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Case Report

A 3-month-old Infant with Kawasaki Disease and Coronary Artery Aneurysms Presenting with Parotitis

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Abstract Parotitis is a rare presentation of Kawasaki disease (KD). We reported a three-month-old baby who presented with parotitis and subsequently diagnosed to have KD. Fever and the parotid gland swelling responded well with Intravenous Immunoglobulin and oral aspirin. Unfortunately, he developed persistent multiple right coronary artery aneurysms. Literature reviews showed that patient with KD that presented as parotitis were usually at extreme ages, i.e., less than 3 months or more than 5 years old, and only the parotid gland was affected but not the other salivary glands. They were associated with more coronary artery anomalies and prompt treatment may decrease the chance of long-term consequences to the coronary arteries.

Key words *Coronary artery aneurysm; Kawasaki disease; Parotitis*

Introduction

Kawasaki disease (KD) is an acute febrile illness most commonly seen in children less than 5 years old. Classic KD presented with prolonged fever, rash, changes to lips or oral cavity, bilateral non-purulent conjunctivitis, erythema and oedema of the hands and feet and cervical lymphadenopathy. While KD can affect multiple systems, there were mostly reports that patients presented with myocarditis, arthritis, pancreatitis or aseptic meningitis,[1] parotitis is seldom reported to be associated with KD.

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We would like to report a three-month-old febrile baby who developed left facial swelling one day after admission and was diagnosed to have acute parotitis but had no response to intravenous antibiotic treatment. He subsequently developed full bloom clinical picture of KD six days later and was treated with intravenous immunoglobulin (IVIG) and oral aspirin.

Case Report

A 3-month-old locally born boy was admitted to our hospital for day one fever up to 39.5ºC in August 2020. Patient enjoyed good past health with unremarkable antenatal and postnatal history. He had no prior travelling or sick contact history.

Physical examination showed a febrile baby with stable vital signs. There was no cervical lymphadenopathy. Respiratory, cardiovascular and abdominal examinations were all normal. There was no focal sign of infection. Complete blood revealed elevated white cell counts of 27.7 x 10^9/L, and the haemoglobin and platelet count were normal. C-reactive protein was elevated to 60.4 mg/L. Other biochemical studies including liver and renal function tests were normal. Nasopharyngeal swab was negative for COVID-19, influenza A, influenza B, adenovirus, parainfluenza virus, enterovirus / rhinovirus,

mycoplasma pneumonia. Patient also underwent sepsis workup including blood culture, catheterised urine culture and cerebrospinal fluid culture, which later all came back to be negative. The chest X-ray showed no pneumonic change. Patient was initially treated as sepsis and started on intravenous antibiotics namely Ampicillin and Gentamicin.

One day after admission, patient developed left facial swelling. Physical examination showed 3 cm x 4 cm facial swelling over left peri-mandibular area with overlying skin erythema and increased warmth. There was no discharge from the stensen duct. Blood test showed a normal amylase level of 22 IU/ml and the immunoglobulin M (IgM) antibody to mumps virus was negative. Ultrasound of the head and neck was performed and showed swollen parotid gland with hyper-vascularity with adjacent subcutaneous oedema. Patient was treated as parotitis and the antibiotics were changed to intravenous Cefotaxime, Vancomycin and Metronidazole.

Despite multiple antibiotics, there was progressive increase in left face swelling which extended to the submandibular region. Patient also developed torticollis towards the left side. Patient had no stridor all along. In view of worsening symptoms, computed tomography of the head and neck with contrast (Figure 1) was performed, showing extensive swelling of the left parotid gland involving both superficial and deep lobes. There was also massive lymphadenopathy at the left upper and mid jugular chain with features of matting. The lymphadenopathy also caused obliteration of the left internal jugular vein. The right parotid gland and bilateral submandibular glands were intact. There was no abscess collection. Moreover, a flexible laryngoscopy was performed by the Ear, Nose and Throat Surgeon confirming patent upper airway.

