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Handling severe asthma exacerbations: current guidelines and techniques: A review of research for pharmacists and emergency medical services

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***Abstract*---Background:** Asthma affects approximately 300 million people globally, with a significant prevalence of uncontrolled cases contributing to rising hospitalizations and healthcare costs. In Saudi Arabia, 64% of asthma patients experience uncontrolled symptoms. Effective management of severe asthma exacerbations is critical, yet many patients remain inadequately controlled even in advanced care settings. **Aim:** This review aims to synthesize current guidelines and techniques for handling and management of severe asthma exacerbations, focusing on optimizing therapeutic strategies and improving patient outcomes via pharmacists and Emergency medical services. **Methods:** The review systematically examines existing guidelines, including the Saudi Initiative for Asthma (SINA) and other international protocols. It evaluates various treatments such as inhaled bronchodilators, systemic steroids, anticholinergic agents, and newer therapies like magnesium sulfate and heliox. The review also considers the effectiveness of different diagnostic and monitoring tools. **Results:** Effective management of severe asthma exacerbations involves a multi-faceted approach. Key strategies include the use of

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inhaled bronchodilators (MDIs preferred over nebulizers), systemic steroids for moderate to severe cases, and oxygen therapy to address hypoxemia. Anticholinergic agents and magnesium sulfate may be used for severe exacerbations, though their benefits vary. Other interventions like IV salbutamol and heliox are reserved for severe cases unresponsive to standard treatments. **Conclusion:** Adherence to current guidelines, including early intervention with appropriate medications and monitoring, is crucial for managing severe asthma exacerbations effectively. Continuous evaluation and individualized treatment are necessary to enhance patient outcomes and reduce hospitalization rates.

***Keywords*---**Asthma, Exacerbations, Inhaled Bronchodilators, Systemic Steroids, Oxygen Therapy, Magnesium Sulfate, Guidelines.

Introduction

Approximately 300 million people worldwide suffer from asthma, making it a common pediatric emergency [1]. According to Alfrayeh [2], asthma is present in 23% of Saudi Arabians. Up to 64% of patients have uncontrolled asthma, according to Jahdali's estimation [3], which indicates that a sizable percentage of asthma cases are still not well controlled. Hospitalizations are rising in tandem with an increase in asthma-related morbidity, according to recent trends [4]. However, the number of people dying from asthma worldwide is decreasing [5]. The management of asthma is becoming more and more expensive, making it a significant contributor to healthcare usage [6]. Even in tertiary care settings, almost 50% of pediatric asthma patients in Saudi Arabia are still uncontrolled despite developments in the field [7]. There are many online guidelines accessible, such as the Saudi Initiative for Asthma (SINA) guidelines, which are especially helpful for the pediatric population and were updated in 2016 [8]. The availability of these guidelines may improve the results of children's asthma management [9]. The main therapeutic techniques for treating asthma are inhaled bronchodilators, systemic steroids, oxygen, and anticholinergic medications. Treatments must be individualized, and this requires constant evaluation and tracking of therapeutic outcomes. Presenting the strongest evidence for patient care depending on an institution's resources, this study seeks to resolve the debate around managing asthma exacerbations [10].

Definition of Exacerbation:

Clinically, an asthma exacerbation is defined as a progressive worsening of symptoms, such as coughing, wheezing, chest tightness, or shortness of breath, combined with a discernible deterioration in lung function that calls for medical attention [5, 11]. Increased coughing, especially at night, decreased tolerance to exercise, interruption of daily activities, and acute or subacute exacerbation of wheezing or dyspnea are some of the symptoms that might be seen during an exacerbation [12, 13].

Objectives of Therapy

- **Assessment of Exacerbation Severity**: Evaluate the seriousness of the exacerbation to guide treatment decisions.
- **Correction of Hypoxemia/Hypercarbia**: Address low oxygen levels and high carbon dioxide levels while rapidly reversing airflow obstruction using appropriate medical interventions.
- **Prevention of Complications**: Avoid potential complications such as air leakage.
- **Appropriate Patient Disposition**: Ensure proper patient management following initial treatment in the emergency department.
- **Recurrence Prevention**: Implement adequate baseline control therapies and arrange for follow-up care to minimize the likelihood of future exacerbations [8, 13, 14, 15].

