

(CASE REPORT)



## Diagnosis and management of allergic rhinitis in pediatric patient: A case report

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### Abstract

**Background:** Allergic rhinitis (AR) is a prevalent chronic condition affecting children and adults worldwide, with significant impacts on quality of life and daily functioning. Accurate diagnosis and effective management are essential to mitigate symptoms and improve outcomes.

**Objective:** To report a case of allergic rhinitis in pediatric patient.

**Case Report:** A 7-year-old female presented with a one-year history of left nasal obstruction, intermittent nasal bleeding, rhinorrhea, and sneezing exacerbated by dust exposure. History of allergy was present in family. Nasal endoscopy revealed mucosal erythema, congested turbinates, anterior septal deviation, and Grade IV adenoid enlargement. A skin prick test (SPT) identified sensitization to house dust (++++), bird feathers (++++), cat fur (+++), and specific foods. Normal eosinophil levels were noted. The patient was diagnosed with persistent moderate-to-severe allergic rhinitis and was treated with cetirizine, intranasal fluticasone furoate, and saline nasal irrigation, with significant symptom improvement at follow-up.

**Clinical question:** What is the optimal management approach for allergic rhinitis in pediatric patient?

**Methods:** A review of evidence-based literature on the management of allergic rhinitis in pediatric patient.

**Result:** Clinical history, physical examination, and SPT are important for diagnosing allergic rhinitis. Management guidelines recommend intranasal corticosteroids as first-line therapy for moderate-to-severe cases, supported by antihistamines and allergen avoidance.

**Conclusion:** This case underscores the importance of a tailored, evidence-based approach in managing pediatric allergic rhinitis. Accurate diagnosis, pharmacotherapy with cetirizine and fluticasone, adjunctive saline irrigation, and allergen avoidance led to rapid symptom resolution. These strategies align with ARIA guidelines and demonstrate the efficacy of multidisciplinary management in achieving optimal outcomes.

**Keywords:** Allergic rhinitis; Aediatric; Aiagnosis; Management

### 1. Introduction

Allergic rhinitis is one of the most prevalent immunological conditions worldwide, affecting over 500 million people. While not life-threatening, its symptoms significantly impact patients quality of life by disrupting daily activities, leading to fatigue, headaches, and difficulty concentrating. Recent studies indicate that AR is one of the most common chronic diseases in children, The International Study of Asthma and Allergies in Childhood evaluated the prevalence of allergic

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rhinitis in children and adolescents, reporting prevalence rates of 8.38% and 14.93%, respectively.<sup>1</sup> The prevalence of AR ranges between 10% and 30% among children and adults in the United States and other developed countries. Surveys specifically diagnosing AR by physicians reported rates of approximately 13% in children.<sup>2</sup> In 2020, Prof. Ngoerah Hospital Denpasar reported a prevalence of 24.5% among pediatric patients.<sup>3</sup> Allergic rhinitis often leads to reduced school attendance in children and decreased productivity in adults, underscoring the importance of accurate diagnosis and effective management strategies. This issue is particularly pressing in developing countries striving to maintain high educational and occupational standards. Appropriate management of allergic rhinitis in pediatric patient is essential optimizing the growth and development process, as well as improving the quality of life.<sup>1</sup>

## 2. Case Report

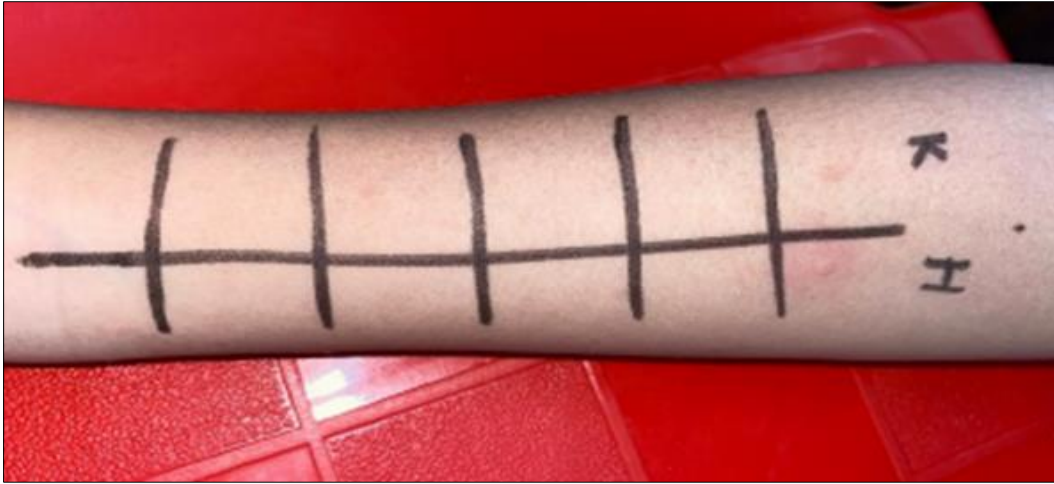
A 7-year-old female presented to the ENT clinic at Prof. Ngoerah Hospital Denpasar with a one-year history of left nasal congestion and intermittent nasal bleeding, which typically resolved spontaneously within five minutes. She also reported persistent rhinorrhea and sneezing, particularly at night and early morning, and triggered by dust exposure. These symptoms disrupted her sleep, causing daytime fatigue and difficulty concentrating at school. These symptoms present since the patient was younger and appears most of the time. The patient visited general practitioner, and medication was given but no improvement was reported.

