom of the expert crowd prediction of response for 3 neurology randomized trials (see p. 201)

In the first segment, Dr. Jason Crowell talks with Dr. Jonathan Kimmelman about his paper on expert crowd prediction on clinical trial response. In the second part of the podcast, Dr. Andrew Southerland and Dr. J.G. Makin talk about Dr. Makin's *Nature* article on thought-to-text technology. The article is available online at: <https://www.nature.com/articles/s41593-020-0608-8>.

Disclosures can be found at [Neurology.org](https://www.neurology.org).

Neurology®

Bilateral transient olfactory bulb edema during COVID-19–related anosmia

Thomas Laundon, Thomas Radulesco, Justine Mugnier, et al.

Neurology 2020;95;224-225 Published Online before print May 22, 2020

DOI 10.1212/WNL.0000000000009850

This information is current as of May 22, 2020

Updated Information & Services	including high resolution figures, can be found at: http://n.neurology.org/content/95/5/224.full
References	This article cites 1 articles, 0 of which you can access for free at: http://n.neurology.org/content/95/5/224.full#ref-list-1
Citations	This article has been cited by 10 HighWire-hosted articles: http://n.neurology.org/content/95/5/224.full##otherarticles
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): MRI http://n.neurology.org/cgi/collection/mri
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.neurology.org/about/about_the_journal#permissions
Reprints	Information about ordering reprints can be found online: http://n.neurology.org/subscribers/advertise

Neurology® is the official journal of the American Academy of Neurology. Published continuously since 1951, it is now a weekly with 48 issues per year. Copyright © 2020 American Academy of Neurology. All rights reserved. Print ISSN: 0028-3878. Online ISSN: 1526-632X.

