

Treating asthma flareups at home - an opinion

COMMENTARY

Asthma flare-ups (exacerbations) in children can occur anywhere, but most begin at home, particularly when associated with viral respiratory infections, which are the most common trigger. Airway narrowing in asthma is due to a combination of bronchial smooth muscle constriction (bronchospasm), and obstruction from inflammatory exudates and airway wall edema.

Short acting beta-agonists (SABAs) are regarded as first-line treatment for asthma flare-ups, particularly when there is mainly bronchial constriction. The delivery device can be a metered dose inhaler (MDI), usually with a valved holding chamber or other spacing device (Diskus [GlaxoSmithKline, United Kingdom] or Turbuhaler [AstraZeneca, United Kingdom]). If the flareup is mild, a few inhalations of a SABA will suffice and nothing further is required. The difficulty, and at times the controversy, begins if the SABA is not successful. This may occur when exudates and airway edema are factors. Past practices have included administering more frequent doses of the SABA, adding or doubling the dose of inhaled corticosteroids (ICSs), adding oral corticosteroids (OCSs) or taking the child to the emergency department (ED). In the latter situation, following assessment, children are treated with more frequent doses of a SABA, delivered by an MDI or wet nebulization (aerosols) depending on the local practice, with or without the addition of OCSs. The majority of children, after a period of observation, are able to be discharged home with recommendations to continue the SABA's, sometimes with the addition of an OCS, the duration depending on local custom. A small number require more intensive therapy, often including supplemental oxygen, and are admitted.

Might there be a better way of successfully managing flare-ups at home and avoiding visits to the local ED? Practitioners have relied on asthma guidelines and consensus statements to aid them in this endeavour. The most often quoted guidelines are those from the Global Initiative for Asthma, the National Asthma Education and Prevention Program in the United States, British Thoracic Society and Scottish Intercollegiate Guidelines Network from the United Kingdom, the Canadian Thoracic Society (CTS), the National Asthma Council Australia, as well as an international consensus report (1-6). To a great extent, these guidelines address the need for proper assessment of the asthmatic child, encouraging preventive/controller therapy, as well as a step-up with loss of asthma control. The focus on flare-up treatments mostly revolve around the child's management in the ED. Despite this, a recent survey demonstrated considerable variability in the ED treatment of acute wheeze, particularly in the delivery method, drug selection, dosage and frequency of inhaled therapy (7). It would not be surprising if similar variability existed in the home management of acute wheezing in children.

Neither the CTS 2012 guideline's or the more recent CTS and Canadian Paediatric Society's position papers provide any detailed instructions on managing acute flare-ups at home (4, 8). A review of other major guidelines reveal that the recommendations for SABA treatment at home are very heterogeneous and include: two puffs, one at a time, repeated a further two times at 20 min intervals (1); two treatments of two to six puffs 20 min apart (2); one to two puffs and, if no relief, two puffs every 2 min with a maximum of 10 puffs (3); and two to 10 puffs every 20 min for the first hour, then referred to a hospital (6). Two statements suggested that nebulizer treatments may be used at home (2, 6). Suggested additional treatments, if required, vary from adding ipratropium bromide, considering or adding an OCS, or seeking medical attention (1-3). Several statements, including one from Canada, recommended against doubling the dose of ICSs (2-4). For OCS use at home, the recommendations also tend to be variable, suggesting that they can be used if necessary; however, the patient must be observed by a physician within 24 h, used only if part of a written asthma action plan (AAP), or used but only with close monitoring by the prescribing physician (2, 3, 6). The 2012 CTS guidelines recommend against 'routinely' adding OCSs as part of a written AAP for acute loss of asthma control; however, "suggest health care practitioners add OCS in children with recent severe exacerbations who failed to respond to inhaled SABA as part of a written AAP at the onset of an episode of acute loss of control" (4). Despite these recommendations, many physicians are reluctant to prescribe OCSs during a flare-up.

There is evidence, although modest, that a written AAP detailing the child's regular asthma medication schedule and suggestions for managing flare-ups, combined with asthma education, is beneficial (9). The current recommendation is that AAPs be symptom based rather than peak flow based (9). The plans should be provided to patients or parents and include instructions for the daily treatment of asthma, as well as instructions for step-up treatment during acute exacerbations and when to seek help if there is further deterioration. How consistent are AAPs with asthma consensus guidelines? A recent review of AAPs in Canada uncovered not only significant variability among plans, but discordance with the 2012 CTS asthma guidelines, particularly with respect to ICS and OCS use (10).

I would like to suggest an AAP used successfully over the past 30 years, for patients observed in a tertiary paediatric referral practice, and specifically for patients whose asthma flare-ups are not controlled with SABAs alone.

The discussion always begins by reviewing the history of the child's acute flare-ups. This includes the triggers (usually viral respiratory infections) and the treatments administered, including devices, doses and frequency, the response to therapy, time course of events, visits to the ED and hospitalizations. It is important to determine what has worked and what has not. Observing the child's technique with the MDI is critical. Optimizing asthma control is essential; the more troublesome asthmatics will benefit from ongoing ICS and add-on therapy with long-acting beta agonists or leukotriene receptor antagonists.