Initial Assessment and Severity:

An acute asthma attack needs to be diagnosed and treated right away as a medical emergency [11]. The course of treatment depends on how severe the exacerbation is. A two-stage continuous evaluation procedure is used to assess an asthma exacerbation: (1) a static assessment to determine the attack's severity, and (2) periodic assessments to track the effectiveness of treatment. It is necessary to analyze a number of aspects in this process [5]. A number of scoring schemes are employed, including the Pediatric Respiratory Assessment Measure (PRAM) and the Asthma Scoring System. The PRAM scoring system has been approved by the SINA group as a legitimate and trustworthy way to gauge the severity of exacerbations in kids between the ages of 2 and 17 [8]. The PRAM score is a 12-point rating system that assesses oxygen saturation, wheezing, suprasternal retractions, and contractions of the scalene muscles [12]. It has been demonstrated that using the PRAM clinical pathway can shorten hospital stays in emergency rooms without having negative effects. In order to determine the likelihood of a hospital stay, the SINA expert panel advises utilizing the PRAM score in the emergency room [8, 16, 17].

- **Total Score of 1–3**: Indicates a low risk (<10%) of hospital admission.
- **Total Score of 4–7**: Suggests a moderate risk (10–50%) of hospital admission.
- **Total Score of 8–12**: Reflects a high risk (>50%) of hospital admission.

Medical History:

A comprehensive medical history is essential for managing an asthma exacerbation. This history aims to ascertain the duration and severity of the symptoms. Key aspects to explore include identifying precipitating factors such as recent medications administered, prior exacerbations (including past hospitalizations), frequency of bronchodilator usage, steroid courses, environmental triggers, patient adherence to treatment, psychosocial factors, and ICU risk factors. ICU risk factors encompass previous admissions to pediatric ICUs (PICUs), intubations, severe life-threatening conditions, and exacerbations during systemic steroid therapy [13, 18].

Physical Examination:

A thorough physical examination is crucial, focusing on the patient's overall appearance and vital signs. Observations should include the child's positioning—whether they can lie down or prefer sitting—as well as signs of distress such as sweating, the use of accessory muscles, and audible wheezing. While the presence of wheezing alone does not necessarily reflect the degree of airway obstruction, a silent chest is a significant warning sign. Extreme manifestations of cerebral hypoxia, such as agitation, confusion, and drowsiness, necessitate immediate intervention. Patients should be evaluated for risk factors associated with severe asthma outcomes. Objective measures of disease severity and therapeutic response are paramount, and frequent assessments are crucial. Spirometry, which measures lung function, can be challenging in younger children, particularly those under six years of age during an exacerbation, and its results may not align with the asthma scoring system. Consequently, spirometry is often unreliable for this age group [19, 20].

Risk Factors for Asthma-Related Mortality

- **Asthma History**
    - Previous severe exacerbation (e.g., intubation or ICU admission for asthma)
    - Two or more hospitalizations for asthma in the past year
    - Three or more emergency department visits for asthma in the past year
    - Hospitalization or emergency department visit for asthma in the past month
    - Use of more than two canisters of short-acting beta2-agonists per month
    - Difficulty recognizing asthma symptoms or the severity of exacerbations
- **Other Risk Factors**
    - Absence of a written asthma action plan
- **Social History**
    - Low socioeconomic status or inner-city residence
    - Illicit drug use
    - Significant psychosocial issues
- **Comorbidities**
    - Cardiovascular disease
    - Other chronic lung diseases
    - Chronic psychiatric conditions

Oxygen Therapy

Hypoxia is a leading cause of mortality in asthma exacerbations, and administering oxygen can alleviate dyspnea, enhance bronchodilation, support cardiac function, and reduce the risk of arrhythmias [21]. Oxygen therapy should be carefully adjusted to maintain oxygen saturation levels at or above 94% [8, 12, 15]. In the absence of pre-existing chronic lung disease (CLD), oxygen will not suppress respiratory drive [20]. An oxygen saturation level below 92% while breathing room air can be indicative of the need for hospitalization [8, 13, 22, 23].

Recommendations: Oxygen supplementation should be provided to patients with oxygen saturation levels below 92% on room air, and the administration should be tapered once the saturation level reaches 94% or higher.

