Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Visual Case Discussion

Extensive oral mucositis and conjunctival injection in an adolescent COVID-19 patient

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1. Visual case discussion

A 16-year-old male without past medical history presented to the pediatric emergency department with diffuse oral ulcerations and bilateral eye redness for 2 days. He reported pharyngitis, cough, and rhinorrhea in the preceding week for which he had been taking ibuprofen, acetaminophen, and dextromethorphan. He had no history of caustic ingestion or trauma. He denied any fever, chills, eye discharge, shortness of breath, chest pain, nausea, vomiting, diarrhea, or abdominal pain. He reported no other cutaneous lesions throughout his body. He was not vaccinated for COVID-19 and reported attending in-person classes but denied known COVID-19 exposures. He had also never been sexually active.

On evaluation, the patient was found to have extensive vesicular ulcerations along the buccal mucosa, palate, and gingiva with extension towards the pharynx but sparing the tongue (Figs. 1–4). There was bilateral limbus sparing conjunctival injection, without discharge (Fig 5). The remainder of the physical examination, including a skin and genitourinary exam, were unremarkable. He tested positive for COVID-19. A respiratory viral panel, including Mycoplasma, was negative. CBC, BMP, ESR, CRP were unremarkable. Empiric intravenous acyclovir was started in the ED and he was admitted to the pediatric inpatient service. As an inpatient, he was given steroid therapy and transitioned to oral treatments after showing marked improvement of symptoms over his 4 day admission.

2. Questions and answers

1. Given the patient's presentation, what is the most likely diagnosis?

a) SJS/TEN
b) Erythema multiforme
c) Behcet's disease
d) Reactive infectious mucocutaneous eruption (RIME)
e) HSV
f) MIS-C

Correct answer = D

Reactive infectious mucocutaneous eruption (RIME) describes the presence of a post-infectious mucositis of two or more mucous membranes with or without cutaneous involvement. RIME was previously termed Mycoplasma-induced rash and mucositis (MIRM); however, it has since been found to occur in association with other infectious triggers. RIME is much more likely to occur in children and adolescents. RIME is distinct from SJS/TEN and erythema multiforme as there is generally sparse cutaneous involvement without targetoid lesions. The patient's acute presentation and lack of genital lesions decrease suspicion for Behcet's disease or autoimmune pathology. Additionally, the extent of his oral mucositis is not characteristic of HSV, though vesicles are present. Although MIS-C may include mucocutaneous and ocular involvement, the clinical presentation is typically systemic with elevations in ESR/CRP, which were not seen in this patient. By excluding

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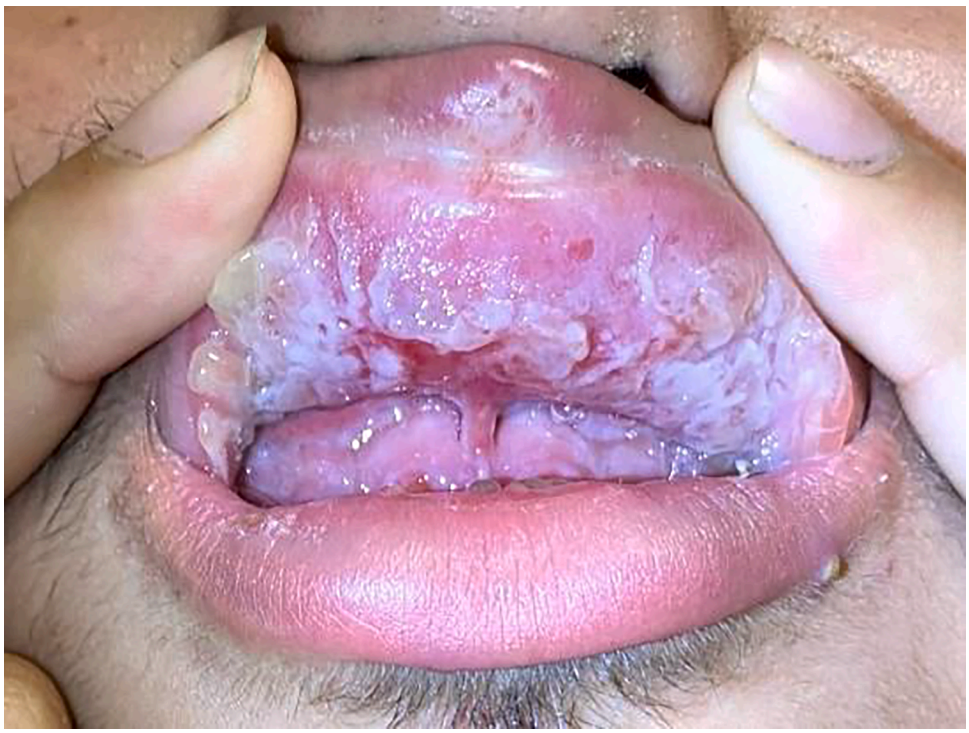

Fig. 1. Extensive oral mucosal ulceration throughout the labial and buccal mucosa.

