MACVIA clinical decision algorithm in adolescents and adults with allergic rhinitis

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The selection of pharmacotherapy for patients with allergic rhinitis (AR) depends on several factors, including age, prominent symptoms, symptom severity, control of AR, patient preferences, and cost. Allergen exposure and the resulting symptoms vary, and treatment adjustment is required. Clinical decision support systems (CDSSs) might be beneficial for the assessment of disease control. CDSSs should be based on the best evidence and algorithms to aid patients and health care professionals to jointly determine treatment and its step-up or step-down strategy depending on AR control. Contre les symptômes varient, et le traitement doit être ajusté. Les préférences cliniques, et le coût. Les expositions aux allergènes et les conséquences des symptômes varient, et le traitement doit être ajusté. Les systèmes de prise de décision clinique (CDSSs) pourraient être bénéfiques pour l'évaluation du contrôle de la maladie. Les CDSSs devraient être basés sur les meilleures preuves et les algorithmes pour aider les patients et les professionnels de santé à déterminer conjointement le traitement et sa mise en œuvre ou sa mise en décalage en fonction du contrôle de l'AR.
The selection of pharmacotherapy for patients with allergic rhinitis (AR) depends on several factors, such as age, prominent symptoms, symptom severity, control of AR, patient preferences, availability of treatment, and cost. With allergen exposure and the resulting symptoms varying daily, patients with AR would benefit from regular monitoring of their symptoms to facilitate treatment adjustment. Clinical decision support systems (CDSSs) might be beneficial for the accomplishment of this task by assessing disease control, such as in response to treatment. A CDSS is a health information technology system designed to assist health care professionals and patients with clinical decision-making.
tasks. Knowledge-based CDSSs consist of 3 parts: the knowledge base, an inference engine, and a mechanism to communicate. \(^1,4\)

The knowledge base contains the rules and associations of compiled data. The inference engine combines the rules from the knowledge base with the patient’s data. The communication mechanism allows the system to show the results to the user, as well as have input into the system. CDSSs should be based on the best evidence and algorithms to aid patients and health care professionals to jointly determine the treatment and its step-up or step-down strategy depending on AR control. \(^1\) Thus CDSSs should help optimize treatment.

Contre les MÂadies Chroniques pour un Veiellissement Actif en Languedoc-Roussillon (MACVIA-LR [fighting chronic diseases for active and healthy ageing], http://macvia.crl-langue. docroussillon.fr) is one of the reference sites of the European Innovation Partnership on Active and Healthy Ageing. \(^5\) It initiated the project Integrated Care Pathways for Airway diseases (AIRWAYS ICPs)\(^6\) and the allergy sentinel network MACVIA-ARIA Sentinel NetworkK (MASK).\(^7\) A knowledge-based CDSS is currently being developed to optimize AR control. The communication mechanism of MASK uses interconnected tablets and cell phones. \(^7,8\) The proposed algorithm of the MACVIA-CDSS is presented in this article.

### CONTROL OF AR AND RHINOCONJUNCTIVITIS

In asthmatic patients, the treatment strategy is based on disease control and current treatment. \(^9,11\) The variability in symptom control is challenging and necessitates careful monitoring, as well as the step up/down of individualized therapeutic regimens over time. Both long- and short-term maintenance and reliever approaches have been proposed, \(^2\) including the combination of an inhaled corticosteroid and fast-onset long-acting \(\beta\)-agonist inhaler as maintenance and reliever therapy. \(^1,5\)

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The symptoms of AR can cause considerable morbidity in physical and emotional comfort, as well as in functional capacity and quality of life (QOL). The control and severity of AR have been defined in a similar manner to asthma. Measures of AR control include symptom scores, patients’ self-administered visual analog scales (VASs), objective measures of nasal obstruction, a recent modification of the Allergic Rhinitis and its Impact on Asthma severity classification, and patients’ reported outcomes, such as QOL or scores with several items. However, the challenges of managing AR are increased by the fact that patients do not often recognize their AR symptoms or confuse them with those of asthma. Therefore it is important for patients to be able to use an AR symptom scoring system that is simple to use and rapidly responsive to change.

As is the case for asthma, the best control of AR should be achieved as early as possible to (1) improve patient satisfaction and concordance to treatment and (2) reduce the consequences of AR, including symptoms, reduced QOL, and school and work absenteeism. Untreated AR can impair driving ability and put patients at risk. The ultimate goal of AR control is to reduce the costs incurred by AR.

