



# Risk of contagion of SARS-CoV-2 among otorhinolaryngologists in Spain during the “Two waves”

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## Abstract

**Introduction** The aim of our study was to obtain data about the contagion rate among Otolaryngologists in Spanish ENT Departments and about the clinical outcomes in positive otolaryngologists. As a secondary objective, we aim to assess the rate of contagion in the first and the second Covid-19 wave in Spain among Otorhinolaryngologists and the regional distribution by ENT-Departments.

**Methods** Study design and population: This is a prospective observational study in a cohort of 975 Otolaryngologists from 87 ENT Departments conducted from March 25 to November 17 in our collaborative group, COVID ORL ESP. COVID-19 polymerase chain reaction (PCR) was the diagnostic standard. Hospitalization and/or intensive care admission and mortality was recorded as non-identified data.

**Results** Data collected from 975 otolaryngologist from 87 Departments resulted in 157 (16.5%) otolaryngologists testing positive for SARS-CoV-19 by RT-PCR. Important geographic differences in contagion are reported. A total of 136 (86.6%) otolaryngologists were tested positive during the first wave and 21 (13.3%) during the second wave. At the last cut-off point of the study only 30/87 ENT Departments (34.5%) remained

COVID19-free and 5 Departments reported more than 50% staff members testing positive. The majority of positive tested otolaryngologists (126/157; 80.2%) had only mild or no symptoms, 17 developed moderate symptoms (10.8%) and 3 had pneumonia not requiring hospitalization (2%). Five colleagues were admitted at hospital, 4 required ICU (2.5%) and 2 colleagues died from COVID-19.

**Conclusions** During the first wave of the SARS-CoV-19 pandemic otolaryngologists in Spain have been overall the group suffering the highest rate of contagion, particularly during the first month. Subsequently, the Spanish Ministry of Health should include otorhinolaryngologists as a high-risk group in airborne pandemics.

**Keywords** SARS-CoV-2 · COVID-19 · Otolaryngology · Morbidity · Mortality

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Cristina Martin-Villares, Manuel Bernal-Sprekelsen contributed equally to this work.

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Collaborative group affiliations and members are listed in Acknowledgements section.

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All authors contributed to the study conception and design. CMV had the responsibility of the data collection and analysis. CMV and MBS wrote the manuscript and have equally contributed as main authors. MBS made final corrections. All authors have revised the manuscript and gave approval for the published version.

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## Introduction

According to data from the Ministry of Health (November 12–30, 2020), with 79,771 confirmed cases, Spanish healthcare workers (HCWs) are worldwide who were the most affected by the COVID-19 pandemic [1]. One reason may be that, at the beginning of the pandemic, the National protocol recommended PCR testing was only in symptomatic HCW [2].

The nationwide Spanish seroepidemiological study ‘ENE-COVID’ concluded that 10% of HCWs in our country had antibodies against SARS-CoV-2, while only 5.2% antibodies were detected in the general population [3]. In another seroprevalence study, among 578 HCW

from a referral hospital in Barcelona, Spain, the cumulative prevalence of SARS-CoV-2 infection was 11.2% and 40% of HCWs with past or present infection had not been previously diagnosed with COVID-19 [4].

The aim of our study was to obtain data about the contagion rate among otolaryngologists, in Spanish ENT Departments and about the clinical outcomes in positive otolaryngologists. As a secondary objective, we aim to assess the rate of contagion in the first and the second Covid-19 wave in Spain among otorhinolaryngologists and the regional distribution by ENT-Departments.

## Methods

### Study design and population

This is a prospective observational study in a cohort of 975 otolaryngologists conducted from March 25 to November 13. The study population was collected from our collaborative group, COVID ORL ESP, created on March 25, among 252 otolaryngologists of 87 Spanish ENT Departments, to share the information by instant messaging about tracheostomies and other issues related to COVID-19 patients [5]. The study was designed to obtain representative data at national and regional levels. Otolaryngologists of all regions participated in the study (Fig. 1).

