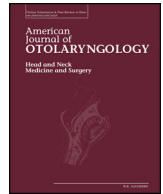




Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Olfactory and gustatory dysfunctions in COVID-19. First reports of Latin-American ethnic patients

Carlos M. Chiesa-Estomba^{a,b,*,1}, Jerome R. Lechien^{a,c,d,e,1}, Patricia Portillo-Mazal^f, Federico Martínez^g, Jesús Cuauro-Sanchez^h, Christian Calvo-Henriquez^{a,i}, Sven Saussez^{a,c,e,2}

^a Task Force COVID-19 of the Young-Otolaryngologists of the International Federations of Oto-rhino-laryngological Societies (YO-IFOS)

^b Department of Otorhinolaryngology - Head & Neck Surgery, Hospital Universitario Donostia, San Sebastian, Spain

^c Department of Human Anatomy and Experimental Oncology, Faculty of Medicine, UMONS Research Institute for Health Sciences and Technology, University of Mons (UMons), Mons, Belgium

^d Department of Otorhinolaryngology and Head and Neck Surgery, Foch Hospital, School of Medicine, UFR Simone Veil, Université Versailles Saint-Quentin-en-Yvelines (Paris Saclay University), Paris, France

^e Department of Otorhinolaryngology and Head and Neck Surgery, CHU de Bruxelles, CHU Saint-Pierre, School of Medicine, Université Libre de Bruxelles, Brussels, Belgium

^f Department of Otolaryngology, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina

^g Department of Otolaryngology, Hospital Masiel, Montevideo, Uruguay

^h Department of Respiratory Diseases, Clínica Siatea, San Fernando de Apure, Venezuela

ⁱ Department of Otolaryngology, Hospital Complex of Santiago de Compostela, Santiago de Compostela, Spain

Comment

Up to April the 18th 2020, a total of 2.160.207 patients had tested positive for the new SARS-CoV-2 coronavirus worldwide and 146.088 (6.7%) died. From those, 88,283 positive patients and 4.108 dies correspond to Latin-American countries (4,6%) [1].

According to the clinical studies from Asia, the most prevalent symptoms consist of fever, cough, dyspnea, sputum production, myalgia, arthralgia, headache, diarrhea, rhinorrhea and sore throat [2]. However, an increasing number of reports from Europe [3], United Kingdom [4] and the Middle East [5] has highlighted a new atypical presentation of the disease including olfactory and taste dysfunctions.

The occurrence of smell dysfunction in viral infections is well known in otolaryngology [6]. However, dysosmia linked to SARS-CoV-2 infection seems particular as not associated with rhinorrhea or other nasal symptoms. This can be relevant in a region particularly vulnerable to the outbreak as Burki highlight, due to the high number of patients suffer from high risk comorbidities, other concurrent outbreaks like dengue, zika, chikungunya, yellow fever and tuberculosis, slums, and the lack of facilities and ventilators where and early and accurate diagnosis can be key to the management COVID-19 pandemic [7].

In order to support our colleagues, clinical data of patients with confirmed COVID-19 infection prospectively collected in the ear, nose, and throat (ENT) consultation from 1 Spanish, 1 Uruguayan, 1 Venezuelan and 1 Argentinian Hospitals is presented. The following inclusion criteria have been considered: adult (> 18yo); with a

nasopharyngeal RT-PCR laboratory-confirmed COVID-19 infection. Information was collected using an online questionnaire created with Professional Survey Monkey (San Mateo, California, USA).

The selection of the relevant epidemiological and clinical features composing the questionnaire carried out by the COVID-19 Study Group of Young Otolaryngologists of the International Federation of Oto-rhino-laryngological Societies (YO-IFOS), which consisted of 4 general subset (Demographic data, medical background, ENT symptoms and Olfactory and Gustatory disfunction). All patients were invited to fulfill the Short version of Questionnaire of Olfactory Disorders-Negative Statements (sQOD-NS) [8]. The rest of the olfactory and taste questions were based on the smell and taste component of the National Health and Nutrition Examination Survey [9].

Five-Hundred and forty-two patients completed the study. Mean age of patients was 34 ± 11 (range: 18–88). There were 324 females and 218 males. Countries of origin are described in Table 1. Four-Hundred and forty-four patients (81.9%) had olfactory dysfunction (OD) related to the infection. Among these patients, 67,5% had a partial loss of smell, 14,4% had a total loss of smell. Phantosmia and parosmia concerned (42; 7.7%) and (68; 12.5%) of patients during the disease course, respectively. The OD appeared before other symptoms in 122 (22,5%) of cases. 19.4% of patients reported that OD appeared during the clinical course of the disease, whereas 52.4% of patients revealed that their OD developed after general or ENT symptoms. Among the 444 patients with OD, 261 (58.78%) reported a recovery of the olfactory function throughout the 14 first days following the resolution of

* Corresponding author at: Department of Otorhinolaryngology – Head and Neck Surgery, Hospital Universitario Donostia, Paseo Dr. Begiristain, #1, CP. 20014 San Sebastián - Donostia, Spain.

E-mail address: carlosmiguel.chiesaestomba@osakidetza.eus (C.M. Chiesa-Estomba).

¹ Have equally contributed to this work and should be regarded as *joint first authors*.

² Have equally contributed to this work and should be regarded as *joint senior authors*.

Table 1

Demographic and clinical data. Olfactory outcomes have been assessed through cross-tab generation between two variables (binary or categorical variables) and Chi-square test. A level of $p < 0.05$ was used to determine statistical significance. Abbreviations: SEL = systemic lupus erythematosus; RA: rheumatoid arthritis.

