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Case report

Recurrent reactive infectious mucocutaneous eruption (RIME) in a 15-year-old adolescent due to recurrent *Mycoplasma pneumoniae* infections: a case report

R Soumya[1], **P Rajendiran**[2]

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Abstract

Reactive Infectious Mucocutaneous Eruption (RIME) is a severe mucocutaneous reaction following bacterial or viral respiratory infections, most commonly *Mycoplasma pneumoniae*. "*Mycoplasma pneumoniae*-induced rash and mucositis" (MIRM) was coined in 2015 after recognition of its unique pathogenesis. MIRM is included in a broader category called "Reactive infectious mucocutaneous eruption" (RIME). While RIME is typically a single occurence, recurrent episodes have been reported, often associated with different infectious triggers.

Introduction

Reactive Infectious Mucocutaneous Eruption (RIME) is a distinct mucocutaneous syndrome triggered by bacterial or viral respiratory infections, most commonly *Mycoplasma pneumoniae*. It predominantly affects children and adolescents with male predominance and is characterised by severe mucositis with sparse or even absent cutaneous involvement. Apart from infectious agents, evidence suggests that genetic factors may predispose some children to recurrent RIME, though no specific genes have been identified. Two mechanisms have been proposed in its pathogenesis. The most accepted is an indirect mechanism in which immune complexes form due to cross-reactivity between bacterial antigens and human keratinocytes, leading to inflammation that damages the mucosal surfaces. For example, molecular mimicry between *M. pneumoniae* P1-adhesion molecules and keratinocyte antigens may contribute to this process. Compared with the Stevens-Johnson syndrome/Toxic epidermal necrolysis (SJS/TEN) spectrum, RIME has a milder course, and a generally good prognosis.

Proposed diagnostic criteria for RIME:

- Mucocutaneous eruption involving one or more sites with <10 percent body surface area involvement
- Presence of a few vesiculobullous lesions or scattered, atypical, targetoid lesions on skin
- Noncontributory medication history
- History of prodromal symptoms (eg, cough, fever, malaise) in the previous 7 to 10 days
- Clinical, radiographic, or laboratory evidence of an infectious trigger (most commonly *M. pneumoniae*, respiratory viruses, or *Chlamydia pneumoniae*)

We present a unique case of recurrent RIME in a 15-year-old adolescent, linked to recurrent *Mycoplasma pneumoniae* infections over several years.

Case report

A 15-year-old adolescent presented with fever and productive cough for five days and bilateral conjunctival redness for two days (Figure 1A). Examination revealed erythematous, inflamed oral mucosa with thick crusting and multiple ulcers on lips and buccal mucosa (Figure 1B). Very few targetoid lesions appeared on the forearms symmetrically by day 2, spreading to the legs and genital mucosa by day 3 (Figure 1C and Figure 1D). Notably, the patient had a history of mucosal-dominant Stevens-Johnson syndrome (SJS) at age 7, following *M. pneumoniae* infection with significantly elevated antibody levels, and had been treated for recurrent oral herpes in subsequent years with oral acyclovir.

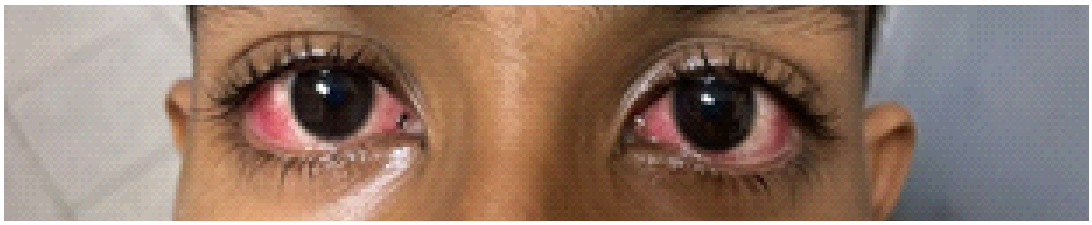
[1]*Registrar in Dermatology,* [2]*Consultant Dermatologist, National Hospital of Sri Lanka, Colombo.*

