Loss of smell in patients with COVID-19

MRI data reveal a transient edema of the olfactory clefts

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Study question
Is the loss of smell in patients with COVID-19 associated with morphologic changes of the olfactory cleft (OC)?

What is known and what this paper adds
Many patients with COVID-19 experience OFL, and there are cells in the olfactory epithelium that express the target receptor for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This investigation’s results provide evidence that OFL in patients with COVID-19 is associated with reversible OC obstruction.

Methods
For this case-control study, the investigators recruited 20 patients with PCR-confirmed SARS-CoV-2 infections and <15-day history of OFL through a university hospital in Paris between March 23 and April 27, 2020. For each patient, they recruited an age-matched (±5 years) control from among the hospital staff. The controls had no history of olfactory dysfunction, chronic rhinosinusitis, or neurologic disorders. The participants underwent olfactory function assessments and 3T MRI scans at baseline and at a 1-month follow-up timepoint. The olfactory function assessments involved computing olfactory function scores on a 0–10 scale based on sensitivity to 5 odorants. A blinded rater reviewed 2-dimensional fast spin-echo coronal T2-weighted images to evaluate OC permeability. The volume of the olfactory bulb was evaluated on the 3D-T2 SPACE sequence. The primary outcome was a between-group comparison of the prevalence of OC obstruction.

Results and study limitations
At baseline, the patients’ mean olfactory function score was lower than that of the controls (2.8 ± 2.7 vs 9.4 ± 0.7; p < 0.001), and MRI scans revealed OC obstruction in 19 patients (95%) and 0 controls (0%). After 1 month, the patients’ mean olfactory function score had improved to 8.3 ± 1.9, and only 7 patients (35%) still had OC obstruction. There was a correlation between the olfactory score and obstruction of the OC (p = 0.004). The present study’s limitations include a small sample size, the need to perform olfactory assessments with a limited set of odorants due to pandemic conditions, and the lack of fibroscopic assessments of OC permeability.

Study funding and competing interests
This study received no funding. The authors report no competing interests. Go to Neurology.org/N for full disclosures.

Figure
Coronal section showing bilateral inflammatory OC obstruction (continuous white arrows) below the olfactory bulbs (dashed white arrows) in a 38-year-old woman with COVID-19 and OFL

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