Keeping the discussion simple, I divide asthma flare-ups into two categories: 'little asthma' and 'big asthma'. The former tends to be minor in nature, triggered by gym activities, sports, weather change or exposure to a known allergen. Bronchospasm is most likely the culprit. Parents have usually learned that these episodes can be controlled with the brief use of the child's SABA. However, sports-induced asthma occasionally can cause the parent and the child some distress (11). 'Big asthma' is typically triggered by viral respiratory infections and parents usually have no difficulty recognizing them in their child. Airway obstruction from inflammation may be the major problem here. These episodes may not respond to SABAs, so families find them disruptive, inconvenient, distressing and frustrating. Many parents feel helpless realizing they cannot get control over their child's symptoms and visits to the local ED are inevitable, often at inconvenient hours. I suspect that the challenges of administering SABAs with an MDI and valved holding chamber to a sick and, perhaps, uncooperative child at home may explain why the parents are unsuccessful. Below, is a four-step written AAP for these families.

Step 1 is the use of the child's SABA (eg, salbutamol MDI with valved holding chamber), two inhalations up to three to four hourly. MDIs are preferred in this instance rather than dry powder devices because some children, during acute asthma flare-ups, experience difficulty generating sufficient inspiratory flow rates to get the powder out of the device.

Step 2 involves maximizing inhaled bronchodilators by recommending salbutamol by wet nebulization, usually administering either a 2.5 mg nebule (5 mg for children ≥ 12 years of age) or the equivalent dose of 0.5% salbutamol respirator solution combined with 2 mL of normal saline every 3 h to 4 h, delivered by an air compressor and nebulizer, which can be readily obtained from most pharmacies. Administration occurs over a 10 min period, using a face mask for younger children or a mouthpiece for those older. Families are instructed to seek medical attention for their child if there is a need for nebulization treatments more often than three to four hourly. It is important to explain to parents that more frequent treatments would not be harmful; however, it may indicate a level of severity that requires assessment. Although I recognize that the use of nebulized beta agonists at home is not standard practice, I only use this route when multiple dosing with the MDI has not been successful. Failure to properly use an MDI is a particular problem for children up to early school age, who have smaller airways and poor technique.

Step 3, if required, is the addition of an OCS, initiated by the parent, using prednisolone suspension for younger children or prednisone tablets for older ones. The starting dose is 1 mg/kg/day as a single dose, to a maximum of 50 mg rounded off to a convenient dose. The duration of treatment is five, seven or 10 days, based on the parents' report of experience with previous episodes. Five days appears to be the most common in EDs, and while sufficient for many, it is insufficient for others. My practice includes tapering the steroid dose, because I believe that the full starting dose is not necessary for the entire five to 10 days as the child's asthma is coming under control. Parents will note their child's asthma improving sometime after the administration of the second dose (usually in 36 h to 48 h). The SABA frequency is gradually reduced as the child improves and the MDI is eventually substituted for wet nebulization.

Step 4 - at any time during the course of this plan if the child is not improving with three to four hourly treatments of beta agonists by wet nebulization and the addition of an OCS, or if the parents are worried, the child is taken for assessment.

The AAP instructions are written out for the family and a copy is kept in the child's clinic chart. Parents can call the clinic nurse or on-call physician for reassurance and guidance at the time of asthma exacerbations if they wish.

The updated Cochrane Review summarizes studies comparing MDIs with wet nebulization for acute asthma in EDs and shows no difference in hospital admission rates, with those receiving MDIs spending a shorter time in the ED before discharge home (12, 13). I agree that in an ED setting under controlled circumstances where treatments can be supervised by health professionals, most patients (but not all) can be successfully managed with MDIs using multiple dosing at frequent intervals. The question is whether the results of this systematic review can be generalized to the home setting, where most asthma flare-ups begin, as commented on by the authors (12).

The use of parent-initiated oral steroids has been the subject of a Cochrane Review and subsequent randomized controlled trial by investigators in Melbourne, Australia (14, 15). The results were modest, and it is possible that some of the subjects treated with OCSs may have been as easily managed with bronchodilators using wet nebulization alone. It has been my experience that children with acute asthma beginning at home, who are not satisfactorily controlled with MDIs, can be successfully managed using wet nebulization of salbutamol and OCSs reserved for those failing to improve. Having adopted the described regimen many years ago, I have not encountered a situation in which a parent was overusing OCSs; however, I have observed many examples in which the parent regretted starting the steroids too late and the child had to be taken to the ED, which still resulted in the use of an OCS. I have found three requirements necessary for the regimen to be successful: instructions for the parent (written AAP); availability of all required medication and equipment in the home; and confidence on the part of the parent to assess their child and initiate the necessary treatments. I do not recommend that parents be given a free hand with OCSs, and I require regular follow-up (usually every three months) to assess the child's progress. In addition to assessing the child's overall asthma control, adherence with anti-inflammatory therapy, device technique, triggers, a review of the family's experience and need for bronchodilators, with or without an OCS, needs to be discussed. The frequency of use of OCSs must be assessed on a case by case basis. Specialist assessment is recommended for patients requiring >2 OCS courses in a six-month period. Many physicians are reluctant to try an AAP that enables parents to initiate OCSs at home, and require that the parent contacts them before escalating asthma treatments. These same physicians are usually not available 24/7 when the parents need help, and on-call associates may not be familiar with the child or even agree with the AAP.

I recognize that not everyone will agree with this regimen; however, when faced with a child who has troublesome asthma, and repeated ED and walk-in clinic visits, should one not try something new?

Parents are capable of becoming very skilled at managing their own child's asthma. Our job is to help them do this safely and successfully.

DISCLOSURES: The author has no financial relationships or conflicts of interest to declare.

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Accepted for publication July 17, 2015

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