Correspondence: SR, e-mail: soumyarajendra27@gmail.com

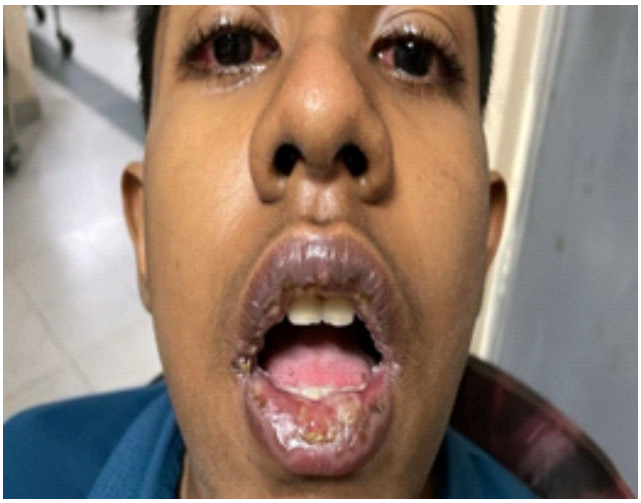
Laboratory findings:

- Blood tests: Mild leukocytosis, slightly elevated inflammatory markers, normal renal and liver function.
- Serology: Significantly elevated *Mycoplasma pneumoniae* IgM antibody titers (1:1280).
- Complement levels (C3 & C4): Within normal range
- Tzanck smear: Negative
- PCR for Infectious Agents:
  - Herpes Simplex Virus (HSV) 1 & 2: Negative
  - Influenza A & B: Negative
  - SARS-CoV-2: Negative

Skin biopsy confirmed findings consistent with erythema multiforme major. The patient responded well to supportive care, systemic corticosteroids, and empirical antibiotics targeting *Mycoplasma pneumoniae*. After discharge, he was referred for immunology follow-up for further evaluation.



1A



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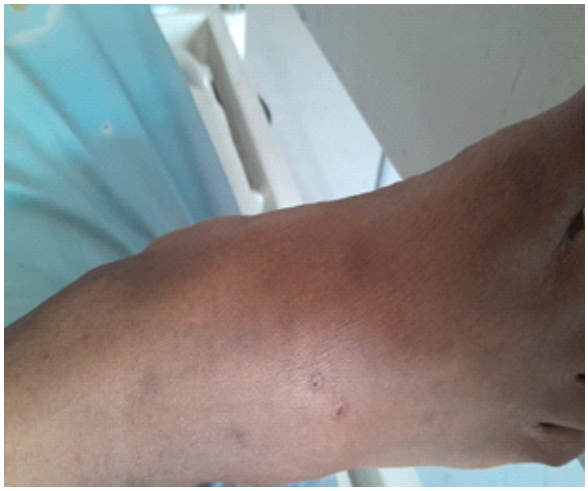