Beta2 Agonist Bronchodilators:

During an asthma exacerbation, a trial of bronchodilators is essential. Metered-dose inhalers (MDIs) with spacers are generally preferred over nebulizers and are recommended for pediatric asthma exacerbations. Robust evidence supports the use of MDIs for managing mild to moderate exacerbations [8, 12, 14, 15, 24]. For pediatric patients, the suggested dosages are 4–5 puffs for those weighing less than 20 kg and 6–10 puffs for those over 20 kg. Nebulization is recommended for severe cases, with dosages of 2.5 mg in 3–4 ml for children under 5 years and 5.0 mg in 3–4 ml for those older than 5 years [25, 26, 27, 28, 29, 30]. Both MDIs and nebulizers are effective for delivering beta2 agonists to children with acute asthma and mild to moderate exacerbations.

Recommendations for Bronchodilator Use According to International Asthma Guidelines:

- **GINA 2018**: For mild exacerbations, 2 puffs; for moderate exacerbations, 6 puffs for children under 5 years, and 4–10 puffs for those over 5 years. Alternative: 2.5 mg over 20 minutes for children under 5 years; 5 mg/ml for children over 5 years.
- **SINA 2016**: 5 puffs vs. 10 puffs based on PRAM assessment, with a shift to nebulization in severe cases. Dosages: 2.5–5 mg in 3–5 ml NS.
- **Cincinnati 2010**: 6 puffs (4–8 hourly) are as effective as nebulizers for mild to moderate cases. Dosages: 2.5 mg/3 ml for children under 30 kg; 5 mg/3 ml NS for those over 30 kg. Continuous nebulization: 0.5 mg/kg/h (up to 15 mg/h).
- **SIGN 2016**: 2–6 puffs for children under 5 years vs. 4–10 puffs for those over 5 years. Shift to nebulization if needed after three hours. Dosages: 2.5 mg vs. 5 mg.
- **NHLBI 2007**: For mild cases, 4–8 puffs × 3; for moderate cases, 4–8 puffs over 20 minutes for 1–4 times. Nebulization recommended for severe cases.
- **New Zealand 2017**: 6 puffs for mild and moderate cases. Continuous nebulization of 2.5–5 mg recommended for severe cases.

Recommendations: Inhaled short-acting beta2-agonists are the preferred treatment for the rapid reversal of airflow obstruction. MDIs are effective for improving discharge rates from the emergency department and reducing the length of stay. They are generally equivalent or superior to nebulizers for managing mild to moderate exacerbations. Nebulization should be reserved for severe exacerbations or for patients who do not respond adequately to MDIs. Continuous nebulized salbutamol has been found to be more effective than intermittent nebulization in severe cases.

Anticholinergic Agents:

The role of anticholinergic medications in the acute management of asthma remains somewhat ambiguous. Nevertheless, ipratropium bromide is frequently used in conjunction with inhaled bronchodilators in emergency settings, often producing synergistic effects with the bronchodilator [31, 32]. Ipratropium bromide may also be administered regularly following hospital admission [33]. Current evidence supports the use of multiple doses of anticholinergics in emergency situations, particularly for moderate to severe asthma exacerbations, where it may reduce hospitalization rates by 30–60% without significant adverse effects. However, the efficacy of single-dose anticholinergics for mild exacerbations or their benefits when used post-admission are less clear [34]. Anticholinergics are generally less effective compared to inhaled beta-agonists and should not be used as monotherapy [35]. **Recommendations**: Anticholinergic treatment is advised for moderate to severe exacerbations rather than for mild cases. Anticholinergics should not be used alone or beyond 24 hours after admission.

Steroids:

Steroids should be reserved for children experiencing moderate to severe asthma exacerbations, as they effectively modulate leukotriene and prostaglandin synthesis, inhibit cell migration, and enhance airway beta-adrenergic receptor function. This can accelerate the resolution of exacerbations, reduce hospitalization rates, and promote earlier discharge from the emergency department [8, 12, 23, 36]. Various steroid regimens are available. Oral prednisone is both cost-effective and convenient, offering similar efficacy to intravenous methylprednisolone. Methylprednisolone is preferred when the patient is critically ill or unable to tolerate oral or IV medication. Oral dexamethasone is comparable in effectiveness to multiple days of oral prednisolone [37, 38, 39, 40, 41, 42, 43, 44]. Dividing doses of oral steroids (morning and evening) can help alleviate symptoms late at night, and tapering of steroids is unnecessary for courses lasting one week or less. **Recommendations**: Steroids should be used for moderate or severe exacerbations. Administering steroids within the first hour of an exacerbation can reduce hospitalization and relapse rates. Oral steroids are the most practical and cost-effective option. Intravenous steroids should be used if oral therapy fails. A single dose of dexamethasone is as effective as several days of prednisolone. Tapering is not required for steroid courses of seven days or less.