History of allergy of medication or food was denied, but the patient had a family history of dust allergy in her mother. Physical examination revealed a well-appearing child with stable vital signs. Nasal endoscopy revealed the following findings: the left nasal cavity appeared narrow, with red mucosa, congested turbinates, and serous secretions. A deviated nasal septum was observed towards the left anterior portion of the nasal cavity. The right nasal cavity appeared narrow, with red mucosa, congested turbinates, and serous secretions, but no deviation of the nasal septum was noted. Adenoid enlargement (Grade IV) was noted on nasopharyngeal examination. Blood tests showed normal eosinophil levels.



**Figure 1** Nasal endoscopy findings of right and left nasal cavity

A skin prick test (SPT) showed strong allergic responses to house dust +4 (++++), and bird feathers (++++), as well as moderate reactions to cat fur +3 (+++), tempeh +2 (++), and peanuts +2 (++). The patient was non-reactive to beef, chicken, egg yolk, and crab allergens. Based on the clinical history, physical examination, and supporting examinations, the patient then diagnosed with persistent moderate-to-severe allergic rhinitis.



**Figure 2** Application of control and allergens or histamine



**Figure 3** Evaluation after 15 minutes of allergens administered



**Figure 4** Evaluation after 20 minutes of allergens administered

**POLIKLINIK ALERGI**

**HASIL TES CUKIT KULIT**

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Histamin : ..... Larutan Kontrol : .....

<b>INHALAN :</b>	<b>INGESTAN :</b>	
① Debu Rumah ++++	1. Tepung Sari Rumput	⑫ Udang ++++
2. Mite	2. Tepung Sari Bunga	13. Tongkol
3. Bulu Anjing	③ Daging Sapi ⊖	14. Bandeng
④ Bulu Burung ++++	④ Daging Ayam ⊖	15. Pindang
5. Ketombe	5. Daging Kambing	⑬ Tempe ++
6. Kapuk	6. Susu Sapi	17. Pepaya
7. Bulu Kucing +++	7. Putih Telur Ayam	⑭ Kacang Tanah ++
	⑧ Kuning Telur Ayam ⊖	19. Coklat
	9. Putih Telur Itik	20. Ragi
	10. Kuning Telur Itik	21. Pisang
	11. Nanas	
	12. Kepting ⊖	

**Figure 5** Result of skin prick test

Management approach in this patient include the prescription of cetirizine and intranasal fluticasone furoate spray, along with regular nasal irrigation using 0.9% NaCl every 8 hours. The patient was advised to avoid allergens identified in the SPT. At a 7-day follow-up, the patient showed significant improvement, with resolved nasal congestion, absence of nasal bleeding, and better sleep quality. The patient was instructed to continue the prescribed treatment and return if symptoms persisted.

### 2.1. Clinical Question

What is the optimal management approach for allergic rhinitis in pediatric patient?

### 3. Review Method

A literature search was conducted using the keywords “diagnosis” AND “management” AND “allergic rhinitis” AND “pediatry” OR “children” across two search engines: PubMed and Google Scholar. A critical review was performed on 30 articles before applying inclusion and exclusion criteria.

### 4. Result

The literature search obtained scientific publications which were released in the last 10 years, relevant with the topics and the full text were available.

### 5. Discussion

Allergic rhinitis (AR) is a common chronic inflammatory condition of the nasal mucosa, triggered by immunoglobulin E (IgE)-mediated reactions to environmental allergens. It affects children worldwide and has a significant impact on their quality of life, including sleep disturbances, reduced academic performance, and emotional well-being. The prevalence of AR in pediatric populations is increasing, partly due to rising exposure to allergens and changing environmental factors.<sup>1</sup>

Diagnosing AR in children requires careful clinical evaluation, as its symptoms often overlap with other conditions such as viral upper respiratory infections or non-allergic rhinitis.<sup>4</sup> This case reported a 7-year-old female patient presented with chief complaints of chronic left nasal congestion and intermittent nasal bleeding. The patient also complained of frequent sneezing, rhinorrhea, and nighttime exacerbations which influenced the quality of life. The patient had family history of house dust allergy. These complaints are the hallmark features of allergic rhinitis.<sup>5</sup>

