



Acute Parotitis: An Atypical Manifestation of Covid-19

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Abstract

While the Coronavirus disease (COVID-19) commonly presents with respiratory symptoms, there has been a rise in the number of atypical manifestations with the unfolding of the pandemic. Acute parotitis is one such atypical manifestation associated with COVID-19. It is important that physicians familiarize themselves with these atypical symptoms in order to prevent infection and disease transmission. It is important that COVID-19 be considered in the differential of parotitis and other virus-causing syndromes, as well as emphasize on the importance of personal protection during initial examination.

Keywords: COVID-19; Coronavirus; Acute Parotitis; Atypical Manifestation; Salivary Gland

The Coronavirus disease (COVID 2019), caused by SARS-COV-2 virus is a highly contagious infection that started in Wuhan, China late in 2019 [1]. Over the last 2 years, this disease has led to the development of a global pandemic, with nearly 192 million cases and 4 million deaths across the globe. The manifestations of the disease results from primary infection by the virus and includes fever, dyspnea, cough, headache, myalgia and diarrhea. Symptoms of olfactory impairment present as sore throat and rhinorrhea [2]. The infection is transmitted through inoculation of infected droplets into mucosal surfaces like the nose, eyes and mouth from both symptomatic and asymptomatic carriers. Diagnosis is usually made by RT-PCR of oropharyngeal and nasopharyngeal swabs [3]. However, SARS-COV-2 can also be found in saliva specimens [4] at high viral loads. Given the high concurrence between saliva and nasopharyngeal specimens in detecting respiratory viruses, including the coronaviruses, there is a very high possibility to develop oropharyngeal symptoms as well.

Reports suggest that Angiotensin converting enzyme-II (ACE-2) is the most important host cell receptor for the SARS-COV-2, that plays a key role in entry of the virus into host cells so as to replicate and cause infection. It has been demonstrated that ACE-2 is highly expressed on mucosa of the oral cavity, taste buds, epithelial cells of the tongue, as well as cells of minor and major salivary glands [5]. Other receptors present in the oral cavity which pose as similar entry sites for the virus are TMPRSS2 and Furin [6]. These findings explain the mechanism in which the oral cavity acts as a reservoir and high-risk source of the COVID-19 infection.

With the growth of the ongoing pandemic, there is an increase in number of asymptomatic cases and atypical presentations which also include otolaryngological symptoms. Atypical manifestations like acute otitis media, sensorineural hearing loss (SNHL), olfactory and taste dysfunction, ulcers and blisters, strawberry tongue and acute parotitis [7] are on the rise and hence physicians must have a high index of suspicion while treating Covid 19 patients. Acute par-

otitis and parotitis like disease are usually associated with Mumps, Measles, Rubella, Influenza virus and HIV due to their predilection for salivary glands, especially the parotids [8]. Later on, parotitis was reported as an associated symptom of Covid 19 [3] and an occurrence of intra-parotid lymphadenitis on MRI findings was also validated [9].

As of April 2021, only 24 cases of Covid 19 associated parotitis have been reported globally in peer reviewed literature. 14 of them (58.3%) being females, with a median age of 28.5 years [10]. Reports also suggest that there will be a further increase in the number of atypical manifestations, which is not surprising given the ongoing covid wave and emergence of new virulent strains at such a fast pace.

Riad., *et al.* [11] in a case series reported 15 cases of acute parotitis, seen at the Emergency department of Masaryk University from March 20 to June 20, 2020. All patients (ages 10 - 73 years) were previously confirmed with a diagnosis of Covid 19 and complained of severe unilateral pain predominantly localized to the angle of mandible region. The duration of pain varied from 1 - 6 days. 10 patients (66.7%) had non-suppurative swelling and 5 patients (33.3%) presented with swelling only on the day of diagnosis. Other most common associated symptoms were headache (46.7%), earache (33.3%) and pharyngitis (20%). All patients were confirmed to be infected with Sar-Cov-2 by PCR, from nasopharyngeal swabs. Viral load (measured using cycle threshold) ranged from 21 - 33. Most patients (86.7%) did not require further investigations, while 2 of them needed special consultation due to other systemic comorbidities like Diabetes Mellitus and immunodeficiency. Laboratory tests were not conducted to exclude mumps, due to advanced age of patients and non-persistent nature of pain experienced. The authors recommend to exclude other infectious etiologies like mumps, rubella and influenza if present, according to age at presentation. The authors concluded that the acute parotitis symptoms were attributed to direct invasion of salivary gland cells by SARS-COV-2 and emphasized on the need to conduct larger epidemiological studies to reveal the role of factors like age and viral load on severity of symptoms.

Zhen Yu Lim., *et al.* [10] reported a case of acute parotitis associated with COVID-19 in a 46-year-old male migrant worker. The patient was found on screening to be positive for SARS-COV-2 via nasopharyngeal swab, and on admission was febrile (38.5C) and

hypertensive. The patient reported of intermittent fevers for 6 days prior to admission, without any associated respiratory symptoms. On day 2 of admission (9 days after illness onset), the patient developed a firm, non-fluctuant, bilateral parotid swelling. Palpation showed mild tenderness, without any associated lymphadenopathy. Bilateral enlarged parotitis depicted as symmetrically enlarged parotid glands with homogenous enhancement and surrounding fat stranding were revealed on CT scan of the head and neck. Thickened platysma on the right side along with fluid track across the right sternocleidomastoid muscle was also found. Saliva and throat swabs were processed for SARS-COV-2 by RT-PCR, both of which turned out negative. Patient's buccal swab was also processed for Mumps and Paramyxovirus, both of which were not detected in the sample. HIV screening was negative as well. 14 days after illness onset, the patient tested negative for SARS-COV-2, after which he underwent naso-endoscopy that revealed features of rhinosinusitis with enlarged bilateral parotid glands. After 28 days PIO, the parotitis showed substantial improvement and patient was discharged, with advice to return for outpatient review 3-weeks post-discharge.