A step-up/step-down approach to AR pharmacotherapy based on patient response might hold potential for optimal AR control and cost of treatment. MASK has proposed that electronic daily symptom diaries may provide additional information that clinical evaluation does not. Well-controlled AR is defined as a VAS score of 2 or less of 10. VAS cutoff values to step up or down treatment were proposed by comparison with pain VAS scores and step-up schemes or from the literature in the field of allergy (see the additional material in this article’s Online Repository at www.jacionline.org).

RECOMMENDATIONS FOR THE TREATMENT OF AR AND RHINOCONJUNCTIVITIS

The treatment of AR also requires the consideration of (1) the type (rhinitis, conjunctivitis, and/or asthma) and severity of symptoms, (2) the relative efficacy of the treatment, (3) the speed of onset of action of treatment, (4) current treatment, (5) historic response to treatment, (6) patient’s preference, (7) interest to self-manage, and (8) resource use. Guidelines and various statements by experts for AR pharmacotherapy usually propose the approach summarized in Box 1.

Allergen immunotherapy appears to be as effective as pharmacotherapy but is also regarded as a disease modifier intervention with the potential of altering the natural history of allergic diseases. Nonpharmacologic interventions, such as nasal filters or saline, have been found to be effective.

PATIENTS’ VIEWS

Many patients with AR are not satisfied with their current treatment, and this results in frequent nonadherence to therapy. In some studies, most patients were satisfied with their treatment, but full control was rarely achieved. Despite the vast availability of treatment options, most patients are “very interested” in finding a new medication and are willing to try different medications to find one that “works.” Patients want more effective treatments that can control all their symptoms, including ocular ones, and a more rapid onset of action.

Some patients believe that their health care provider does not understand their allergy treatment needs or does not take their allergy symptoms seriously. Many patients self-medicate with over-the-counter drugs for a long period of time and usually only consult a physician when their treatment is ineffective. In one study, patients chose a step-down therapy to speed up the control of symptoms.

A patient’s individual preference for an oral or intranasal route treatment needs to be considered. In addition, health care professionals need to inform the patient of the relative benefits and harms of each prescribed treatment to support their decision making.

Box 1. Summary of recommendations for the treatment of AR and conjunctivitis used in the algorithm

- Oral or intranasal H1-antihistamines are less effective than intranasal corticosteroids for the control of all rhinitis symptoms.
- Leukotriene receptor antagonists are usually considered less effective than oral H1-antihistamines.
- Comparisons between oral and intranasal H1-antihistamines differ between recommendations, and thus no definite conclusions have yet been reached.
- Combined intranasal fluticasone propionate and azelastine hydrochloride in a single device is more effective than monotherapy.
- Intraocular H1-antihistamines or cromones are effective for ocular symptoms. The importance of decongestants is debatable.
- In clinical practice, intranasal corticosteroids need a few days to be fully effective, whereas intranasal H1-antihistamines or combined intranasal fluticasone and azelastine are rapidly effective.
- All recommended medications are considered safe at the usual dosage. First-generation oral H1-antihistamines are sedating and should be avoided.
- Oral or nebulized corticosteroids can be helpful in patients with severe disease whose symptoms are uncontrolled by other treatment, although studies are lacking in patients with AR.
- Further studies are needed in preschool children to make more firm recommendations possible, although recent studies show the efficacy of oral H1-antihistamines.
ALGORITHM DECISION AID

A step-up/step-down individualized approach to AR pharmacotherapy might hold the potential for optimal control of AR symptoms while minimizing side effects and costs. However, the following should be considered:
- as in asthmatic patients, treated and untreated patients should be considered differently (Figs 1 and 2);
- most patients have received a previous treatment that should guide health care professionals with regard to the current prescription; and
- patterns of medication use in previously treated patients should be evaluated when future treatment is initiated.

The step-up or step-down strategy should be discussed with the patient and should consider the following:
- efficacy of previous treatments;
- adherence to treatment;
- the patient’s preference (route of administration, fear of side effects, and experience of the patient regarding the treatment);
- possible side effects or harms; and
- costs.