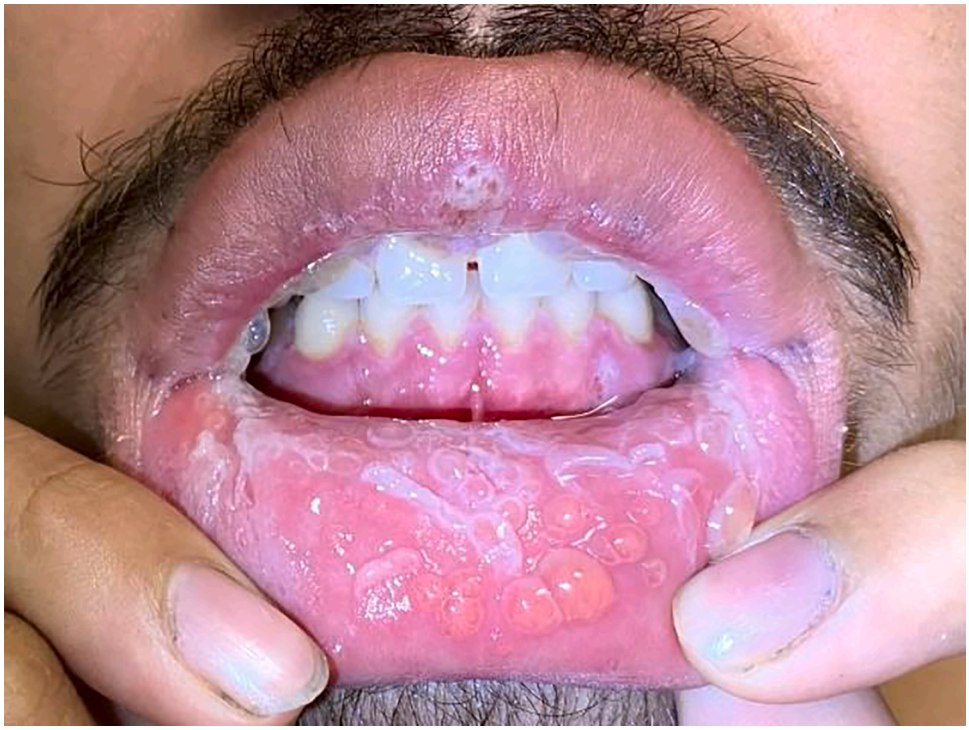

Fig. 2. Extensive oral mucosal ulceration throughout the labial and buccal mucosa.

alternative diagnoses, we suspect our patient's case was likely due to COVID-19-induced RIME.

2. Which of the following is the preferred evidence-based treatment for RIME?

a) Systemic corticosteroids
b) Cyclosporine
c) IVIG
d) Immunomodulators
e) Topical corticosteroids
f) None of the above

Correct answer = F

In this case, we suspect the patient had RIME suspected to be

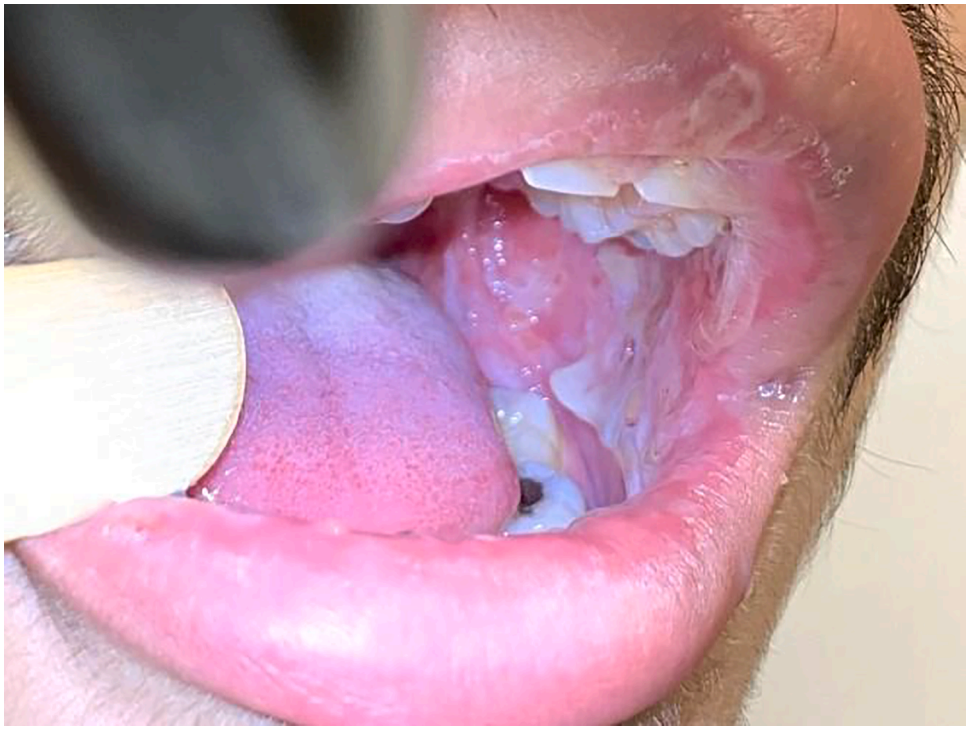

Fig. 3. Extensive oral mucosal ulceration throughout the labial and buccal mucosa.