Inhaled Corticosteroids for Acute Asthma: Research on the efficacy of various inhaled corticosteroids for acute asthma exacerbations reveals minimal improvements in respiratory scores. There is a lack of substantial evidence supporting their use as adjunctive therapy in severe asthma exacerbations [23, 45, 46, 47, 48, 49, 50, 51]. **Recommendations**: High-dose inhaled corticosteroids are not recommended for acute asthma attacks.

Fluids:

Dehydration is common in asthma exacerbations due to increased basal metabolic rate, and maintaining euvolemia is generally advised. While inappropriate antidiuretic hormone secretion (SIADH) is rare, it should be considered if hyponatremia is present alongside significantly reduced urine output [14, 52]. **Recommendations**: Aim for euvolemia unless dehydration or SIADH is suspected. Avoid aggressive rehydration during asthma exacerbations.

Antibiotics:

Antibiotics are generally not required for asthma exacerbations triggered by viral infections. They may, however, be considered under specific circumstances: if the patient presents with a high fever and appears severely ill, if chest X-ray shows signs of consolidation, or if there is production of purulent sputum with evidence of polymorphonuclear leukocytes [8, 12, 14]. **Recommendations**: Antibiotic therapy should be reserved for cases where bronchopneumonia or another infectious source is suspected.

Chest X-ray:

Chest X-rays are often overused in cases of asthma exacerbations, leading to frequent misinterpretation of peribronchial opacities as pneumonic infiltrates, which may result in unnecessary medication [13, 53].

Recommendations: Chest X-rays should be conducted only under the following conditions:

1. Status asthmaticus, where the patient is unresponsive to standard treatment.
2. The presence of complications such as barotrauma, pneumothorax, or pneumomediastinum.
3. Suspected bronchopneumonia.
4. Suspected foreign body causing wheezing and respiratory distress.

Serum Electrolytes:

Monitoring serum electrolytes is crucial in severe asthma cases, particularly for serum potassium levels. Frequent administration of beta-agonists can lead to hypokalemia, while acidosis may cause transient hyperkalemia [8, 14, 15]. **Recommendations**: Electrolyte levels, especially potassium and lactate, should be monitored during severe asthma exacerbations.

Serum Glucose: Blood glucose levels may be influenced by stress, infection, and the use of beta-agonists and corticosteroids during asthma exacerbations, with hyperglycemia potentially indicating prolonged hospitalization [54]. Younger children are also at risk of hypoglycemia due to their limited glucose reserves. **Recommendations**: Blood glucose should be monitored in severe asthma exacerbations.

Complete Blood Cell Count (CBC):

CBCs and differential counts are frequently requested in emergency settings for asthma exacerbations. While leukocytosis is common, neutrophilia should be interpreted with caution due to the demargination effect of beta-agonists and corticosteroids, which can lead to increased peripheral white cell counts with a left shift [14, 30]. **Recommendations**: CBC should not be routinely performed for asthma exacerbations, as leukocytosis may be a result of demargination.

Viral Study: Viruses are known to be primary triggers for asthma exacerbations [8]. **Recommendations**: Viral screening should be limited to moderate or severe exacerbations or admitted cases and may help avoid unnecessary antibiotic use [14, 30].

Blood Gas Analysis:

Blood gas analysis is not routinely required for asthma exacerbations. The diagnosis of asthma exacerbation is primarily clinical, and blood gas analysis should be reserved for moderate cases or those with inadequate responses to standard therapy [8, 13, 14].