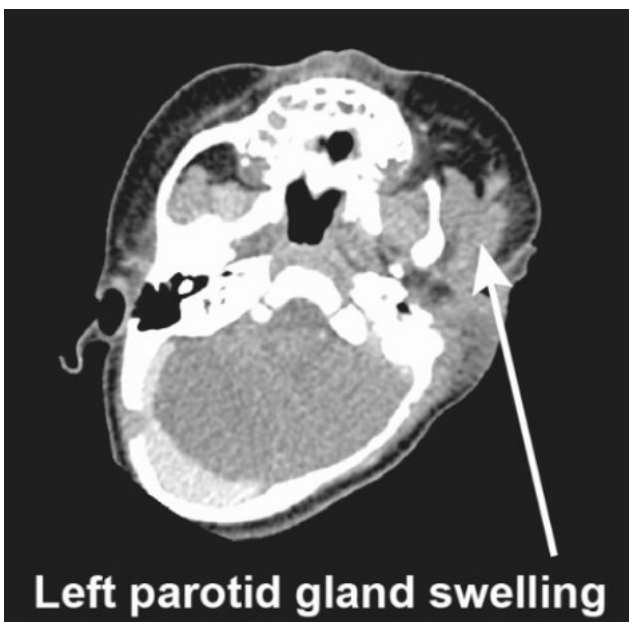

Figure 1 Computed tomography of the head and neck region.

On day 6 fever, patient was noted to have bilateral conjunctival injections, maculopapular rashes over trunk, red and cracked lips and erythema over hands. The diagnosis of classic KD was made, and patient was given a dose of intravenous immunoglobulin (IVIG), 2 grams per kg and high dose of oral aspirin. Echocardiogram was arranged on day 8 fever, showing multiple right coronary artery aneurysms. The proximal right coronary artery was 2.75 mm (Z score: +4.20), mid-right coronary artery was 2.84 mm (Z score: +5.25) and distal right coronary artery was 2.96 mm (Z score: +6.4). Left anterior artery measuring 1.91 mm (Z score: +1.95) and left circumflex artery measuring 1.27 mm (Z score: +0.31) were normal and there was no evidence of pericarditis (Figure 2).

Patients' fever subsided 12 hours after starting IVIG. Inflammatory markers also improved with white cell count normalised to 16.2 x 10^9/L and C-reactive protein down to 12.6 mg/L. Patient was continued on low dose aspirin and was discharged soon afterwards. Follow up echocardiogram at second and eighth week showed persistent right coronary artery aneurysms with steady sizes.

Discussion

KD is a disease characterised by systemic vasculitis thus it is not surprising that blood vessels in the salivary glands can be affected. Autopsy study in 1980 revealed that vasculitis was observed in salivary glands in patients who died of KD.[1]

To our best knowledge, our case is the first reported case of KD associated parotitis in Hong Kong. From the literature, there have been 15 cases of KD presenting with parotitis as described by a case report and reviewed by Li et al[2] in 2019. Among the 15 cases in this review, 2 cases of Kawasaki disease presented with mumps have been reported in the United States (1987, 2008), 1 case reported in South Korea (2009), 1 in Japan (2017), and 10 in China (2009, 2011, 2013, 2017, 2019). Among them include 10 boys and 5 girls with a mean age of 3.3 years (range, 3 months to 10 years) and the parotid swelling developed on

average 1.93 (1-4) days after the onset of fever. In most children, the parotid swelling subsided within 6 to 12 days (mean, 8 days) after antibiotic treatment, but the fever continued unabated and the symptoms of KD appeared. Twelve out of 15 patients (80%) in this series and our patient developed full bloom picture of classic KD according to the diagnostic criteria of the American Heart Association.[3]

Similar to the 15 cases reported by Li et al, our case involved the parotid gland only but not the submandibular and sublingual salivary glands.[2] The exact reason for this anatomical predilection is still unclear, but Lai et al[4] attributed this to the intraglandular lymph node distributions. While numerous intraglandular lymph nodes are found within the parotid gland,[5] interestingly, intraglandular lymph nodes are absent in submandibular glands[6] and sublingual glands.[7] This may explain why only the parotid gland but no other salivary glands are involved in KD.

Moreover, among the 15 cases reported by Li et al, only two cases have antibodies to mumps.[2] It is hypothesised that infectious agents related to KD trigger an incompletely understood cascade of inflammation in susceptible children, although the exact role remains to be elucidated.[8] Mumps IgM was negative and amylase level was normal in our case.