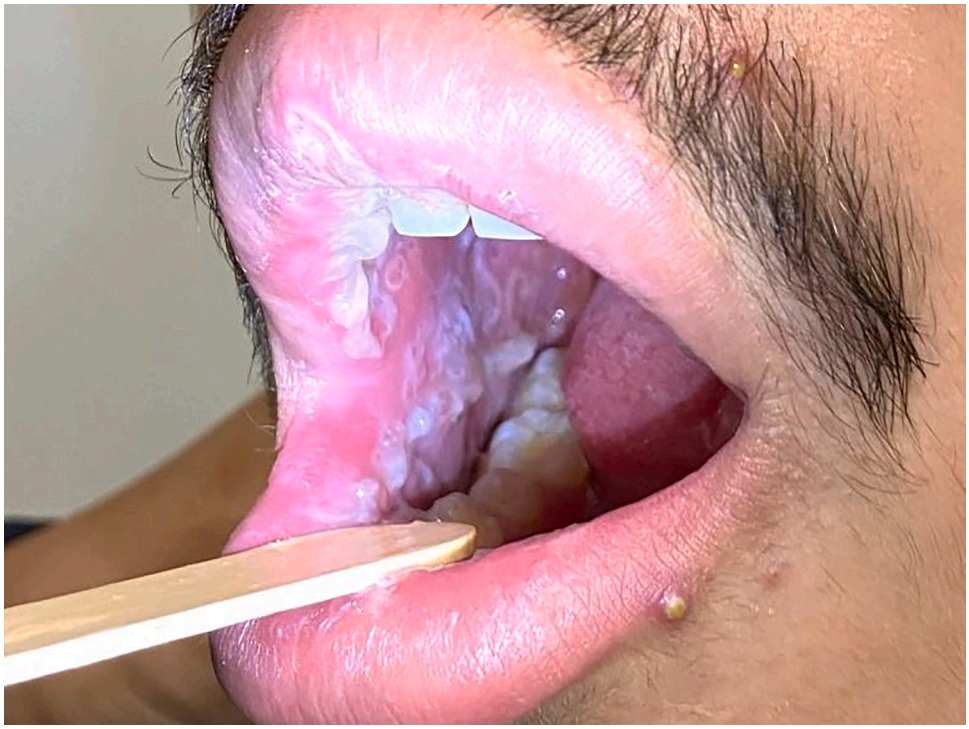

Fig. 4. Extensive oral mucosal ulceration throughout the labial and buccal mucosa.

associated with acute COVID-19 infection. In recent literature, a similar case of RIME associated with COVID-19 in an adolescent patient was successfully treated with 1 mg/kg oral prednisone; therefore, the decision was made to start systemic steroid therapy. Though data on steroid therapy in RIME/MIRM is mixed, many experts recommend a 5–7 day course of systemic steroids equivalent to 1 mg/kg/day of prednisone. Other treatment options for RIME include cyclosporine, topical corticosteroids, IVIG, and most recently, etanercept. However, there is no evidence-based guideline for the treatment of RIME.

3. True or false: Up to a third of cases of patients with RIME will have a recurrence.

Correct answer = True

RIME has been described to recur in specific patients with subsequent episodes often triggered by other infectious agents. Recurrences

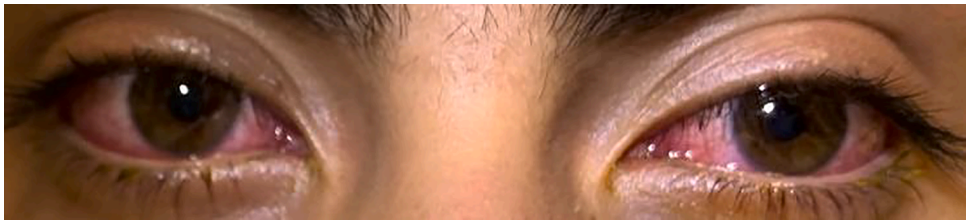

Fig. 5. Bilateral conjunctival injection.

generally involve fewer mucous membranes and cutaneous sites and require shorter hospitalizations. Recurrence of RIME is poorly understood.

3. Discussion

In this report, we present a case of suspected Reactive Infectious Mucocutaneous Eruption (RIME) in a COVID-19 patient who presented with diffuse oral ulcerations and bilateral conjunctival injection. Three cases of COVID-19-induced RIME have been reported in the literature, all of which were in previously healthy adolescent patients with a viral upper respiratory infection syndrome.[1–3] However, this case varies from prior reports due to the severity of oral mucositis and presence of ocular involvement. From an emergency medicine perspective, it is crucial to consider RIME in the differential diagnosis of an adolescent patient with post-viral mucositis and to admit the patient for steroid therapy if suspected.

Declaration of Competing Interest

The authors have no conflicts of interest or disclosures.

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