Magnesium Sulfate:

Magnesium plays a role as a cofactor in numerous enzymatic reactions, including the inhibition of calcium uptake in smooth muscle, which facilitates muscle relaxation [55, 56]. It may also inhibit cholinergic transmission, enhance nitric oxide and prostacyclin synthesis, and stabilize mast cells and T-lymphocytes [57]. Intravenous magnesium has demonstrated efficacy in moderate to severe asthma exacerbations, with the usual dose being 25–75 mg/kg over 20 minutes initially, and then every 6 hours as needed. IV magnesium is considered safe and beneficial for moderate to severe exacerbations when administered at doses of 4–6 mg/dl, though it can be toxic at levels above 12 mg/dl. Side effects may include nausea, flushing, muscle weakness, hyporeflexia, and respiratory depression, with renal impairment and heart block being contraindications. The evidence for nebulized magnesium sulfate is minimal, particularly in severe cases, and is dependent on the specific scoring system or pulmonary function results [58, 59, 60, 61, 62, 63]. **Recommendations**: Magnesium sulfate may be used in moderate to severe asthma exacerbations in patients with minimal responses to bronchodilators and steroids [64, 65, 66, 67, 68, 69, 70]. The use of inhaled magnesium sulfate for severe asthma exacerbations is not well-supported by current data.

Salbutamol:

IV salbutamol is typically reserved for patients with status asthmaticus who do not respond to continuous nebulized beta2-agonists. It has been shown to improve lung function tests and gas exchange but carries risks of toxicity, including cardiac side effects like arrhythmia and significant tachycardia [71, 72]. Therefore, IV salbutamol should be administered only in pediatric ICUs equipped with continuous cardiac monitoring. The initial recommended dose is 15 μg/kg over 10 minutes, with careful monitoring of cardiac status and electrolytes to avoid hypokalemia and increased lactate. Evidence suggests no additional benefit from IV salbutamol compared to continuous nebulized salbutamol [73, 74]. **Recommendations**: Use IV salbutamol under cardiac monitoring for patients with refractory asthma who do not respond to standard treatments.

Aminophylline:

Aminophylline, a bronchodilator, generally does not offer additional benefits beyond standard therapies (e.g., continuous inhaled beta2 agonists, ipratropium bromide, and IV steroids) and should be considered only for severe exacerbations unresponsive to maximized therapy after consulting a pediatric intensivist. Its effects on oxygenation, ventilation duration, and PICU stay are not well established. Due to its narrow therapeutic range, side effects such as vomiting, and dysrhythmia are common. It should only be used under cardiac monitoring. The usual dose is 5 mg/kg infused over 20 minutes, followed by 0.9 mg/kg/h, with a therapeutic range of 10–20 mg/l [75, 76]. **Recommendations**: Aminophylline should be reserved for severe exacerbations unresponsive to maximum therapy in the PICU and used under expert supervision due to potential adverse effects [77, 78, 79, 80].

Inhaled Heliox:

Heliox, a mixture of oxygen and helium (usually 80:20), can help reduce respiratory failure progression and prevent intubation by increasing laminar flow and reducing turbulence. It is reserved for severe asthma exacerbations unresponsive to maximum therapies in the ICU [13, 14, 23, 81, 82, 83, 84]. **Recommendations**: Consider heliox-driven salbutamol nebulization for patients with life-threatening or severe exacerbations unresponsive to intensive conventional therapies.

Noninvasive Positive Pressure Ventilation (NIPPV):

NIPPV is a safe and effective treatment for status asthmaticus in pediatric patients. It can prevent intubation, reduce mortality, and lower treatment costs by providing airway stenting and bronchodilation, which aids in alveolar recruitment [85, 86, 87, 88, 89, 90]. **Recommendations**: Encourage the use of NIPPV in refractory cases with intensivist supervision.

Endotracheal Intubation and Ventilation:

Endotracheal intubation and mechanical ventilation are necessary in less than 10% of cases of severe asthma attacks with respiratory failure. These interventions are associated with significant complications, such as hypotension and pneumothorax, occurring in up to 50% of cases. Therefore, intubation should be used only as a last resort [85, 91-93].

Recommendations: Intubation should be avoided if possible and performed only under the guidance of a pediatric intensivist. The indications include:

- Respiratory or cardiac arrest.
- Progressive hypoxemia despite O_2 or NIPPV.
- Rising $PaCO_2$ despite maximum therapy and/or NIPPV.
- Deterioration of mental status.
- Progressive exhaustion.