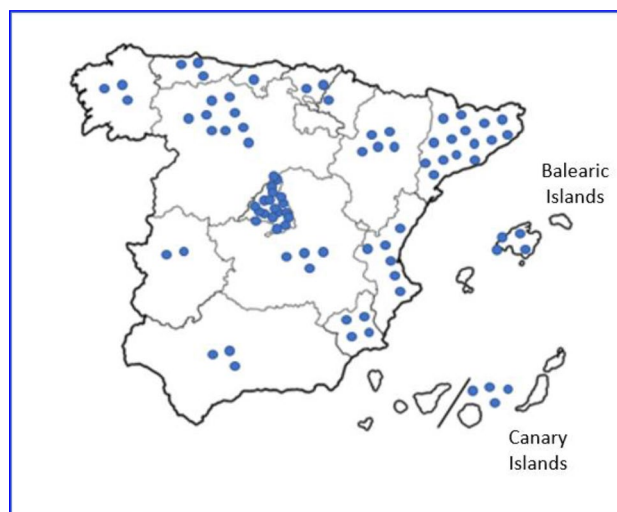
Participants of the collaborative group collected data from all included ENT-Departments along 8 months, from March 25 to November 13. COVID-19 polymerase chain reaction (PCR) was the diagnostic standard. Date of diagnosis, the need for hospitalization and/or intensive care admission and mortality was recorded as non-identified data. The severity of clinical outcomes of otolaryngologists tested positive was scored by a scale: (1) non-hospitalized cases, (2) hospitalized cases, (3) ICU admission, and (4) death. The two COVID-19 “waves” were defined following the official MoMo data from Spain (momo.isciii.es):

-“*First wave*” from March 10 to May 10 (with a 66.9% excess deaths).

-“*Second wave*” from September 1 to November 16 (with 16.9% excess of deaths).

## Results

After two waves of the pandemic in Spain, data collected from 975 otolaryngologist from 87 Departments resulted in 157 (16.5%) otolaryngologists testing positive for SARS-CoV-19 by RT-PCR. The first otolaryngologist who



**Fig. 1** Regional distribution of ENT Departments of COVID ORL ESP collaborative group

tested PCR positive was on March 9, 2020 at a hospital in Madrid. The last otolaryngologist who tested positive was on November 9 in Zaragoza Fig. 2 and Table 1.

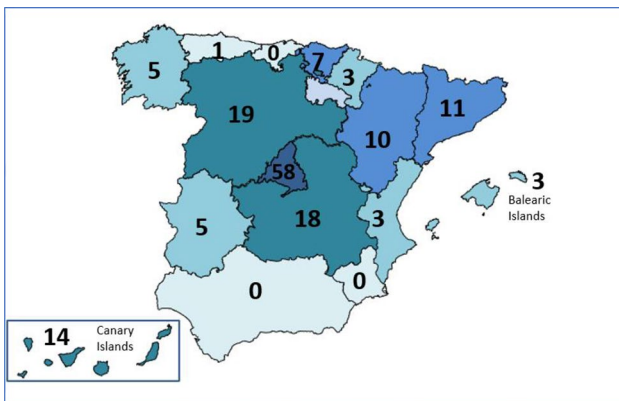
Important geographic differences in contagion among otolaryngologists are reported in Fig. 1. Madrid, Castilla, and León and Castilla-La Mancha displayed the highest incidence of otolaryngologists who were tested positive (Table 1). The majority of positive tested otolaryngologists (126/157; 80.2%) had only mild or no symptoms (Table 2). Seventeen otolaryngologists developed moderate symptoms (10.8%) and three of them had pneumonia not requiring hospitalization (2%). Five colleagues were admitted in hospital with moderate-severe pneumonia. Four otolaryngologists required ICU (2.5%) for critical pneumonia and finally, one otolaryngologist died from COVID-19 in March and another colleague died in November.

A total of 136 (86.6%) otolaryngologists was tested positive during the first wave and 21 (13.3%) during the second wave. After the first wave, 35/87 ENT Departments of our study group (40.2%) remained COVID19-free (Table 3). At the last cut-off point of the study, only 30/87 ENT Departments (34.5%) remained COVID19-free and five Departments reported more than 50% staff members testing positive.

**Table 1** Distribution of otolaryngologists testing positive by Spanish regions

Spanish regions (CA, Autonomous Community)	Otolaryngologists	
	157 infected	975 total otolaryngologists
CA Madrid (6 663 394 inhabitants*)	58	271
CA Castilla León (2 399 548)	19	102
CA Castilla La Mancha (2 032 863)	18	55
CA Islas Canarias (2 153 389)	14	64
CA Cataluña (7 675 217)	11	109
CA Aragón (1 319 291)	10	52
CA País Vasco (2 207 776)	7	42
CA Extremadura (1 067 710)	5	22
CA Galicia (2 699 499)	5	34
CA Islas Baleares (1 149 460)	3	38
CA Valencia (5 003 769)	3	67
CA Navarra (654 214)	3	24
CA Asturias (1 022 800)	1	25
CA Cantabria (581 078)	0	17
CA Murcia (1 493 898)	0	20
CA Andalucía (8 414 240)	0	33

\*Demographic data from Spanish National Statistics Institute (INE) in 2019 <https://www.ine.es/dynt3/inebase/es/index.htm?padre=517&capsel=523>



**Fig. 2** Regional distribution of ENT positive tested

**Discussion**

The aim of our study was to obtain data about contagion among otolaryngologists and ENT Departments in Spain during the two waves of the current coronavirus pandemic, as well as potential regional differences of contagion.

