REUE | Consensus document

Consensus document update on the management of asthmatic patients in the Emergency Department

Actualización del documento de consenso para el manejo del paciente asmático en urgencias

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Introduction

Asthma is a chronic disease with high prevalence.[1] Despite this, it is underdiagnosed, and a significant proportion of diagnosed patients do not receive adequate treatment and/or lack proper follow-up.[2,3] The absence of exacerbations is the main indicator of asthma control. Exacerbations are the leading cause of morbidity and mortality in these patients and are frequently managed—especially the most severe cases—in emergency departments (EDs), where they account for a high number of visits. This represents an opportunity not only for appropriate management of the acute episode but also to prevent future exacerbations or reduce their severity by identifying patients with poor baseline asthma control and taking corrective actions.[4-7] The aim of this article is to update the previous consensus document published in 2018.[8]

Methodology

Design

The document was developed by a multidisciplinary team experienced in asthma management, consisting of three emergency physicians, one pulmonologist, and one allergist.

Search strategy

We conducted an initial targeted bibliographic search of clinical practice guidelines for asthma management. Experts searched PubMed on June 1st, 2024. Results were analyzed, prioritizing the Global Initiative for Asthma (GINA 2024),[9] the Spanish Guideline for Asthma Management (GEMA 5.4),[1] the ERS/ATS guidelines for severe asthma, and the SEPAR guideline on uncontrolled severe asthma.[10] During document preparation, the ALAT-SEPAR consensus on the definition and classification of asthma exacerbations by severity was published and exceptionally included due to its relevance.[11]

Consensus method

Two in-person meetings were held. In the first, the work was planned by developing a list of clinical questions organized into four thematic blocks on asthma exacerbations: a) definition and diagnosis; b) classification according to severity; c) therapeutic management; and d) referral criteria. Subsequently, participating experts worked individually on the answers to each question between June 1st and October 21st.

On October 22nd, 2024, a 2nd in-person meeting of all participants was held, led by an expert moderator, during which the responses to the questions from the different thematic blocks were discussed and agreed upon.

Consensus criteria

Agreements were reached unanimously. Points where there could be differences in criteria among the authors were discussed until consensus on the content was achieved.

Process

In the 1st round, an individual review of the literature was conducted. In the 2nd round, a preliminary discussion of the recommendations was carried out. Finally, in the 3rd round, the final document was produced and reviewed by all authors.

Classification of evidence

To evaluate the quality of the evidence, as done in GEMA 5.4[1] and GINA 2024,[9] the quality of the information was classified into four categories (A, B, C, D), representing a gradient of confidence in the results obtained from the available studies (Table 1). Category A corresponds to high quality and category D to very low quality. Confidence in category A results makes it unlikely that future studies will change the available findings. In contrast, for

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Table 1. Classification of the quality of evidence	
A	SR of RCTs, with or without MA, and RCTs with low risk of bias. The evidence comes from a substantial number of well-designed studies with consistent results.
B	SR of RCTs, with or without MA, and RCTs with moderate risk of bias. The evidence comes from a limited number of studies and/or inconsistent results.
C	The evidence comes from non-randomized, observational, or uncontrolled studies.
D	Clinical experience or scientific literature that cannot be included in category C.

SR: systematic reviews; RCTs: randomized controlled trials; MA: meta-analysis.

lower categories, confidence is lower or very low, making it more likely that future studies will modify the results.

Classification of recommendations

To classify the relevance and consistency of clinical recommendations, the same method used in GEMA 5.4[1] was followed, categorizing them into two levels: strong recommendations (R1), which represent those in which the guideline development group is confident that they provide more benefits than risks; and weak recommendations (R2), in which there is uncertainty about whether their application provides more benefits than risks. The level of evidence and the recommendation category are shown in parentheses in the text.

The level of evidence and the type of recommendation are included in each section of this document.

Definitions

Asthma is a chronic inflammatory disease of the airways, partly influenced by genetic factors, characterized by bronchial hyperresponsiveness and variable airflow obstruction that is totally or partially reversible, either spontaneously or with treatment.[1,9] Good baseline asthma control is defined by adequate symptom control without the need for rescue medication, normal pulmonary function tests, and absence of severe exacerbations in the previous year.[1,9]

An asthma exacerbation is identified by the onset of clinical worsening with increased symptoms, need for relief medication, and/or deterioration in lung function vs the patient's usual daily variation.[1,9,13] The risk of experiencing an asthma exacerbation is closely related to poor control of baseline disease symptoms.[9] Several risk factors have been described, including poor treatment adherence or incorrect inhalation technique, absence of inhaled corticosteroids in baseline therapy, frequent use of short-acting β_2-adrenergic agonists (SABA), history of prior exacerbations, obesity, smoking, and psychosocial factors.[1,14] Although the risk is lower, patients with good baseline control and no risk factors may still experience exacerbations.[13-15]