On physical examination of the nose, ears, and throat, clear, watery nasal secretions, nasal congestion, Eustachian tube dysfunction, and postnasal drip may be observed. Specifically, signs of atopy, such as allergic shiners, allergic creases, Dennie Morgan's lines, and allergic salutes, should be sought. If eye complaints are present, an examination of the eyelids and conjunctiva is necessary to look for edema, secretions, and other abnormalities. Chronic nasal congestion in some children can lead to chronic mouth breathing, potentially resulting in craniofacial abnormalities and orthodontic issues.<sup>5</sup> In this patient, nasal endoscopy revealed pale, edematous mucosa, hypertrophied turbinates, and Grade 4 adenoid enlargement, all consistent with allergic rhinitis.<sup>5</sup> To confirm the etiology of allergy, a skin prick test (SPT) was done and demonstrated strong sensitization to house dust, bird feathers, cat fur, shrimp, and other allergens, supporting the diagnosis. While the patient's eosinophil levels were within normal limits, this does not exclude AR, as non-eosinophilic pathways can also mediate allergic responses.<sup>6</sup>

Based on the literature, the diagnostic approach aligns with established guidelines that emphasize symptom assessment and allergen testing. According to the ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines, SPT remains the gold standard for identifying allergen sensitization in allergic rhinitis.<sup>7</sup> Studies by Bousquet et al. indicate that a significant proportion of AR cases in children are associated with sensitization to house dust mites and other common allergens, consistent with this patient's findings.<sup>8</sup> Additionally, the absence of eosinophilia in this patient reflects the heterogeneous nature of AR, as also reported in studies by Gwalabe et al. which revealed 88.5% of participants exhibiting normal eosinophil levels.<sup>9</sup>

Management of allergic rhinitis (AR) requires optimal collaboration between patients, caregivers, and healthcare professionals to maximize treatment responses in children. A multidisciplinary approach involving pediatricians and otolaryngologists is essential. The four primary components of managing AR in children are patient/caregiver education, environmental control measures, pharmacotherapy, and immunomodulation. Environmental control involves avoiding allergenic triggers that exacerbate symptoms. Measures such as using dust-proof bedding, water-resistant mattress covers, air filters, and replacing furniture and carpets can help reduce allergen exposure. Guidelines also recommend minimizing outdoor activities to avoid pollen exposure.<sup>10</sup> Pharmacotherapy is often necessary when environmental control alone is insufficient. Intranasal corticosteroids, antihistamines, and leukotriene receptor antagonists are effective for managing moderate to severe or persistent AR.<sup>2</sup>

Management of this patient's allergic rhinitis was guided by evidence-based recommendations, including pharmacotherapy, adjunct treatments, and allergen avoidance strategies. Pharmacologic therapy involved a combination of cetirizine, a second-generation antihistamine, to address sneezing and rhinorrhea, and intranasal fluticasone furoate, a corticosteroid, to reduce nasal inflammation and congestion. Adjunctive nasal irrigation with 0.9% NaCl every 8 hours was prescribed to remove allergens and mucus from the nasal passages. The patient was also counselled to avoid identified allergens, particularly house dust and bird feathers, and was scheduled for follow-up evaluations to monitor symptom control and treatment adherence.

The patient's management closely adhered to these evidence-based recommendations, demonstrating effective symptom control and aligning with ARIA guidelines. This highlights the importance of a comprehensive, multi-faceted approach to AR management in children. Long-term follow-up and patient education remain essential to optimize outcomes and ensure adherence to therapeutic interventions. The prognosis of allergic rhinitis (AR) in pediatric patients is generally favorable, particularly with appropriate management. While AR is prevalent among children, affecting up to 40% of adolescents, its symptoms can diminish with age, and effective treatment can significantly improve quality of life and associated comorbidities.<sup>11</sup>

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## 6. Conclusion

This case highlights the diagnosis and management of persistent moderate-to-severe allergic rhinitis in a 7-year-old female, presenting with chronic nasal congestion and occasional epistaxis. Comprehensive evaluation, including rigid nasoendoscopy and skin prick testing, confirmed significant sensitization to multiple allergens, including house dust, bird feathers, and shrimp. Management involved pharmacotherapy with cetirizine and intranasal fluticasone furoate, coupled with nasal irrigation and allergen avoidance. This multidisciplinary approach resulted in substantial symptom improvement, emphasizing the importance of tailored, evidence-based interventions in achieving optimal outcomes in pediatric allergic rhinitis.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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