Data collected over an eight-month period from 87 hospitals in Spain, showed an overall rate of contagion of 16.5%, with 157/952 otorhinolaryngologists testing positive for SARS-CoV-19. This rate is three times higher as compared with the general population in Spain with a

seroprevalence of 5.2% of IgG antibodies against SARS-Cov2, and also above the 10% rate of antibodies among HCWs found in the same study [3]. In a large Spanish referral hospital seroprevalence of anti-bodies against SARS-CoV-2 among all HCWs reached 11.2% [4]. Data from other invasive airways physician collaborative group [6] reported a contagion rate of 10.5% among anaesthesiologists ( $n = 150/1328$ ) and 12.3% among intensive care physicians ( $n = 31/251$ ).

Because the study was designed to obtain representative data at both national and regional levels, we were able to observe marked regional differences in contagion, particularly between the centre of Spain (Madrid, Castilla y León, and Castilla La Mancha) and peripheral regions. Similar results about regional differences were reported in a large nationwide study about seroprevalence of SARS-CoV-2 in Spain (ENE-COVID) [3] with prevalence five times higher in Madrid and central parts of Spain than that observed in low-risk regions.

Inadequate personal protection at the beginning of the pandemic, shortage of personal protective equipment (PPE), and long-time exposure to large numbers of infected patients was established at the Shanghai International Forum as the most impact reasons for HCWs becoming infected [7]. In our study, 86% of the reported contagion happened during the first wave, coinciding with a shortage of PPEs and limited number of PCR testing performed at the beginning of the pandemic in our country. Monitoring the prevalence of

**Table 2** Clinical outcomes of otolaryngologists positive tested during pandemic (from March to November 2020)

Clinical outcomes	Otolaryngologist with test positive for COVID-19		
	Total ( <i>n</i> = 157)	%	
No symptoms	11	7%	
Mild symptoms	115	73.2%	At least one symptom associate with COVID-19
Moderate symptoms without hospitalization	17	10.8%	
Pneumonia without hospitalization	3	2%	
Hospitalization	5	3.2%	
ICU admission	4	2.5%	1 with neurological sequelae
Deaths (in-Hospital)	2	1.3%	1 in March 2020 1 in November 2020

infection among different activities during pandemics will be useful for assessing the potential level of exposure and identifying high-risk diagnostic or therapeutic procedures performed by otorhinolaryngologists, thus reinforcing the critical role of PPE in our speciality to prevent contagion. Lessons learned from the SARS 2003 outbreak in Hong Kong, Singapore and Canada validated the effectiveness of standard protective personal equipment (PPE) on aerosol generating procedures in our speciality [8]. A study from one referral hospital participating in our collaborative group reported no contagion among the surgical team along with the first wave with high standards of protection in 50 COVID-19 tracheostomies [9].

Despite being otolaryngologists an obvious high-risk group, recent recommendations of the Spanish Ministry of Health about safety measurements for HCWs in aerosol-generating procedures (AGP) left otolaryngologists out of the list of groups at risk [10], while e.g. the UK Government [11] considered any upper ENT airway procedures that involve suctioning as the potentially infectious AGPs for COVID-19 and recommended full PPE for ENT specialist while visiting any patient in the office. However, recommendations as to how physicians, and particularly otorhinolaryngologists, had to protect themselves had not been established back then. In fact, at the beginning of the pandemic PPE, let alone PAPR, were available in sufficient numbers and, as stated above, diagnostic or therapeutic procedures performed by otorhinolaryngologists have even not yet been listed as a risk. All this might contribute to explain the high rate of contagion registered during the first weeks among otorhinolaryngologists in Spain.