Management of asthma exacerbation

Management of the exacerbation episode should be systematic and includes, first, the diagnosis of an asthma attack and differential diagnosis with other possible causes of symptoms. Chronic disease may decompensate due to asthma exacerbation or its treatment. Optimization of comorbidities is essential. In addition, asthma exacerbations may present with concomitant acute conditions such as acute bronchitis or pneumonia, or complications such as pneumothorax or pneumomediastinum.

Once an asthma exacerbation is diagnosed, its severity must be established. Pulmonary function tests are essential both for diagnosis and for classification of severity and evaluation of response to treatment. Therefore, they should be incorporated into the management of all asthmatic patients treated in emergency departments. Treatment and frequency of reassessment should be adapted according to severity (C; R1).

Diagnosis

History: patients with asthma exacerbation present with dyspnea, chest tightness, cough, and/or wheezing. It is important to assess baseline asthma control (including recent exacerbations), whether usual treatment includes inhaled corticosteroids (ICS) and long-acting β_2-agonists (LABA), treatment adherence, whether the patient has a written action plan, and baseline pulmonary function values. The speed of onset of the exacerbation is important.

Rapid-onset exacerbations (hours), mainly mediated by bronchoconstriction triggered by inhaled allergens, drugs, food, or emotional stress, are associated with greater initial severity but faster response to treatment.

Slow-onset exacerbations (developing over days; representing 80 % of those seen in emergency departments) are primarily inflammatory, secondary to respiratory infections and/or poor baseline disease control, and response to treatment is usually slower.[1] Exposure to potential triggers or signs and symptoms of respiratory infection should be documented (C; R1).

In patients without a prior diagnosis of asthma but with suggestive history, acute management is the same, and they should be referred for further evaluation (D; R1).

The presence of cardiovascular comorbidity is a risk factor for life-threatening exacerbations[1] (C).

Initial systematic physical examination should include assessment of mental status, respiratory rate (RR), respiratory mechanics, presence of retractions, use of accessory muscles, or paradoxical thoracoabdominal pattern. This helps assess severity, progression, and response to treatment. Signs of decompensation of other chronic diseases should also be described[16] (C; R1).

Tests to be performed in the emergency department

Performing a pulmonary function test allows objective assessment of airway obstruction and response to treatment. The test of choice is spirometry (FEV_1 and FVC), although it is rarely available in most emergency departments. Instead, peak expiratory flow (PEF) measurement can be used and should be recorded before and during evaluation (C; R1). Patients should know their baseline PEF values to allow comparison. If baseline values are unavailable, reference values adjusted for age, sex, and height may be used[1] (C; R2).

Peripheral oxygen saturation (SpO_2) measured by pulse oximetry allows estimation of hypoxemia. Values below 90–92 % (95 % in pregnant patients) while breathing room air or usual oxygen therapy are associated with life-threatening risk.[1] If SpO_2 does not improve rapidly with treatment and oxygen therapy, arterial blood gas analysis should be considered[17] (D; R1).

If clinical presentation or unexpected evolution suggests complications, decompensation, or alternative diagnosis, imaging studies should be performed—mainly chest X-ray or bedside ultrasound—to detect pulmonary edema, consolidation, pleural effusion, or pneumothorax.[18,19] If pulmonary embolism is suspected, pulmonary vascular imaging should be considered.[1] An electrocardiogram should be performed when arrhythmia is suspected or chest tightness raises diagnostic uncertainty and does not resolve with treatment[1,16] (D; R1).

Regarding blood tests: complete blood count, C-reactive protein, other acute-phase reactants, or procalcitonin may help in identifying a concomitant infectious process.[16] In these cases, in addition to the possible development of respiratory failure, the presence of other organ dysfunctions should be assessed, as this defines sepsis and is associated with higher mortality.[20] Measurement of natriuretic peptides may be useful when heart failure is considered in the differential diagnosis or as an additional complication of the asthma exacerbation. In asthmatic patients with respiratory worsening without clear deterioration in lung function (PEF), the alternative diagnosis of pulmonary embolism—although less frequent than in patients with chronic obstructive pulmonary disease (COPD)—should be considered. In this context, measurement of plasma D-dimer levels may be helpful[21] (D; R2). When the exacerbation is suspected to be related to an allergic reaction, serum tryptase should be measured at patient arrival, again at 2 hours after symptom onset, and ideally a third time at 24 hours, corresponding to baseline levels[22] (C; R1). In patients treated with high doses of long-acting β_2-agonists (LABA) or systemic corticosteroids (SCS), monitoring serum potassium levels is recommended[16] (D; R1).

