

## RECOMMENDATIONS

### Airway Diseases Education and Expertise (ADEX) in Pediatrics: Adaptation for Clinical Practice in India

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**Justification:** Asthma and allergic rhinitis together are part of the concept of 'one airway, one disease' or 'united airway disease'. The management of allergic airway diseases should address this united concept and manage the issue by educating the patients and their parents and health care providers, along with environmental control measures, pharmacotherapy and immunotherapy. Here, we present recommendations from the module of 'Airway Diseases Education and Expertise' (ADEX) that focused on allergic rhinitis, asthma and sleep disorder breathing as a single entity or Allergic Airway Disease.

**Process:** A working committee was formed by the collaboration of Pediatric Allergy Association of India (PAAI) and Indian Academy of Pediatrics (IAP) Allergy and Applied Immunology chapter to develop a training module on united airway disease.

**Objectives:** To increase awareness, understanding and acceptance of the concept of "United Airway disease" and to educate the primary health care providers for children and public health officials, in the management of united airway diseases.

**Recommendations:** Recommendations for diagnosis, management and follow-up of Allergic airway disease are presented in this document. A better compliance by linking education of child, parent, grandparents and other health care providers, and scientific progress by collaboration between practitioners, academicians, researchers and pharmaceutical companies is suggested.

**Keywords:** Allergic rhinitis, Asthma, Education, Guidelines, Management

Asthma and allergic rhinitis frequently occur together [1], and are major public health problem, [2]. Owing to close association between asthma and rhinitis, they are often referred to as "one airway, one disease" or "diseases of the integrated airway" or "united airway diseases" [2-5]. Upto 40% patients with allergic rhinitis may have asthma, and around 80% patients of asthma can have allergic rhinitis. Allergic rhinitis also known to adversely affect asthma and its response to treatment, and therefore, should also be evaluated and treated [6,7].

Allergic airway diseases are the most common cause for sleep disordered breathing (SDB) and obstructive sleep apnea syndrome (OSAS) [8,9]. Similarly, OSAS is common in patients with asthma, but it is poorly investigated. If OSAS is left untreated, it can lead to worsening of asthma symptoms [9]. The severity of OSAS can be reduced through adequate treatment of AR [8].

Though allergic rhinitis and asthma are common in children [10], difficulty in diagnosis, management and lack of knowledge/education among parents of the affected children make the situation more challenging. Further, there is a need of diagnostic and prognostic markers for asthma and/or specific phenotypes [11]. To

highlight the current thinking and increase awareness, understand and accept the concept of United Airway disease and bridge the knowledge gap in awareness, diagnosis, management and referral of airway diseases at the basic general practitioner level specifically in India; we developed a module on Airway Diseases Education and Expertise (ADEX) in pediatrics that focused on allergic rhinitis, and asthma as an integrated approach.

A working committee (*Annexure I*) was formed by the collaboration of Pediatric Allergy Association of India (PAAI) and Indian Academy of Pediatrics (IAP) Allergy and Applied Immunology chapter to develop a training module on united airway disease (ADEX). The scientific, technical and financial support was provided by Wockhardt Pvt. Ltd. A literature search was done for the period 1993-2014 using PubMed and Google scholar with keywords for allergic airway diseases. A total of 584 publications were obtained till January 2014. The abstracts of the articles were reviewed by the panel members. The full text articles of 49 potentially relevant articles were read to consider the article for inclusion in ADEX training module. The articles published during last two decades, pertaining to allergic rhinitis, asthma and SDB in children were included; while the articles pertaining to airway

diseases in adults, with poor sample size and ambiguous results were excluded.

All discussions, suggestions and panel consensus were compiled into a presentation module which was then reviewed by international experts.

