

Acute Severe Asthma - Are Deaths Preventable?

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Over the last decade, there has been a worldwide increase in both the prevalence and mortality rate of asthma. Various patient characteristics and comorbid factors have been postulated to account for the increased morbidity and mortality⁽¹⁾. These include inadequate assessment with resultant underappreciation of the severity of the disease by the patient, family or physicians, and thus undertreatment, the overuse of beta-agonists, non-compliance, psychosocial problems and inconsistency of care^(2,3).

Despite the availability of therapeutic options and various step-care programmes, death due to asthma continues to occur and receives much attention. Currently available clinical and physiologic methods for identifying persons at risk of severe morbidity and death from asthma are relatively imprecise. Thus, are asthma deaths preventable, and if so, how can they be avoided?

Asthma deaths generally are of two types – those that occur suddenly, and usually outside the hospital (the sudden-onset, catastrophic type), and those that arrive late at the hospital after a prolonged, intractable attack (the slow-onset, late arrival type). It is not known what percentage of asthma deaths can be truly classified as the sudden onset-catastrophic type, as histories in the period immediately prior to death are often incomplete. Therefore it is difficult to exclude severe but unperceived airway obstruction, or overuse of bronchodilators that could mask more severe disease. The main causes of death in asthma include dysrhythmias, pneumothorax and asphyxia due to progressive airflow obstruction and respiratory acidosis.

The impression that health care workers are failing to assess and adequately treat asthma is a recurrent theme in studies of deaths from the disease^(1,4). Patients themselves, all too often, are subjectively unaware of the severity of their condition. These factors emphasise the need for objective measurement of lung function in high risk groups, as well as education of patients about when to seek further treatment and how to control their own asthma with a combination of anti-inflammatory and bronchodilatory agents.

In this issue of the SMJ, Lee KH et al reported on the morbidity and mortality of severe asthmatic patients requiring intensive care management at a teaching hospital. They found an overall in-hospital mortality of 12% which increased to 20% among

those requiring mechanical ventilation. Morbidity amongst the 48 patients consisted of two pneumothoraces and two cases of hypoxic brain damage. Although they showed that hypercapnia did not guarantee the need for mechanical ventilation, it was still a marker for mortality. For those that survived their acute episode, there was only one mortality out of 40 survivors after an average 2 years of follow-up. This six-year retrospective study on severe acute asthma found that there was a significant mortality associated with the severe asthmatics that needed mechanical ventilation.

Acute severe asthma is a medical emergency, one that should be managed by a team expert in assessment and resuscitation. Often, patients arrive at the A&E in a 'collapsed' state and one of the major problems in performing cardio-pulmonary resuscitation (CPR) on patients with acute severe asthma is the difficulty in maintaining cerebral blood flow. Intrathoracic pressures are extremely high due to hyperinflation of the lungs and positive pressure ventilation. This reduces venous return and cardiac output. Hypoxia, hypercarbia, hypotension and increased pleural pressures all combine to impair cerebral blood flow. For these reasons, full neurologic recovery after CPR is not easily achieved in patients who have arrested from acute severe asthma. The present study showed that half who had cardiorespiratory arrest survived with a favourable outcome. The inference was that good intensive care and prompt resuscitation allowed 50% of those that presented with cardiorespiratory collapse to survive without hypoxic brain injury.

There are many inherent risks in mechanically ventilating patients with acute severe asthma. It requires extensive knowledge of the underlying pathophysiology, familiarity with ventilatory strategies and compulsive intensive care. While some series report no mortality, others report mortality rates ranging from 2% to 42%. In view of this, the criteria for instituting mechanical ventilation should be strict and limited to end-stage exhaustion, rather than simply hypercarbia.

Acute severe asthma is a preventable life-threatening condition, the end stage of an underrecognised and undertreated disease. The most effective treatment is prevention and the authors have rightly stated that "to make further impact on asthma deaths, patient education remains paramount in the

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Singapore context". More than that, a mechanism should be established for quick communication between patient and health care team.

It would also be valuable to establish safety nets for treatment failures. These include a system whereby emergency calls and ambulance dispatch are available 24 hours a day as in the Edinburgh emergency asthma admission service⁽⁵⁾, the availability of high dependency treatment facilities whereby patients can be directly admitted to for closer monitoring, and for the patients with unpredictable and catastrophic, acute severe asthma, a crisis plan should be developed. Such patients should carry a medic-alert card or bracelet as well as readily available supplies of anti-inflammatory and bronchodilatory drugs. Patients known to be fatality prone, such as those with a history of respiratory failure, hypoxic seizure, or life-threatening attack, should also have special planning.

An episode of acute severe asthma is one short term event during a long-term illness. Patients who end up needing intensive care represent failures in management, not successes, no matter what the short-term outcome. While we have much to learn before asthma deaths can be prevented completely, there is still much that can be done now to reduce their number.

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