Classification of exacerbation severity

To appropriately tailor treatment and ensure proper patient management, it is necessary to establish the severity of the exacerbation episode. Severity categories have been defined based on clinical presentation, lung function (measured by PEF), RR, and SpO_2. The presence of refractory hypoxemia, hypercapnia, and acidosis indicates life-threatening risk[1,9] (C; R1).

Assessment before and after treatment allows classification of exacerbation severity and evaluation of the response to treatment, respectively.[1] This dynamic assessment enables a more accurate estimation of severity and supports subsequent clinical decision-making[1,9] (C; R1).

Treatment

Exacerbations are the main cause of morbidity and mortality in patients with asthma.[8] Their treatment aims to reverse airflow obstruction and hypoxemia, if present, as quickly as possible. The intensity of treatment and patient assessment should be adapted to the severity of the exacerbation.[1,8] In more severe exacerbations, assessment is practically continuous until improvement is achieved. In less severe cases, after the initial evaluation, a single reassessment of therapeutic response may be performed after 1 to 3 hours of appropriate management[1] (C; R2).

Patient comorbidities and their potential decompensation—whether due to the exacerbation itself and/or its treatment—are risk factors for poor outcomes and must be considered in the management of asthma exacerbations[9] (C; R1).

Table 2 summarizes therapeutic management, including the frequency of clinical evaluation, according to severity stratification of exacerbations (C; R1). There is no significant benefit from the use of nebulized magnesium sulfate in adults, adolescents, or children (B; R2). Intravenous magnesium sulfate should only be considered in specific cases of severe exacerbations that do not respond to initial treatment, particularly in adults and children with persistent hypoxemia or when lung function does not reach 60 % of baseline or predicted value after one hour of care[9] (C; R2).[23,24]

If the exacerbation occurs in the context of SARS-CoV-2 infection, in mild-to-moderate cases in patients requiring daily asthma treatment, direct antiviral therapy with nirmatrelvir–ritonavir (considering potential drug interactions) or remdesivir should be initiated (C; R1). In patients with severe COVID-19, treatment with remdesivir should be started[25] (C; R1). Nirmatrelvir–ritonavir interacts with salmeterol and vilanterol; therefore, if these are used, they should be replaced with another LABA during the 5 days of treatment and for at least 3 days after completion[26] (C; R2). If the exacerbation occurs in the context of influenza infection, treatment with oseltamivir is indicated[27] (C; R1). Asthmatic patients, especially those with partially or poorly controlled baseline disease, should be vaccinated against pneumococcus, SARS-CoV-2, and influenza, and those older than 64 years vs respiratory syncytial virus[9,28,29] (A; R1).

Non-invasive (NIV) and invasive mechanical ventilation (IMV)

Currently, the main clinical practice guidelines recommend NIV for the treatment of some patients with severe exacerbations and incomplete response to therapy, always under close monitoring and without delaying IMV when it is indicated.[1,9] When NIV is initiated, pulmonary function (PEF or FEV_1), blood gases, and ventilator settings must be closely monitored to avoid dynamic hyperinflation and barotrauma.[9] Indications for NIV in asthma exacerbations are mainly in patients showing signs of respiratory muscle fatigue and mild hypercapnic or hypoxemic respiratory failure that do not yet require IMV.[30,31] In asthmatic patients, NIV carries a risk of dynamic hyperinflation; therefore, ventilator settings should follow the recommendations outlined in Table 3[30,31] (C; R2).

When an exacerbation presents with life-threatening criteria (very severe exacerbation), preparation for intuba-

Table 2. Treatment and clinical evaluation according to severity of asthma exacerbation