Recommendations: Follow the rapid sequence intubation protocol, ensuring it is performed by an experienced clinician with cardio-respiratory monitoring. Use controlled mechanical ventilation with the most familiar mode, preferably PRVC, and consider permissive hypercapnia strategies (e.g., slow rate, low tidal volume, short inspiratory time, FiO_2 at 100%, and physiological PEEP) [91, 92, 93].

Recommendations: Discharge patients only after successful extubation, stable hemodynamic status, weaning off continuous IV beta-agonists, and stability on intermittent beta-agonist aerosol therapy for more than 3 hours. Ensure thorough education for patients and families about asthma management, medication use, risk factors, and when to seek medical help [36, 45].

Admission Criteria

Recommendations: Consider ICU admission for:
- Ongoing need for supplemental oxygen despite initial treatment.
- Frequent beta2-agonist therapy (more than 3 hours).
- Life-threatening asthma features.
- History of near-fatal events.
- Exacerbation despite oral steroids.
- Psychosocial conditions.
- Exacerbation despite adequate steroid doses and recurrent presentation.
- Residence in a remote area with limited access to transportation/communication.

Discharge Criteria
Recommendations: Discharge patients when:
- They require beta2-agonists every 4–6 hours.
- Show minimal signs of respiratory distress.
- Have oxygen saturation above 92% in room air.
- Exhibit good air entry.
- Have no psychosocial issues.

Other Treatments:

Beyond the treatments already discussed, there are a few additional options and considerations for managing severe asthma exacerbations:
1. Nebulized Sodium Bicarbonate: Nebulized sodium bicarbonate has been studied for its potential to address metabolic acidosis and improve airway function in severe asthma exacerbations. However, the evidence supporting its routine use is limited, and it is generally not recommended unless there is a specific indication for metabolic acidosis.
2. Biologic Agents: Biologics such as monoclonal antibodies are typically used for long-term management of asthma, especially in severe cases. For acute exacerbations, their use is less common but may be considered in certain cases, particularly for patients with severe, uncontrolled asthma despite conventional treatments. Examples include:
- **Omalizumab**: Used for severe allergic asthma.

- **Mepolizumab, Reslizumab, and Benralizumab**: Target eosinophilic inflammation.

3. Heliox for Specific Situations: While not universally recommended, heliox might be considered in specific cases where conventional treatments fail. Its use is mainly for cases where it can help reduce work of breathing and improve airflow dynamics in severe exacerbations.

4. Titration of Inhaled Beta-Agonists: In some cases, titration of inhaled beta-agonists can be adjusted based on response and severity. Continuous nebulization or high-dose intermittent nebulization may be used in critical cases.

5. Sedation and Analgesia: In extremely severe cases where agitation or distress is a factor, controlled sedation and analgesia may be used to improve patient comfort and cooperation. This should be done cautiously and under strict monitoring.

6. Chest Physiotherapy: While less common in acute settings, chest physiotherapy might be used in some cases to help with mucus clearance, particularly if there is evidence of significant mucus production.

7. Environmental Control: For patients with known triggers, managing environmental factors can be critical. This may include avoiding known allergens, reducing exposure to irritants, and managing indoor air quality.

8. Patient Education and Asthma Action Plans: Patient education is a crucial component of asthma management. Ensuring patients and families understand how to use inhalers correctly, recognize early signs of worsening asthma, and follow an asthma action plan can prevent exacerbations and improve outcomes.

9. Follow-Up and Care Coordination: Regular follow-up visits to review asthma control, medication adherence, and adjustment of treatment plans are essential. Coordination between primary care providers, specialists, and sometimes case managers can ensure comprehensive management of asthma. These treatments and strategies should be tailored to individual patient needs and circumstances, often involving a multidisciplinary approach to achieve the best outcomes.