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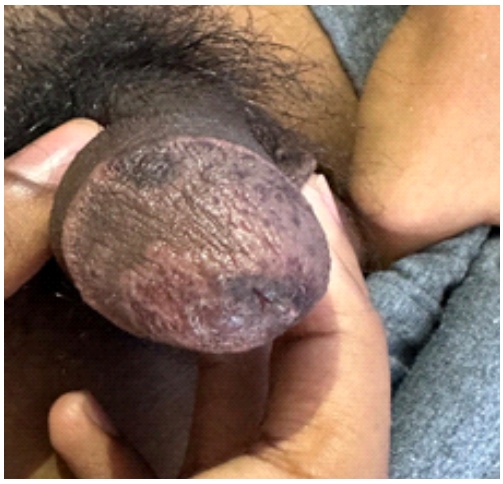
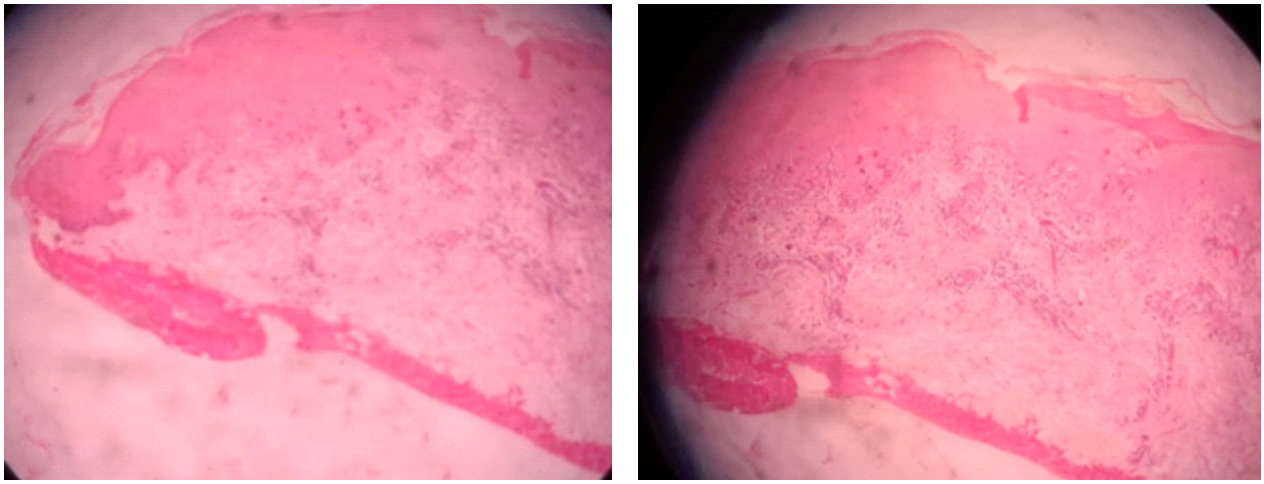


1D

Figure 1.



A B

Figure 2.

Histopathology report (Figure 2 A & B) showed;

- Acanthotic epidermis with central parakeratosis
- Numerous necrotic keratinocytes in the basal layers
- Marked basal vacuolar degeneration
- Oedematous dermis with prominent perivascular lymphoplasmacytic infiltrates

These findings were consistent with Erythema multiforme.

Discussion

We faced histopathology challenges in confirming a definitive diagnosis of RIME. Mucosal or cutaneous biopsies are not routinely performed for RIME, as no pathognomonic histopathologic features exist. RIME shares features with both erythema multiforme (EM) major and Stevens-Johnson syndrome/Toxic epidermal necrolysis (SJS/TEN), including apoptotic keratinocytes and a sparse, perivascular dermal infiltrate. During our literature review we found that one study reported cases initially diagnosed as *M. pneumoniae*-induced EM that were later reclassified as RIME. These cases exhibited full-thickness epidermal necrosis and detachment, resembling SJS/TEN more than EM. This indicates that histologic differentiation among RIME, EM, and SJS/TEN can be challenging or even impossible. RIME is typically considered a single-episode disorder. However, recurrence has been reported in 9-38% of cases, often with different infectious triggers. In our case, multiple prior infections with *M. pneumoniae* suggest an ongoing immune predisposition. Long term monitoring is essential to detect mucosal and ocular complications such as conjunctival, genital scarring and persistent cutaneous lesions.

Conclusion

This case highlights recurrent RIME due to recurrent *Mycoplasma pneumoniae* infections, suggesting a possible immune susceptibility. Clinicians should be aware of infectious triggers in recurrent muco-cutaneous eruptions and consider immunologic evaluation in such cases. Further research is needed to identify genetic or immune markers associated with recurrent RIME.

Declaration of consent

Written informed consent was obtained from the patient's father for publication of this case report and accompanying images.

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