Clinical presentation	Non-severe	Severe	Very severe
	Moderate subjective symptom worsening; PEF > 50 %; RR < 25 rpm; SpO_2 > 93 %	Marked subjective symptom worsening; PEF < 50 % or RR > 25 rpm measure SpO_2; exacerbation in pregnancy	Altered mental status; respiratory muscle fatigue (decreased RR); silent chest; hypoxemia refractory to oxygen therapy; hypercapnia; acidemia
Urgent treatment			
Bronchodilator	pMDI with spacer: salbutamol 4–10 puffs every 20 min in the first hour	pMDI with spacer: salbutamol 4–10 + ipratropium bromide 4–8 puffs every 10–15 min in the first hour OR *Intermittent nebulization every 20 min in the first hour: salbutamol 2.5 mg + ipratropium bromide 0.5 mg	*Continuous nebulization: salbutamol 2.5 mg + i Iratropium bromide 0.5 mg
Inhaled corticosteroid	pMDI with spacer: fluticasone propionate or budesonide up to 4 doses every 10–15 min OR Intermittent nebulized budesonide up to 0.5 mg every 20 min within the first hour		
Systemic corticosteroid		Oral prednisone 0.5–1 mg/kg ideal body weight (< 50 mg every 24 h)	IV hydrocortisone 250 mg
Oxygen therapy		FiO_2 < 40 % to achieve SpO_2 > 92 % (95 % in pregnancy)	FiO_2 as needed to maintain adequate saturation up to ventilatory support
Ventilatory support		Consider NIV (see text)	Do not delay NIV (see text)
Additional treatment if no improvement		IV salbutamol 200 µg infusion over 30 min, then 0.1–0.2 µg/kg/min Single dose IV magnesium sulfate 2 g over 20 min Heliox for nebulization	
Anaphylaxis present		IM adrenaline 0.5 mg every 5–15 min in lateral thigh	IV adrenaline 0.5–1 mg if anaphylactic shock or during CPR
Clinical, oximetric and PEF evaluation			
Frequency of evaluation	Every 30 min	Continuous until improvement	Constant until improvement

Adapted from[1,9,11,23,24].
The doses correspond to inhalations; generally, each delivers 100 µg of salbutamol, 20 µg of ipratropium bromide, 250 µg of fluticasone propionate, or 200 µg of budesonide. You should review the specifications for each device before use to ensure that the correct doses are administered.
pMDI: pressurized metered-dose inhaler; IV: intravenous; IM: intramuscular; CPR: cardiopulmonary resuscitation; PEF: peak expiratory flow
*If viral respiratory infection is suspected and nebulization is used, appropriate aerosol transmission precautions should be taken.[1]

tion and IMV must be immediate, alongside the administration of medical treatment described in Table 2. If rapid and clear clinical improvement is not achieved, intubation and IMV should not be delayed. The decision to initiate IMV during a severe asthma attack is clinical: respiratory muscle fatigue (indicated by decreasing respiratory rate), decreased level of consciousness, and hypercapnic and/or hypoxemic respiratory failure with inability to maintain SpO_2 > 92 % despite supplemental oxygen suggest the need for intubation and ventilatory support[32] (C; R1).

IMV in patients with asthma exacerbation is challenging due to the complex pathophysiology resulting from severe bronchoconstriction and dynamic hyperinflation. Ventilatory support must always be accompanied by intensive medical treatment aimed at reversing airflow obstruction. Traditional ventilation strategies carry potential life-threatening complications such as obstructive shock due to pulmonary hyperinflation and pneumothorax.[30] The main objective is to reduce air trapping while maintaining adequate oxygenation and acceptable hypercapnia. To achieve this, the ventilatory strategy known as permissive hypercapnia may be required.[31] Recommended initial ventilatory parameters are shown in Table 3 (C; R1).

Disposition decision

After therapeutic management of the asthma exacerbation and assessment of subsequent evolution, it must be determined whether the patient can be safely discharged or requires admission to conventional hospitalization or an intensive care unit (ICU). Some cases may require an additional observation period in the emergency department before the final decision (D; R2).

The admission rate of patients presenting to emergency departments is approximately 20 %.[33] Adherence to clinical practice guidelines is associated with a lower risk of admission[34] (B). Mortality after hospitalization for an asthma exacerbation is around 6 %, with independent risk factors including diabetes mellitus, pneumonia, and the need for mechanical ventilation.[35] Exacerbations are the leading cause of death in asthmatic patients, and even those with previously well-controlled asthma may experience severe exacerbations[36] (C).

The decision regarding patient disposition should be individualized, taking into consideration the severity of the treated exacerbation, response to treatment, and the patient's risk factors for complications (hospitalization or death related to asthma).[16] Risk factors for hospitalization[37-41] or death[42-47] in patients treated for asthma exacerbation in emergency settings are shown in Table 4 and grouped into three categories: poor or absent baseline asthma control, characteristics of the current exacerbation, and patient-related factors not directly related to asthma (C).

ICU admission should always be considered when the patient requires invasive or non-invasive ventilatory support for management of the exacerbation (C; R1).