## RECOMMENDATIONS

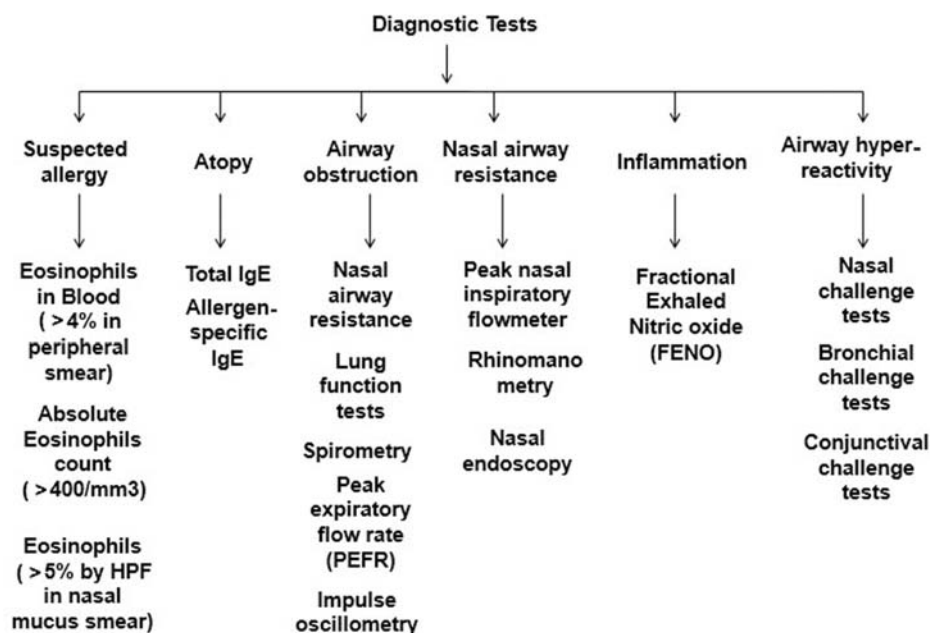
### *Diagnostic Tests and Modalities for Allergic Airway disease (Fig. 1)*

The association between allergic rhinitis and asthma increases the importance of accurate diagnosis of allergic rhinitis. The diagnosis of allergic diseases is based on history of typical allergic symptoms and supported by laboratory tests and investigations (*Fig. 1*).

### ADEX Recommendations

Diagnosis of allergic airway diseases

- Good clinical history supported by physical examination is the cornerstone for diagnosing allergic airway diseases. Laboratory tests are only complementary.
- Where available, spirometry is recommended for all patients suspected to have asthma for confirming the diagnosis, assessing severity of airflow obstruction and monitoring of asthma control. However, normal spirometry does not rule out asthma.
- Forced expiratory flow between 25% and 75% of vital capacity (FEF[25%-75%]) is an early marker of bronchial involvement in patients with AR.
- Peak expiratory flow rate (PEFR) measurement is inexpensive and to be used in clinic set up for monitoring of asthma. Self-monitoring of PEF by patients is recommended for better asthma control.
- Other tests like FENO, and impulse oscillometry are not recommended routinely.
- Tests for bronchial hyper-responsiveness are to be performed in specialized centers only, where facilities are available and not routinely recommended.
- Skin prick test (SPT) is a useful tool for detection of sensitization by specific allergen/allergens. This test can be done by pediatricians trained in SPT, by using 10-12 common standardized antigens, for purpose of allergen avoidance, and whenever planning for specific immunotherapy.
- *In vitro* testing of serum specific IgE is very expensive and not recommended routinely. However, when we suspect a particular allergen is the cause, it can be done for purpose of allergen avoidance.
- Quantification of eosinophil count in nasal smear (>5/HPF) by Hansel's stain is easy to do, has good accuracy and cheap. It can be done by the practitioners in their clinics. Quantification of eosinophil count in sputum in children is not recommended.
- Total IgE, absolute eosinophil count and peripheral smear for eosinophil count are routinely not



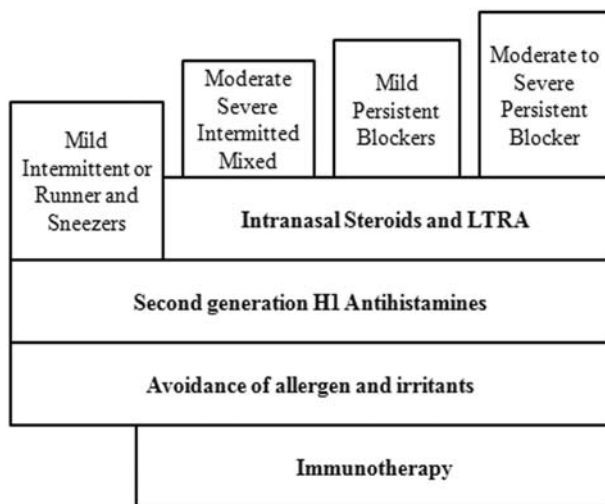
**FIG. 1** Diagnostic tests for various allergic airway diseases.

recommended for the diagnosis, as elevated levels are seen in other conditions also. It may be normal in 30% cases of respiratory allergies.