The step-up approach consists of the following:
- **Step 1:** For mild symptoms, use intranasal or oral non-sedating H1-antihistamines.
- **Step 2:** For moderate-to-severe symptoms and/or persistent AR, use intranasal corticosteroids. The dose of some intranasal corticosteroids can be increased according to the package insert.
- **Step 3:** For patients with uncontrolled symptoms at step 2 (current or historical), use a combination of intranasal corticosteroids and intranasal H1-antihistamines. However, depending on the physician’s experience, other therapeutic strategies can be used.
- **Step 4:** It is possible that an additional short course of oral steroids might help to establish control and continue control by step 3. Intraocular cromones or H1-antihistamines can be added to improve the control of ocular symptoms.
- Treatment should be reassessed quickly (eg, 1-7 days) to confirm control by using a step-up approach.
- Patients whose symptoms are uncontrolled at step 3 should be considered as having severe chronic upper airway disease and might benefit from specialist referral and assessment for allergy workup and nasal examination. For example, specialist referral should be considered if there is failure to reduce the VAS score to less than 5 of 10 after 10 to 14 days, assuming the patient is adherent to therapy.
- At all times, patient adherence and intranasal device technique mastery should be regarded as potential for lack of treatment effect.

Alternatively, a step-down approach can be used, and step 3 treatment should be considered as the first option in patients with a previous treatment failure or resistance to monotherapy. After a few days of achieving complete control, consideration could be given to treatment reduction. However, the step-down approach is based on consensus, and more data are needed.

The duration of treatment is determined by the type of rhinitis (intermittent or persistent). In the patient with intermittent rhinitis, treatment should be continued daily for 2 weeks or for the duration of the pollen season or other specific allergen exposure. In the patient with persistent rhinitis, a longer course
Assessment of control in treated symptomatic patient

![Assessment of control in treated symptomatic patient](image)

of treatment is often needed. Of course, it is important to assess concordance with agreed regimens because treatment failure can be a result of poor patient concordance.

**CONCLUSION**

We propose a simple algorithm to step up or step down AR treatment globally. However, its use varies depending on the availability of medications in different countries and depending on resources. These issues have not been approached in the present article because of their variability between countries. Inherently, algorithms are a combination of individual decision nodes that represent separate recommendations. They require testing as a complete algorithm and comparison with alternative strategies to explore whether the combination of these separate recommendations leads to more benefit than harm when applied in practice. Thus this algorithm, as with other algorithms, requires testing in large-scale trials to provide the necessary certainty in available evidence. The current algorithm is being developed by MASK² for a CDSS that will be available on Apple and Android and that will provide opportunities for evaluation.

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In CARAT, the MCID is 4 (range, 0-30). E22 The real-life study future studies should refine this cutoff level. French populations can be generalized to other countries with toid arthritis clinical practice and similar to that seen in clinical 
MCID for the fatigue V AS was around 10 mm in a large rheuma-
tion)E24 and the elderly. E25 Furthermore, it can be used in a wide 
to find a clinically significant difference. 
31 mmE8 have been shown to be clinically meaningful. In patients with endometriosis, the pain MCID was set at 10 mm. E9 The 
these studies suggest that the cutoff of 23 mmE18 is appropriate 

test for arthritis clinical practice and similar to that seen in clinical trials. E10 The MCID in theVAS pain score does not differ with sex, age, and cause-of-pain groups E3 or with the severity of 

In patients with AR, to our knowledge, there is a single study that has estimated MCIDs in theVAS during treatment. E18 By us-

A level of more than 23 mm appears to be a relevant cutoff. VAS changes appear to encompass both symptoms and disease-
specific QOL. E18 Another study, the Control of Allergic Rhinitis and Asthma Test, E20,E21 approximated the VAS MCIDI. In CARAT, the MCID is 4 (range, 0-30). E22 The real-life study of Demoloy et al.E3 in primary care used the same methods as a cluster randomized trial carried out in specialist practices. E3 Both studies, which were carried out in France in large populations, showed a very similar change in VAS levels during treat-


tment depending on total symptom scores and RQLQ sores. These studies suggest that the cutoff of 23 mmE18 is appropriate to find a clinically significant difference. VAS levels appear to be similar in different countries in patients with severe intermittent or persistent rhinitis. A VAS can be used in all age groups, including preschool children (guardian evalua-
tion)E24 and the elderly. E25 Furthermore, it can be used in a wide variety of languages. E25-E32 VAS levels vary with the Allergic Rhinitis and its Impact on Asthma classification in many languages. E25,E33-E35 A VAS level of 50 (>100 mm) is suggestive of moderate-to-severe AR, E19,E36,E37 although in some studies the cutoff was greater than 60 mm. E32 AVAS was used to define severe chronic upper airway disease. E3 Thus the MCDI found in 2 large French populations can be generalized to other countries with different languages and cultures across the lifecycle. However, future studies should refine this cutoff level.

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