Conventional hospitalization is indicated in patients who, despite initial improvement, remain symptomatic and require reliever treatment more frequently than every 4 hours and/or require supplemental oxygen to maintain $SpO_2 \geq 93$ %. It is also indicated when treatment adherence or adequate monitoring at home cannot be guaranteed. In many cases, admission is determined by decompensation of chronic disease in the context of the asthma exacerbation or by the presence of complications (pneumonia, pneumothorax, pneumomediastinum)[1] (C; R1).

To consider safe discharge of a patient treated for an asthma exacerbation, there must first be clear clinical improvement with treatment, with the patient asymptomatic or with minimal residual symptoms, without dyspnea on minimal exertion, and able to tolerate the supine position, with baseline SpO_2 above 93 % in young or adult patients (previously 92 %, but updated in recent guidelines).[1,8,9] In addition to favorable evolution, patient risk factors must be considered (Table 4) (C; R1). Pulmonary function tests (FEV_1 or PEF) combined with SpO_2 are fundamental parameters, but alone do not determine disposition; however, low values at initial assessment or after treatment are associated with higher relapse risk.[48] Physician experience has also been shown to influence prognosis[8] (C). It is essential to ensure that the patient understands and can follow the prescribed treatment and action plan[1] (D; R1). If the initial evolution is favorable, less severe exacerbations may be considered for discharge after one hour of management, whereas more severe cases usually require closer to 3 hours before decision-making[1] (C; R2).

Figure 1 illustrates the diagnostic-therapeutic management and conceptual framework for disposition decisions. Risk factors for poor outcomes should always be considered, especially in patients with less favorable response or greater severity at presentation (C; R1). Recommendations in GEMA 5.4 and GINA 2024 differ slightly in pulmonary function cut-off points, but the overall concept is the same.[1,9] GEMA 5.4 recommends discharge if FEV_1 or PEF > 70 % of personal best or predicted value. If values are between 50–70 %, risk factors for poor outcomes (hospitalization and death; Table 3) should be considered.[1,49] In GINA 2024, if FEV_1 or PEF is < 25 % at presentation or < 40 % after treatment, hospital admission is indicated. If improvement reaches 40–60 %, discharge may be considered depending on risk factors. For values > 60 %, discharge is recommended if risk factors are taken into consideration[9] (C; R2). As shown in Table 4, biopsychosocial factors leading to poor adherence (e.g., loneliness, homelessness, financial hardship) must also be considered.

Discharge treatment

The objective is to resolve the current exacerbation and ensure appropriate follow-up of baseline asthma, thereby reducing the risk of future exacerbations and/or inadequate management should they occur[1] (C; R1). Table 5 summarizes discharge treatment after emergency department care for an asthma exacerbation.

Table 3. Indications for non-invasive and invasive mechanical ventilation in asthmatic patients in the emergency department

NIV	IMV
Indications (present after initial treatment)l)	**Indications** (any present)
– Respiratory rate > 25 rpm – Heart rate > 110 bpm – Use of accessory respiratory muscles – FEV_1 or PEF < 50 % of predicted value – Mild respiratory failure: • Hypoxemia with PaO_2/FiO_2 > 200 • Hypercapnia with $PaCO_2$ < 60 mmHg	– Decreased level of consciousness – Agitation – Risk of bronchoaspiration due to excessive secretions – Technical difficulties for NIV – Hemodynamic instability – Severe respiratory failure: • PaO_2/FiO_2 < 200 • $PaCO_2$ > 60 mmHg
Recommended ventilator settings	
– IPAP: start at 8 cm H_2O – EPAP: 4–6 cm H_2O – I:E ratio: 1:4 or 1:5 – Ramp: as fast as tolerated – Inspiratory trigger: lowest tolerated without asynchrony – Expiratory trigger: around 75 %	– Mode: volume-controlled – Tidal volume: 6–8 mL/kg – Respiratory rate: 10–12 rpm – Minute ventilation: < 115 mL/kg/min – Plateau pressure: < 30 cm H_2O – Inspiratory flow: 60–80 L/min – Flow waveform: decelerating – I:E ratio: 1:3 to 1:5 – PEEP: 0 cm H_2O – FiO_2: 100 %

IPAP: inspiratory positive airway pressure; EPAP: expiratory positive airway pressure; I:E ratio: inspiration/expiration time ratio (expiration is prolonged in asthma to reduce air trapping and hyperinflation); PEEP: positive end-expiratory pressure.

– Before discharge, the patient's inhalation technique should be reviewed; the patient must understand the prescribed treatment, particularly the importance of ICS, and if a clear trigger has been identified in the clinical history, instructions should be given for its avoidance[8] (C; R1).

