Case report

Bilateral submandibular sialadenitis following influenza A virus infection

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**A R T I C L E   I N F O**

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**A B S T R A C T**

A 48-year-old male presented to our hospital with pyrexia and general fatigue. The patient was diagnosed with influenza A virus infection, and then given laninamivir octanoate hydrate. Eleven days after onset, he noticed bilateral swollen submandibular glands. He visited our hospital again, and underwent blood examination and cervical computed tomography (CT). CT indicated that bilateral submandibular glands were swelling. We believe that this is the first report of bilateral submandibular sialadenitis following influenza A virus infection, and thus we presented this patient.

**Introduction**

Influenza spreads around the world in seasonal epidemics. Common symptoms are fever, chill, headache, muscle pain, arthralgia, coughing and general fatigue [1]. We have experienced a patient with bilateral submandibular sialadenitis following influenza A virus infection, here-in sought to report this case.

**Case report**

The patient was a 48-year-old male with the past history of mumps infected at 4 years of age. He felt general fatigue when woke up in the morning. Body temperature was 37.7 centigrade. He went to the hospital and was diagnosed with influenza A virus infection using influenza virus diagnostic kit (ImmoAce Flu\textsuperscript{®}, TAUNS, Shizuoka, JAPAN). He inhaled 40 mg of laninamivir octanoate hydrate (Inavir\textsuperscript{®}, Daiichi Sankyo Pharmaceutical, Tokyo, JAPAN) soon after prescription, and became febrile the next day. General fatigue lasted for 6 days. Seven days after onset, he had a pain in his left submandibular region while masticating food. Left submandibular pain continued for several days. Eleven days after onset, he noticed that bilateral submandibular glands were swollen when he looked in a mirror. He visited our hospital again, and underwent blood examination and cervical CT.

The data of blood examination are described as follows: white blood cell (WBC) count of 6400/μL with normal fractions; red blood cell count, 4,590,000/μL; hemoglobin, 14.2 g/dL; platelet count, 287,000/μL; normal liver enzyme levels; serous amylase, 55 U/L; creatine kinase, 176 U/L; normal electrolytes; blood sugar, 105 mg/dL; C-reactive protein (CRP), 0.10 mg/dL; rheumatoid factor, 2 IU/ml; CH50, 48.9 U/mL (normal ranges, 30.0–50.0 U/mL); C3, 98 mg/dL (normal ranges, 65–135 mg/dL); C4, 17 mg/dL (normal ranges, 13–35 mg/dL); anti-SS-A antibody, <1.0 U/mL; anti-SS-B antibody, <1.0 U/mL; anti-nuclear antibody titer, <40; IgG4, 39.7 mg/dL (normal ranges, 4.8–105 mg/dL). Blood examination showed no evidence of Sjögren syndrome and IgG4-related disease, i.e. Mikulicz disease. Cervical CT indicated that bilateral submandibular glands were swollen and salivary stones were not detected (Fig. 1). Submandibular sialadenitis spontaneously disappeared in several days.

Written informed consent was obtained from this patient, and the Institutional Review Board on human research approved the presentation of this case.

**Discussion**

Previous study has revealed that influenza virus is detected in salivary glands after infection [2]. However, to the best of our knowledge, this is the first report of bilateral submandibular sialadenitis after influenza A virus infection in adults. Parotitis, however, has been described in children after influenza H3N2 infection [3]. Here is also a nice poster describing similar cases, with similar pictures in children (http://scholarlyworks.lvhn.org/cgi/viewcontent.cgi?article=1154&context=pediatrics). What makes the case different is presentation 1...
week after treatment of the acute influenza. The history of mumps makes him unlikely to be susceptible. Unfortunately other causes of viral infection which may have coexisted with influenza are not ruled out and correlation cannot be established (coxsackie, EBV etc.). Watanabe et al. reported that illness alleviation in laninamivir octanoate treatment was achieved within 3–4 days [4]. It has been revealed that the influenza virus is disappeared approximately 85% of the patients 2 days after normalization of body temperature [5]. However, in the present report, the patient felt general fatigue for 6 days and had a submandibular pain at 7 days after onset despite the application of laninamivir octanoate. Because WBC counts and CRP were within normal limits and this patient became afebrile next day after laninamivir octanoate inhalation, it does not seem there was either systemic inflammation or influenza virus in his body at the second presentation. According to the latest drug information from Daiichi Sankyo Pharmaceutical (Tokyo, JAPAN), there are no reports of submandibular sialadenitis as a consequence of laninamivir octanoate application [6]. Other illnesses that can accompany submandibular sialadenitis are deniable in this patient.

In conclusion, we have experienced a case with transient painful bilateral submandibular sialadenitis subsequent to infection of influenza A virus. This epiphenomenon appears to be considered rare, and thus we reported this patient.

Author contributions

Satomi A. Fujiwara, M.D. drafted this manuscript.
Satomi A. Fujiwara, M.D., Toshimitsu Kobayashi, M.D., Ryoukichi Ikeda, M.D. and Kaku Yasuda, M.D. examined this patient.
Isao Kubota, M.D. and Yasuchika Takeishi, M.D. made the important suggestion regarding medical examination and manuscript preparation.

Declaration of interests

All authors disclose no financial and personal relationships with other people or organizations that could inappropriately influence their work.

Disclosures

The authors declare no conflict of interest.

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