Conclusion

Severe asthma exacerbations pose a significant challenge in both pediatric and adult populations, necessitating prompt and effective management to prevent adverse outcomes. The review highlights that despite advancements in treatment strategies, a substantial proportion of asthma cases remain inadequately controlled, emphasizing the need for adherence to established guidelines and the optimization of therapeutic approaches. Inhaled bronchodilators, particularly metered-dose inhalers (MDIs), are favored for their efficacy and convenience in managing mild to moderate exacerbations. Nebulizers, while effective, are recommended primarily for severe cases. Systemic steroids play a crucial role in managing moderate to severe exacerbations, with oral prednisone being the preferred option due to its cost-effectiveness and convenience. Intravenous steroids are reserved for critically ill patients or those unable to tolerate oral medications. Oxygen therapy is a cornerstone in managing hypoxemia and enhancing overall respiratory function. Anticholinergic agents like ipratropium bromide provide additional benefit in moderate to severe exacerbations but should not be used as monotherapy. Magnesium sulfate has demonstrated efficacy in severe cases, though its use should be cautious due to potential side effects and toxicity. The review underscores the importance of individualized treatment plans, continuous monitoring, and early intervention. Techniques such as intravenous salbutamol and heliox are valuable for cases unresponsive to conventional treatments, though their use should be restricted to specialized settings. Overall, effective management of severe asthma exacerbations requires a comprehensive approach that integrates current guidelines, employs appropriate therapies based on exacerbation severity, and ensures rigorous monitoring and follow-up care. Future research should focus on refining treatment protocols and exploring new therapeutic options to further improve patient outcomes and reduce the burden of asthma on healthcare systems.

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إدارة تفاقم الربو الحاد: الإرشادات والتقنيات الحالية - مراجعة بحثية لخدمات قطاع الصيدلة وطب الطوارئ

الملخص:

الخلفية : يؤثر الربو على حوالي 300 مليون شخص عالميًا، مع انتشار كبير للحالات غير المسيطر عليها مما يساهم في زيادة حالات الدخول إلى المستشفيات وتكاليف الرعاية الصحية. في المملكة العربية السعودية، يعاني 64% من مرضى الربو من أعراض غير مسيطرة. إن الإدارة الفعالة لتفاقم الربو الحاد أمر حاسم، ومع ذلك، يظل العديد من المرضى غير المسيطر عليهم بشكل كافٍ حتى في بيئات الرعاية المتقدمة.

الهدف : يهدف هذا الاستعراض إلى تلخيص الإرشادات والتقنيات الحالية للتعامل مع تفاقم الربو الحاد، مع التركيز على تحسين استراتيجيات العلاج وتحسين نتائج المرضى للعاملين بقطاع الصيدلة وطب الطوارئ.

الطرق : يستعرض البحث بشكل منهجي الإرشادات الحالية، بما في ذلك المبادرة السعودية للربو (SINA) وبروتوكولات دولية أخرى. يقيم البحث العلاجات المختلفة مثل موسعات الشعب الهوائية المستنشقة، الستيرويدات الجهازية، العوامل المضادة للكولين، والعلاجات الأحدث مثل كبريتات المغنيسيوم وهليوكس. كما يأخذ الاستعراض في الاعتبار فعالية أدوات التشخيص والمراقبة المختلفة .

النتائج : تشمل الإدارة الفعالة لتفاقم الربو الحاد نهجًا متعدد الأوجه. تشمل الاستراتيجيات الرئيسية استخدام موسعات الشعب الهوائية المستنشقة (يفضل البخاخات المدمجة على أجهزة الاستنشاق)، الستيرويدات الجهازية للحالات المتوسطة إلى الشديدة، وعلاج الأكسجين لمعالجة نقص الأكسجة. قد تُستخدم العوامل المضادة للكولين وكبريتات المغنيسيوم للحالات الحادة، على الرغم من أن فوائدها تختلف. تُخصص تدخلات أخرى مثل السالبوتامول الوريدي والهليوكس للحالات الشديدة التي لا تستجيب للعلاجات القياسية.

الاستنتاج : إن الالتزام بالإرشادات الحالية، بما في ذلك التدخل المبكر بالأدوية المناسبة والمراقبة، أمر حاسم لإدارة تفاقم الربو الحاد بفعالية. التقييم المستمر والعلاج المخصص ضروريان لتحسين نتائج المرضى وتقليل معدلات الدخول إلى المستشفيات.

الكلمات الرئيسية : الربو، التفاقم، موسعات الشعب الهوائية المستنشقة، الستيرويدات الجهازية، علاج الأكسجين، كبريتات المغنيسيوم، الإرشادات.