Characteristics	All patients = 542	%	p
Median age (years)	34 ± 11 (range: 18–88)		
Sex			0.001
Male	218	40.2	
Female	324	59.8	
Ethnicity			0.682
Argentina	116	21.4	
Peru	93	17.1	
Colombia	84	15.5	
Uruguay	71	13.1	
Ecuador	52	9.6	
Venezuela	47	8.7	
Bolivia	34	6.3	
Chile	27	5	
Nicaragua	11	2	
Panama	7	1.3	
Current SMOKER	63	11.6	0.576
History of seasonal allergy	125	23.1	0.464
Comorbidities			
Diabetes	29	5.3	0.936
Heart problems	15	2.8	0.189
COPD	9	1.7	0.929
Hypertension	39	7.2	0.445
Asthma	29	5.4	0.572
Hypothyroidism	20	3.7	0.711
Autoimmune disease (LES, RA)	6	1.1	0.719
General symptoms			
Headache	393	72.5	0.060
Myalgia	340	62.7	0.056
Cough	229	43.6	0.379
Loss of appetite	253	46.7	0.074
Dyspnea	44	5.8	0.344
Diarrhea, abdominal pain	172	31.7	0.058
Fever (> 38C)	192	35.4	0.079
Arthralgia	255	47	0.065
Nausea, vomiting	108	19.9	0.061
Sticky mucus/phlegm	101	18.6	0.923
Ear, nose and throat symptoms			
Nasal obstruction	99	18.2	0.291
Sore throat	83	15.3	0.344
Rhinorrhea	40	7.4	0.535
Postnasal drip	77	14.2	0.420
Face pain/heaviness	106	19.5	0.116
Ear pain	26	4.8	0.275
Dysphagia	30	5.5	0.384

the disease. Patients suffer from OD at the time of the evaluation had a significant lower score of sQOD-NS compared with patients with normosmia ($p = 0.0001$; Kruskal-Wallis). In the present study, 443 patients had no nasal obstruction and no rhinorrhea during the clinical course of the disease. Among them, 307 (69.3%) suffered from a partial loss of smell and 37 (8.3%) a total loss of smell. Three-Hundred and thirty tree patients (61.4%) reported taste disorder, which was characterized by impairment of the following four taste modalities: salty,

sweet, bitter and sour.

There was no significant association between comorbidities and the development of olfactory or gustatory dysfunctions (Table 1). Olfactory dysfunction was not significantly associated with rhinorrhea or nasal obstruction (Table 1). There was a significant positive association between olfactory and taste dysfunctions ($p = 0.003$).

To the best of our knowledge, this is the first report of Latin-American ethnic patients. As in previous report, olfactory and gustatory dysfunction are present in Latin-American population. We consider these results can have a paramount of importance due to difficult in the diagnosis of the COVID-19 infection due to the lack of resources, which may be associated with misdiagnosis and related lack of precaution for isolating these patients and their families. According to the data of the present study, the prevalence of olfactory and taste dysfunction would be similar to those reported from European COVID-19 patients. In addition, OD may appear before the rest of the other complaints in 22.5% of cases, yielding the symptoms important for an early detection of the disease. Despite our study limitations, the focus on mild-to-moderate patients, the inclusion of Latin-American patients living in Spain, and the absence of objective nasal testing, any effort is important to alert physicians across Latin-American countries to be aware about these symptoms in suspected patients.

Ethics

Four ethics committees approved the current study protocol (HAP2020-011; CHUSP20032020; EpiCURA-2020-2303; CHU-Charleroi: B32522020).

Declaration of competing interest

The authors declare don't have any conflicts of interest.

References

- [1] Coronavirus disease 2019 (COVID-19) situation report – 89. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200410-sitrep-81-covid-19.pdf?sfvrsn=ca96eb84_2, Accessed date: 19 April 2020.
- [2] Young BE, Ong SWX, Kalimuddin S, et al. Epidemiologic features and clinical course of patients infected with SARS-CoV-2 in Singapore. *JAMA* 2020. <https://doi.org/10.1001/jama.2020.3204>.
- [3] Lechien JR, Chiesa-Estomba CM, De Siaty DR, Horoi M, Le Bon SD, Rodriguez A, 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* 2020. <https://doi.org/10.1007/s00405-020-05965-1>. Apr 6.
- [4] Hopkins C, Surda P, Kumar N. Presentation of new onset anosmia during the COVID-19 pandemic. *Rhinology* 2020. <https://doi.org/10.4193/Rhin20.116>. Apr 11.
- [5] Moein ST, Hashemian SMR, Mansourafshar B, Khorram-Tousi A, Tabarsi P, Doty RL. Smell dysfunction: a biomarker for COVID-19. *Int Forum Allergy Rhinol* 2020. <https://doi.org/10.1002/alr.22587>. Apr 17. [Epub ahead of print].
- [6] Suzuki M, Saito K, Min WP, Vladau C, Toida K, Itoh H, et al. Identification of viruses in patients with postviral olfactory dysfunction. *Laryngoscope* 2007;117:272–7.
- [7] Burki T. COVID-19 in Latin America. *Lancet Infect Dis* 2020. [https://doi.org/10.1016/S1473-3099\(20\)30303-0](https://doi.org/10.1016/S1473-3099(20)30303-0). Published: April 17.
- [8] Mattos JL, Edwards C, Schlosser RJ, Hyer M, Mace JC, Smith TL, et al. A brief version of the questionnaire of olfactory disorders in patients with chronic rhinosinusitis. *Int Forum Allergy Rhinol* 2019;9(10):1144–50. <https://doi.org/10.1002/alr.22392>.
- [9] Bhattacharyya N, Kepnes LJ. Contemporary assessment of the prevalence of smell and taste problems in adults. *Laryngoscope* 2015;125(5):1102–6. <https://doi.org/10.1002/lary.24999>.