Fisher, *et al.* [12] reported a case of a 21-year-old female who presented with left sided facial and neck swelling, previously diagnosed with COVID-19. The swelling increased progressively, causing trismus and malocclusion. The patient did not report of any fever, pain or facial weakness. On palpation, preauricular and submandibular swelling was noted, without erythema or induration. CT scan of the neck showed diffuse asymmetric enlargement of the left parotid gland without sialolithiasis, mass, or abscess, with fat stranding around the parotid, and free fluid tracking into the left submandibular, submental, and parapharyngeal spaces and along the strap muscles and left sternocleidomastoid. Malocclusion was attributed to inflammatory processes surrounding the muscles of mastication, for which patient was prescribed amoxicillin/clavulanic acid. Patient was also advised to apply warm compress, massage salivary gland, use sialagogues to help salivary flow and hydration. Authors concluded that the examination and radiological findings were most consistent with the diagnosis of acute infectious parotitis, which would not have been otherwise associated as an atypical symptom of COVID-19 had the patient not tested positive for SARS-COV-2 prior to hospital admission, due to lack of epidemiological research.

In a case reported by Yildis, *et al.* [13], a 4-year-old boy presented to the Pediatrics department in the Izmir Katip Celebi University in Turkey with fever, malaise, abdominal pain, vomiting and diarrhea. The patient was an asthmatic, on montelukast for 1 year. He was up-to-date with immunizations, including the MMR vaccine. A combined nasopharyngeal and oropharyngeal swab was positive for SARS-COV-2 by RT-PCR. 4 days later, patient was admitted for right-sided pain and facial swelling in the preauricular and cheek region, with difficulty in swallowing. On examination swelling was soft and non-fluctuant, measuring 2 x 2 cm. Serum amylase was found to be 147 U/L (Normal: 28 - 100 U/L). Serology for Hepatitis A, Hepatitis C, Mumps, Measles, Rubella, CMV, EBV and HIV was negative. Neck ultrasound revealed hypoechoic, diffuse enlargement of parotid gland consistent with acute parotitis. No lymph node enlargement was detected. Patient was then treated with NSAID's and advised for a follow up after 3 days, by which facial symptoms had resolved completely.

Chowdhury MRU, *et al.* [14] reported a case of a 62-year-old man from Bangladesh, who presented with left sided facial and neck swelling for 2 days along with flu-like symptoms. Patient complained of dry cough, soreness of throat and malaise. He is a known case of diabetes, on anti-diabetic drugs. On examination, left sided preauricular and submandibular swelling was noted with mild erythema. Routine investigation along with nasopharyngeal swab and PCR for COVID-19 was advised, due to history of contact with an infected patient. X-ray neck lateral view revealed left sided soft tissue swelling without an obstructing stone. Patient was prescribed with paracetamol and antibiotics for probable bacterial infection, along with hot compress and massaging of gland. RT-PCR for COVID-19 came positive the following day. Patient was then started on thromboprophylaxis, antiviral drugs and advised strict home isolation. However, symptoms worsened over the next 3 days and patient attended emergency department with symptoms of high-grade fever, respiratory distress and increase in size of his facial and neck swelling. Lung examination revealed bilateral coarse crackles. HRCT of chest was advised, which showed multi-focal ground glass opacities and consolidations in multiple peripheral areas of both lungs. Patient was then started on IV steroids, antivirals, subcutaneous LMWH and IV antibiotics for any possible co-infection. After 14 days, patient tested negative, with satisfactory follow up investigations and radiological improvements. The authors concluded that parotitis with an infectious etiology like Mumps, Enterovirus,

CMV, EBV, etc. might have been the prime differential. But given the context of ongoing pandemic, parotitis as a late atypical symptom of COVID-19 infection is a more likely cause of acute parotitis in this patient.

Currently, acute parotitis presents as a late symptom in many patients affected with COVID-19. With the ongoing pandemic and emergence of new virulent strains at such a fast pace, a rise in number of atypical symptoms has been noticed. As observed, acute parotitis can be seen in patients of any age group, from childhood to old age. The number of cases reported in children are less due to their relative protection against the illness so far. Furthermore, parotitis is often a childhood illness that is predominantly attributed to Mumps. Hence, many children escape a confirmatory PCR or serologic testing pertaining to COVID [15]. Atypical symptoms are generally observed in patients with diabetes mellitus or those who are immunocompromised [16]. Most of the cases of COVID-19 associated parotitis that have been reported involves unilateral parotid gland enlargement [17]. These demographics may change in the future with the emergence of new virulent strains and their level of infectivity.

In conclusion, acute parotitis is a rising atypical symptom noticed in patients infected with COVID-19 that generally presents itself after 2 - 3 days of acute illness. It is very essential for physicians and health care workers to have a high suspicion for emerging atypical symptoms and keep in mind COVID-19 as a cause, in context of the current pandemic. The salivary glands being a reservoir for multiplication of the virus, is a potential source of infection and must be handled with caution. Necessary precautions must be taken every time an examination is conducted on a patient. Donning PPE kits, including nasopharyngeal swab PCR in routine investigations and advising timely radiological investigations can all help in early detection and prevention of rapid spread of the disease. Also, further research on the pathological changes noticed in relation to COVID-19 and involvement of parotid glands is needed, so as to understand the development of symptoms like acute parotitis, as well as bring out ways to treat and prevent it.

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