The results of our survey are in full contrast to a recent international study, registering Otolaryngologists—Head

and Neck surgeons with COVID-19 in 19 countries [12]. Here, Spain is listed with just 11 cases for a total of 361. The methodology of this registry remains unclear as it does not explain which inclusion period had been considered. Our contagion rate is higher than the one found in the recent national web-based survey on the SARS-CoV-2 infections among otorhinolaryngologists in Germany [13] with 54/970 (5.56%) ORLs reported testing positive. At that point, the prevalence in the general population in Germany was lower. In any case, the German study concluded that otolaryngologists have an almost 3.7-fold risk of contracting SARS-CoV-2 compared with the population baseline level, similar to our results.

The limitations of our survey are the data acquired through social media: the maximum number of participants in a WhatsApp-group is 256. Large studies also used a smartphone app to recollect prospective data on pandemic in real time [14]. Thus, we missed two additional deceased otorhinolaryngologists from hospitals not included in the study group. Also, results do not necessarily reflect the rate of nosocomial infection. However, the latter would not explain the differences in the contagion rate in comparison to other specialists handling the upper airway.

## Conclusions

During the first wave of the SARS-CoV-19 pandemic otolaryngologists in Spain have been overall the group suffering the highest rate of contagion, particularly during the first month. Subsequently, the Spanish Ministry of Health should include otorhinolaryngologists as a high-risk group in airborne pandemics.

**Table 3** ENT Departments with otolaryngologist tested positive during both waves of the pandemic in Spain

ENT Departments ( $n=87$ )	Otolaryngologist+ ( $n=157/952$ )	
	First wave+Second wave (136+21 ENT+)	Total ENT+ at Department/total ENT at Department
D 1	11+2	13/22
D 2	6+0	6/14
D 3	6+0	6/13
D 4	6+0	6/7
D 5	5+0	5/18
D 6	3+2	5/12
D 7	4+0	4/28
D 8	2+2	4/26
D 9	3+1	4/22
D 10	2+2	4/21
D 11	4+0	4/16
D 12	0+4	4/15
D 13	4+0	4/15
D 14	4+0	4/13
D 15	4+0	4/10
D 16	4+0	4/7
D 17	4+0	4/7
D 18	2+1	3/24
D 19	2+1	3/21
D 20	3+0	3/19
D 21	3+0	3/15
D 22	3+0	3/14
D 23	2+1	3/13
D 24	3+0	3/13
D 25	2+1	3/13
D 26	2+1	3/9
D 27	3+0	3/8
D 28	3+0	3/7
D 29	3+0	3/3
D 30	2+0	2/24
D 31	2+0	2/19
D 32	2+0	2/16
D 33	2+0	2/13
D 34	2+0	2/12
D 35	3+0	3/10
D 36	2+0	2/8
D 37	2+0	2/7
D 38	1+1	2/5
D 39	1+0	1/26
D 40	1+0	1/19
D 41	1+0	1/17
D 42	0+1	1/14
D 43	0+1	1/12
D 44	1+0	1/10
D 45	0+1	1/10
D 46	1+0	1/8

**Table 3** (continued)

ENT Departments ( $n=87$ )	Otolaryngologist+ ( $n=157/952$ )	
	First wave+Second wave (136+21 ENT+)	Total ENT+ at Department/total ENT at Department
D 47	1+0	1/8
D 48	1+0	1/8
D 49	1+0	1/6
D 50	1+0	1/6
D 51	1+0	1/6
D 52	1+0	1/5
D 53	1+1	1/5
D 54	1+1	¼
D 55	1+0	¼
D 56	0+0	0/23
D 57	0+0	0/21
D 58	0+0	0/17
D 59	0+0	0/17
D 60	0+0	0/15
D 61	0+0	0/14
D 62	0+0	0/13
D 63	0+0	0/12
D 64	0+0	0/11
D 65	0+0	0/8
D 66	0+0	0/7
D 67	0+0	0/6
D 68	0+0	0/6
D 69	0+0	0/6
D 70	0+0	0/6
D 71	0+0	0/6
D 72	0+0	0/6
D 73	0+0	0/5
D 74	0+0	0/5
D 75	0+0	0/5
D 76	0+0	0/5
D 77	0+0	0/4
D 78	0+0	0/4
D 79	0+0	0/4
D 80	0+0	0/4
D 81	0+0	0/3
D 82	0+0	0/3
D 83	0+0	0/3
D 84	0+0	0/2
D 85	0+0	0/2
D 86	0+0	0/2
D 87	0+0	0/2

D ENT department, ENT otolaryngologist, ENT+ otolaryngology tested positive for COVID-19

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