First Reports of Salivary Gland Involvement in Coronavirus Disease 2019

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Background

Many viruses infect salivary glands. These include mumps, Epstein-Barr, herpes virus 6, parainfluenza, influenza, adenovirus, bocavirus and others [1,2,3]. Coronavirus disease 2019 (COVID-19) infected patients carry the virus in saliva [4,5]. Salivary duct epithelium were the early target cells in macaque monkeys infected with severe acute respiratory syndrome coronavirus (SARS-COV) [6]. Here we present 2 COVID-19 cases with the involvement of salivary glands. Salivary gland involvement has not been reported in COVID-19.

Methods

We followed the COVID-19 clinical findings in a Pennsylvania long term care facility with 197 residents. At the time of submission of the original abstract 30 tested polymerase chain reaction (PCR) positive. However, 48 were presumed infected. Eighteen likely cases were not tested due to shortage of swabs. Thirty-four employees also tested positive. Two out of 48 patients aged 78 and 88 developed unilateral sialadenitis during the course of the illness. Both were Hispanic females. We studied the clinical presentations, co-morbidities, lab and imaging results and the outcome. In the final analysis in mid August there were 13 confirmed and 11 suspected deaths due to COVID-19 with zero new cases.

Results

Case 1: Two days after the first confirmed case in the facility, an 88 year old Hispanic female developed fever and fatigue. She tested COVID-19 positive. Fever lasted 5 days. Twenty days later the patient developed a 5x3 cm tender left parotid mass and hypoxia treated with oxygen via nasal cannula. (table 1)

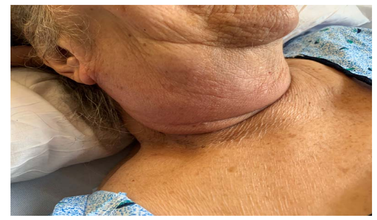
Case 2: A 78-year-old Hispanic female developed high fever and cough 7 days after the index case. She tested COVID-19 positive. Six days later she had persistent fever and presented with a tender 8.5x3.5 cm right submandibular mass. The patient was intubated for 3 days to protect the airway due to the size of the mass.

Both made an uneventful recovery. (table 1 and Figure 1)

Table 1

	Case 1	Case 2
Age	88	78
Sex	Female	Female
Race	Hispanic	Hispanic
Exposure	Nursing home	Nursing home
Co-morbid conditions	Hypertension, diabetes mellitus 2 (DM2), asthma, cardiac disease, pacemaker, dementia, mood disorder	Hypertension, DM2, obesity, dementia, mood disorder, cerebrovascular accident
Clinical features	Fever, Fatigue, left parotid mass 5 x 3 cm, hypoxia (oxygen saturation on room air 87%) nasal O2, 2L/minute	Fever, Cough, right submandibular mass 8.5 x 3.5 cm, Oxygen saturation on room air 98%, Intubated and on ventilator for 3 days to protect airway, due to size of mass[fig 1], and altered mental status
Vital signs	Blood pressure 134/87, pulse 100/ minute, respiratory rate (RR) 22/minute, temperature 101.8 F	Blood pressure 120/56, pulse 70/ minute, RR 20/ minute, temperature 100.3 F
Relevant laboratory results	White blood cell count 5700 (NL 4500-10,500) neutrophils (N) 47%, lymphocytes (L)22%, monocytes 14% (M), eosinophils (E) 16%, basophils 1%	White blood cell count 15,250 N 74%, L 17%, M 7%, E 1%, procalcitonin < .05, interleukin 6: 75.2 (NL < 5pg/ml), D-dimer 3.69 (NL 0.5 mg/l), ferritin 454 (NL 18-160 mcg/l), vitamin D level 20.4 (NL >40nmol/l), prothrombin time 29 (NL 11-13.5 seconds), international normalized ratio 1.57 (NL < 1.1), fibrinogen 658 (NL 200-400)
Imaging studies	Chest x-ray: negative	Chest x-ray: negative, computerized tomogram head/neck: inflammation of right submandibular gland, no duct dilatation or sialolithiasis
Salivary glands involved	Left parotid gland	Right submandibular gland
The test to confirm COVID-19	PCR nasal swab	PCR nasal swab
Treatment	Vitamins C and D3, zinc, atorvastatin, enoxaparin sodium, ceftriaxone	Cefepime, trimethoprim/sulfamethoxazole, hydroxychloroquine, prednisone, aspirin, amlodipine, Vitamins C and D3, zinc, atorvastatin
Outcome	Full recovery	Full recovery

Figure 1. Case 2 with massive right submandibular sialadentis



Conclusion

New clinical findings of COVID-19 have been gradually added during the course of the pandemic. The virus is almost universally present in saliva [5]. In experimental Chinese macaques with SARS-COV early target cells were the salivary duct epithelium [6]. Salivary gland inflammation and swelling should be included among the possible clinical features of COVID-19.

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