– Patients will require, in addition to optimization of their maintenance treatment, a reliever treatment regimen and many will also require a short course of SCS. All patients must have a written action plan described in their discharge report for exacerbations and must understand it[8] (C; R1).

– The use of ICS improves baseline asthma control, an effect that is enhanced when combined with LABA. Every asthma patient should have ICS as part of their regular treatment, and if not, it should be prescribed at emergency department discharge[1,50,51] (C; R1).

– SMART or MART therapy (single-inhaler maintenance and reliever therapy) is defined as the use of the same device containing a combination of ICS and LABA for both maintenance treatment and relief during exacerbations. The only formulations approved for MART/SMART therapy are formoterol–beclometasone or formoterol–budesonide. This strategy has been shown to be superior to the use of SABA as reliever therapy added to regular ICS treatment, significantly reducing subsequent exacerbations in adult patients with moderate or severe exacerbations.[9,52-55] Therefore, at discharge after an asthma exacerbation, especially in moderate or severe cases, prescribing ICS–formoterol as maintenance and reliever therapy (MART/SMART) is recommended. This approach not only reduces the risk of new exacerbations but also simplifies treatment and improves adherence[1,9] (C; R1). When initiating ICS–

Table 4. Risk factors for hospitalization or death after emergency department care for asthma exacerbation

Group	Hospitalization RF	Mortality RF
Poor baseline asthma control	– No prior diagnosis of asthma – Exacerbations in the previous year	– Frequent prior emergency visits – No ICS in regular treatment – Frequent use of rescue SABA – Poor adherence to regular treatment
Severity of current exacerbation	– Severe signs and symptoms (dyspnea, chest tightness, fragmented speech, retractions, use of accessory muscles, cyanosis, altered mental status or de-creased level of consciousness) – Severely reduced lung function (PEF or FEV_1) at presentation or insufficient improvement after treatment	– Exacerbation worsening despite prior SCS – Food allergy as trigger – Recent hospitalization or emergency visit due to asthma exacerbation – Rapid-onset exacerbation, especially if response to treatment is not equally rapid – Concomitant complications (pneumonia, pneumothorax, pneumomediastinum) – Infection as a trigger with organ failure (sepsis)
Patient-dependent factors	– Cardiovascular comorbidity – COPD – Advanced age – Female sex	– Biopsychosocial factors leading to poor adherence to treatment

Adapted from[9,16,20,34].
RF: risk factors; COPD: chronic obstructive pulmonary disease; PEF: peak expiratory flow; FEV_1: forced expiratory volume in the first second; SABA: short-acting β_2-adrenergic agonist; ICS: inhaled corticosteroids; SCS: systemic corticosteroids.

Table 5. Treatment at discharge from the emergency department[1]

Bronchodilator	If the patient is not on ICS-formoterol combination therapy: initiate it and add on-demand inhalations (MART therapy)*
Inhaled corticosteroid	If the patient is already on ICS-formoterol combination therapy: increase the baseline ICS dose and add on-demand inhalations (MART therapy)*
Systemic corticoster-oid	Oral prednisone 0.5–1 mg/kg ideal body weight (or equivalent of other steroids), up to a maximum of 50 mg, in a single morning dose for 5–7 days

*MART therapy is the preferred option recommended by GINA 2024. When initiating ICS-formoterol combination therapy during an exacerbation, starting with a high ICS dose may be considered, with later dose reduction during follow-up once the crisis has resolved.
MART: single-inhaler maintenance and reliever therapy; ICS: inhaled corticosteroid.

LABA combination therapy during an exacerbation, a high ICS dose may be selected initially, with later dose reduction assessed during follow-up once the exacerbation has resolved. In patients already receiving ICS–LABA maintenance therapy, the ICS dose should be increased at discharge.[1] In those already receiving maximum ICS doses or with suspected chronic airflow limitation, a long-acting muscarinic antagonist (LAMA) should be added to baseline therapy, using MART as reliever treatment. Triple therapy (ICS–LABA–LAMA) is associated with fewer severe exacerbations in adults with moderate to severe baseline asthma[56,57] (C; R2).

Some patients require a short course of SCS due to risk of treatment failure. This includes patients who required care due to lack of improvement despite 2–3 days of increased ICS dosing and appropriate use of reliever medication, those discharged after rapidly developing exacerbations, those with pulmonary function tests < 60 % of their personal best or predicted value, those with suspected poor baseline asthma control, or those with a history of severe rapidly developing exacerbations.[1] Oral prednisone 0.5–1 mg/kg ideal body weight (or equivalent of other steroids), up to a maximum of 50 mg in a single morning dose, should be initiated and continued after discharge for 5–7 days without tapering (A; R1).