- X-ray of neck (lateral view) for visualization of adenoid enlargement is not recommended, as adenoid size never correlates with X-ray.
- X-ray PNS is not recommended as in only 40% of patients with allergic rhinitis, mucosal thickening is seen in routine X-ray PNS.
- X-ray chest is not routinely recommended for patients suspected to have asthma; however; it can be done to rule out alternate diagnosis, and whenever complications of asthma are suspected.
- Nasal endoscopy in AR patients is not routinely recommended. It can be done with ENT specialist whenever anatomical abnormalities are suspected, for knowing the size of adenoids, and the status of osteomeatal complex.
- Computed tomography (CT) of para nasal sinuses are not routinely recommended. It is indicated only when maximum medical treatment has failed, when surgery is planned or when there are complications of sinusitis.

**Management of Allergic Airway Disease**

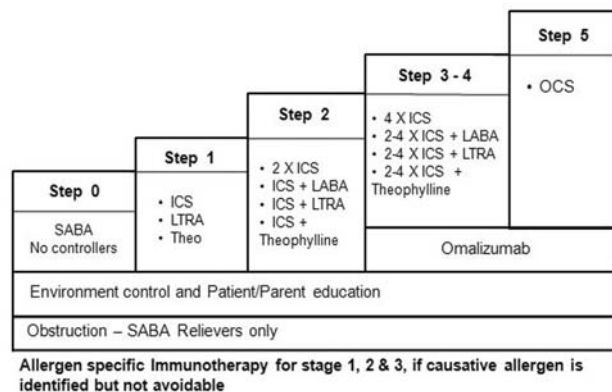
The management of allergic airway diseases is based on education of the patients, parents, and healthcare providers, environmental control measures, pharmacotherapy and specific immunotherapy (*Fig. 2*) [11-13]. A sequential approach to the therapy of pediatric asthma is presented in *Fig. 3*.



**FIG. 2** Allergic rhinitis disease management.

**ADEX Recommendations**

- Goals of management of respiratory allergies include relief of patient’s current symptoms, prevention of further disease progression, good lung function and ability to perform his/ her normal daily activities.
- Combination of patient education, self-monitoring, and regular physician visits, avoidance of triggers along with pharmacotherapy is the corner stone in the management.
- Allergen and irritant avoidance along with patient education is the first step in the treatment of respiratory allergic diseases.
- Second generation antihistamines are to be used instead of first generation because of better safety and efficacy ratio.
- All second generation antihistamines are equally effective; however, cetirizine can cause mild sedation in certain children while Fexofenadine and Levocetirizine cross blood brain barrier minimally and therefore are non-sedating, effective and safe.
- Intranasal antihistamines are not recommended in children, due to their bitter taste and mild somnolence.
- Oral decongestants are not recommended in children, due to their systemic side effects, like irritability, dizziness, headache, tremor and insomnia as well as tachycardia and hypertension.
- Intranasal decongestants are not recommended in children. Prolonged use (>10 days) can cause rhinitis medicamentosa.
- Intranasal anticholinergic agent (Ipratropium bromide) is not routinely recommended.
- Inhaled corticosteroids (ICS)/inhaled nasal steroids (INS) are the controller medications of choice.