While all 15 cases reviewed by Li et al appeared self-limiting,[4] our patient developed progressive enlarging parotitis that exerted mass effect on the oropharyngeal airway and massive lymphadenopathy obliterating the left internal jugular vein. Luckily, he was diagnosed to have KD before further deterioration and IVIG was given promptly. His face swelling responded well to IVIG and prevented him from airway obstruction which may need resuscitation and intubation.

Coronary artery abnormalities are a well-known complication of KD. The reported rate of coronary artery abnormalities in KD was reported as high as 23% before the era of IVIG treatment.[3] According to the previous review,[2] the rate of coronary artery abnormalities was as high as 40% (6 out of 15 patients) and more than 66% (4 out of 6 patients) who developed coronary artery abnormalities were either at age less than 6 months old or greater than 5 years old. It appears that patients with KD who presented with parotitis had a higher prevalence of coronary artery abnormalities although the sample size is small. It may be due to the disease entity itself or may be due to the extreme age of presentation. Manlhiot et al study showed that patients suffering from KD at extreme age of presentation will have more coronary artery aneurysms.[9] This is similar to our 3-month-old patient, who is at extreme age of presentation of KD, who also developed coronary artery dilatation. Another possibility is that patients with KD presenting with parotitis tend to be diagnosed later as the previous review[2] showed that the mean time from onset to the definite diagnosis of KD was 9.5 days and delayed diagnosis may be associated with higher complication rate of coronary aneurysms.[10] Early recognition of this disease entity with timely IVIG treatment may prevent coronary complications.

Conclusion

Physicians should be aware that KD can present atypically. We should think about KD if children or adolescents presenting with parotitis, in particular with unabating fever despite antimicrobial treatment. Prompt

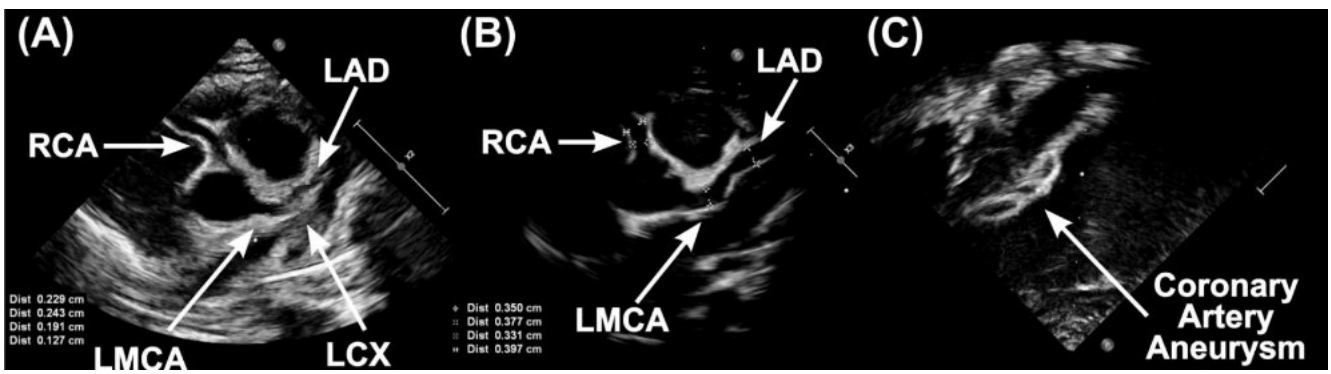

Figure 2 Echocardiogram: (A and B) showed dilated coronary arteries; (C) showed right coronary artery aneurysms over lateral aspect of coronary sulcus (Right). RCA – Right coronary artery; LMCA – Left main coronary artery; LAD – Left anterior descending artery; LCX – Left circumflex artery

diagnosis of KD and timely treatment with IVIG may prevent coronary artery complications or progression of parotitis to life-threatening airway obstruction. Last but not least, KD presenting with parotitis appeared to be associated with more coronary artery anomalies, although the underlying mechanism is still unknown which may warrant further studies.

Declaration of Interest

There are no conflicts of interest to declare.

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