Action plan: the patient may already have a written asthma action plan as part of follow-up. If so, it should be reinforced and any doubts clarified. If not, the discharge report should include an educational plan with clear instructions on the use of prescribed inhalation devices (ideally explained and supervised before discharge), treatment regimen (dose and frequency of maintenance and reliever medication), expected clinical course, and when to seek medical attention if there is no improvement or if symptoms worsen.[9] The discharge report should specify that the patient must urgently seek reassessment if symptoms or lung function measured by PEF worsen despite treatment, or if reliever medication is required more frequently than every 4 hours, or if nighttime awakenings due to cough or dyspnea occur[16] (D; R1).

It is important to emphasize proper therapeutic adherence, highlighting its importance and providing strategies to avoid missed doses.[58] Finally, emphasis should be placed on avoiding contributing factors such as allergens, tobacco smoke, irritants, obesity, sleep apnea–hypopnea syndrome, and non-use of CPAP[14] (D; R1).

Follow-up after emergency department discharge

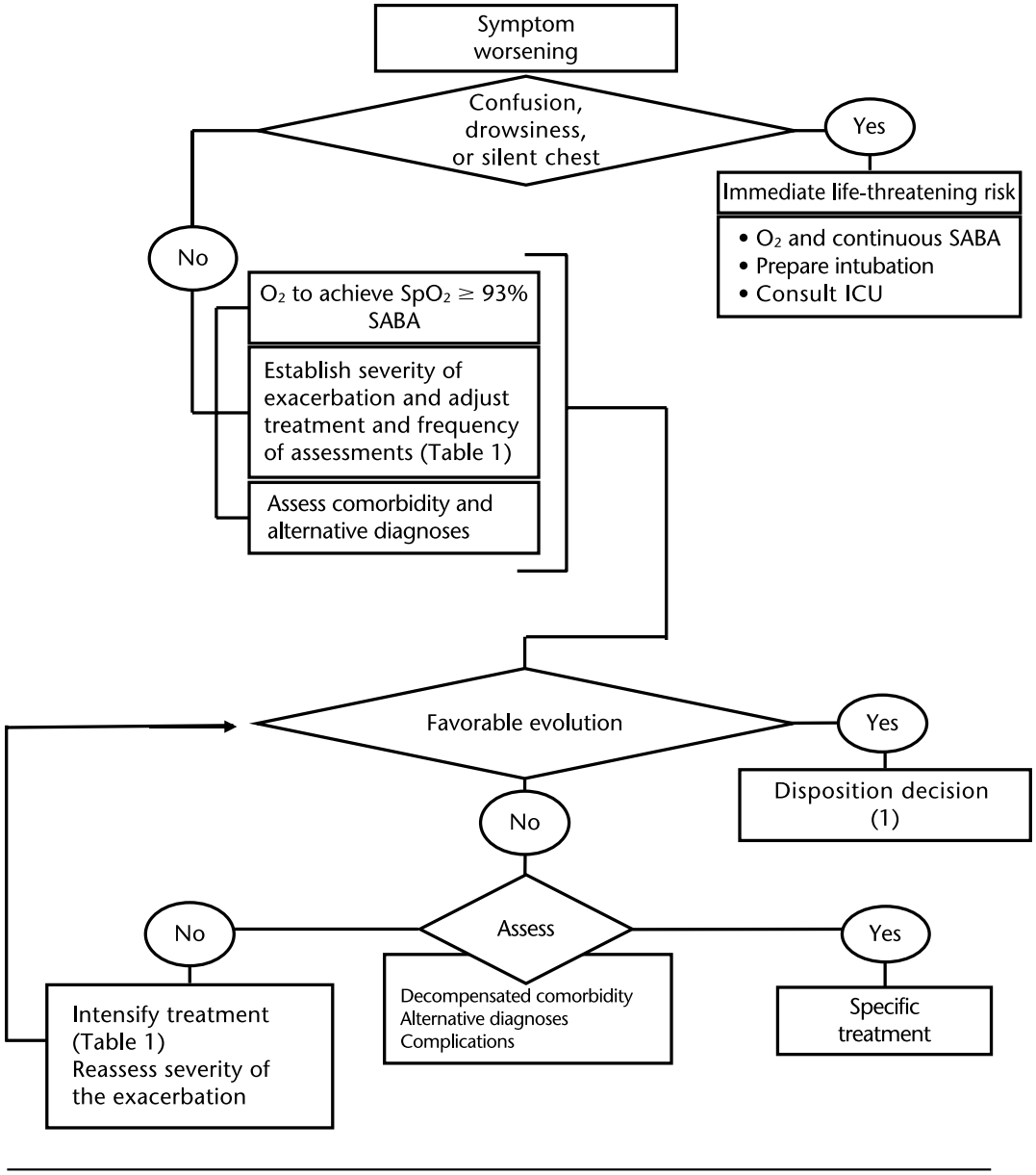
Asthma and its exacerbations require continuous management. Appropriate follow-up after discharge allows better disease control and reduces the risk of future exacerbations. All patients should have follow-up with their primary care physician within approximately one week. In addition, referral to pulmonology or allergy specialists should be considered (Table 6).[1] If possible, patients should leave the emergency department with appointments already scheduled[16] (D; R2).