**FIG. 3** Sequential approach to therapy for pediatric asthma.

- All ICS/INS are equally efficacious when used in equipotent doses.
- Choose an INS/ICS with low systemic bioavailability like Mometasone or Fluticasone furoate at a minimum dose required to achieve symptom control.
- Adverse effects of INS are negligible (Minor nasal bleed, throat discomfort), and they arise mainly due to faulty technique.
- Prescription of the device should be individualized according to patients' ability to use, preference and cost. Technique of INS/ICS should be evaluated during each visit.
- Most of the clinical benefit from INS/ICS is obtained at low to moderate doses.
- Always use spacer with metered dose inhaler (MDI). In children younger than three years, and non cooperative patients, use face mask along with spacer with MDI.
- When prescribing inhaled steroids for rhinitis and asthma together, the total dose of steroid should not exceed the recommended levels.
- Long acting beta agonist (LABA) monotherapy should not be used.
- ICS+LABA is a preferred choice when symptoms are uncontrolled despite ICS monotherapy in children older than 5 years.
- Montelukast monotherapy is inferior to ICS/INS.
- Short acting beta2 agonist (SABA) is the drug of choice for rescue medication during acute episode of asthma.
- Combination of ipatropium bromide with salbutamol provides better bronchodilatation compared to either drug alone.
- Oxygen saturation to be measured by pulse oxymetry whenever possible in all cases of acute attack of wheeze (asthma).
- If allergic rhinitis is predominant, INS with Montelukast is the choice
- If Asthma is predominant, ICS with Montelukast is the choice.
- Antihistamines and bronchodilators are to be used on need basis.
- Allergen specific immunotherapy (Desensitization) is recommended in respiratory allergy patients with definite but unavoidable specific one or two allergens and patients not responding to maximum

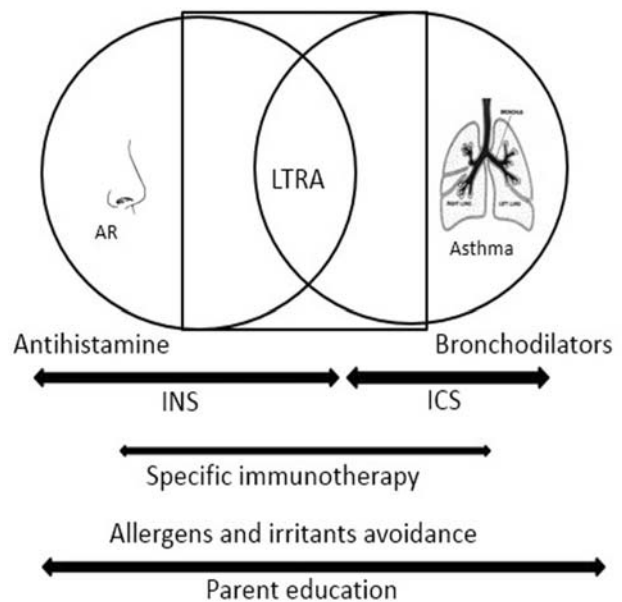
pharmacotherapy by a trained specialist. Patients with severe asthma with  $FEV_1 < 65\%$  are contraindicated.

- Sublingual Immunotherapy (SLIT) is preferred over subcutaneous immunotherapy (SCIT) due to better safety.
- Nasal irrigation may be used as adjuvant therapy.
- Anti IgE is not recommended due to its cost.

The treatment of allergic airway disease is represented in **Fig. 4**.

#### Monitoring and Follow-up

- Regular monitoring of the child is vital for success of therapy.
- Monitoring should be initially once in a month until good control is achieved and thereafter once in 3 months
- Upper and lower airway symptom score to be done in every visit.
- Dosage of drugs is to be adjusted (decreased or increased) according to the control of the disease.
- Withdraw the last added drug during step down therapy.
- Maintain minimal or low dose of ICS/INS to keep patient symptom free (under control).
- Encourage patient to perform PEFR twice daily and maintain a record.



**FIG. 4** Treatment of allergic airway disease.

- Check the inhalation technique during every visit.
- Encourage children to lead a normal life at school, and participate in games.
- Advise on yoga, pranayama etc. maybe given.

### CONCLUSIONS

This module aims to meet the local needs of the health care resources. Most aspects of allergic rhinitis and asthma have been reviewed that will help in better understanding and management of the airway allergies by the primary health care providers for children and the public health officials. It is hoped that this module serves as a basis for treatment and management of the united allergic airway disease for primary care providers in children. It is advised that the judgment of the management should be based on the diagnostic and treatment choices available as well as on social determinants like acceptability, availability, affordability and accountability.

*Acknowledgements:* Knowledge Isotopes Pvt. Ltd. ([www.knowledgeisotopes.com](http://www.knowledgeisotopes.com)) for the medical writing support.

*Funding:* None; *Competing interests:* None stated.

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### Annexure: ADEX Working Group

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*International reviewers:* Nicos Papadopoulus and PK Vedanthan.