Limitations

This document was developed by a panel of five experts. It is a narrative review of the literature aimed at developing recommendations for the management of asthma exacerbations in Spanish emergency departments. During the development process, GEMA and GINA guidelines were updated to their 2025 versions.[59,60] These updates were reviewed prior to publication, and no modifications to the document were required.

Conclusions

Asthma is a highly prevalent chronic disease that is underdiagnosed, with a significant proportion of patients lacking ad-



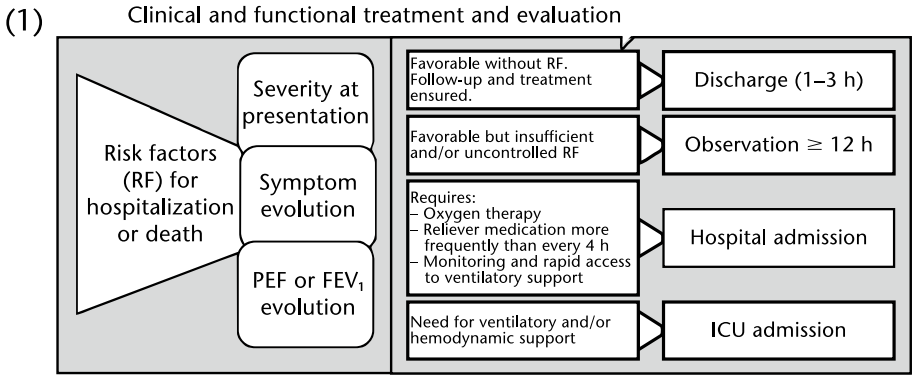


Figure 1. Diagnostic-therapeutic management and disposition decision of the patient seen in the emergency department for asthma exacerbation.
PEF: peak expiratory flow; FEV_1: forced expiratory volume in the first second; SABA: short-acting β_2-adrenergic agonist; ICS: inhaled corticosteroids; ICU: intensive care unit.

Table 6. Indications for referral to allergy or pulmonology clinics after discharge from the emergency department and their priority[1,22,45,51]

Within approximately 1 month:
- Patients without a prior diagnosis of asthma
- Patients without adequate maintenance treatment or with treatment considered insufficient or inappropriate
- Patients with loss of asthma control despite correct inhaled treatment and adequate adherence
- Patients using only SABA with recurrent exacerbations or frequent or nocturnal symptoms
- Patients with two or more emergency visits per year due to asthma exacerbations
- Patients who, without adequate medical supervision, use systemic corticosteroids recurrently or continuously
Within approximately < 2 weeks:
- Patients with life-threatening exacerbations within the past year
- Pregnant patients, regardless of exacerbation severity
- Patients requiring frequent rescue medication despite maximal appropriate maintenance therapy (indicates poor disease control and high risk of exacerbation)
- Patients with asthma exacerbation in the context of anaphylaxis

SABA: short-acting β_2-adrenergic agonist

equate control. The absence of exacerbations is the main indicator of asthma control. Exacerbations are the leading cause of morbidity and mortality in these patients. This document, based on the review of multiple guidelines and studies, provides support for the management of asthma exacerbations.

Management of exacerbations should be systematic and includes initial diagnosis and differential diagnosis with other possible causes of symptoms. Severity should then be established. Pulmonary function tests are essential for diagnosis, classification of severity, and assessment of response to treatment. Treatment and frequency of reassessment should be adapted according to severity. Disposition decisions after emergency care should consider initial severity, treatment response, and risk factors for poor outcomes. Safe discharge requires a patient-understood action plan, including treatment and criteria for urgent reassessment, as well as appropriate follow-up to ensure both resolution of the current exacerbation and proper management of baseline asthma.

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