sternal wound infections increase the length of hospital stay by about 50 days. Studies are still needed to evaluate whether rigorous preoperative and perioperative glucose management will reduce the risk for wound infections, and to assess whether it is cost-effective to admit patients the night before surgery in order to titrate glucose levels down.

At present, it is prudent to try to achieve the best glucose control possible in patients undergoing surgery to try to reduce the risks for infections.

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ASTHMA: INCREASED MORTALITY WARRANTS AGGRESSIVE, SPECIFIC TREATMENT

Despite an increasing understanding of the pathogenesis of asthma, morbidity and mortality from this disease have risen at an alarming rate during the past decade. What is behind this trend, and what can be done to turn it around?

POTENTIAL CAUSES ARE MANY

There is as yet no general agreement on the reason for the current upswing in asthma-related morbidity and mortality. However, numerous retrospective studies have examined the circumstances of asthma-related deaths, and the evolving consensus from these studies is that adequate and efficacious therapy for asthma is complicated by a host of factors, any or all of which may be contributing to the rise in morbidity and mortality.

A history of prior serious asthma-related emergency room visits and prior respiratory failure seems to contribute to increased risk of death. A change in the prevalence or severity of the disease may play a role.

Poor compliance and poor access to health care appear to play a role. Race may be a factor: for example, in the United States, the asthma-related mortality rate for blacks is three times higher than for whites. Inadequate assessment of asthma severity is apparently frequent in patients who die from the disease. Patients underestimate severity of their asthma. A British study found that among a large group of patients receiving therapy for accurately diagnosed asthma, almost all had at least one episode of nocturnal awakening per month, and 40% were awakened nightly by asthma attacks. Patients did not report these events unless specifically asked.

Some potential factors are related to treatment, such as toxicity of current therapeutic agents, inadequate therapy, or inadequate clinical assessment. During the past decade, a concensus has been evolving for the central role of airway inflammation in the pathogenesis of airway hyperreactivity and asthma. Inadequate treatment with either inhaled or systemic corticosteroids and cromolyn sodium is a frequently described finding in patients with poorly controlled asthma or in patients at greatest risk of death.

Recently, much controversy has arisen concerning the potential role of beta-agonists and theophylline preparations in the increasing asthma mortality. The hypothesis is that these agents would alone or in combination produce arrhythmias leading to sudden death. Additional data suggest that regular use of inhaled beta-agonists is worse than use as needed for acute relief of symptoms. Overall, the exact contribution of beta-agonists to the recent mortality trends remains unknown. Perhaps the asthmatic patient's overreliance on inhaled beta-agonists may be a clinical marker for suboptimal control of asthma.

RECOMMENDATIONS

Confirmation of the diagnosis of bronchial asthma is usually straightforward. However, unusual causes of wheezing (congestive heart failure, vocal cord paralysis, obstructing tracheal or bronchial tumors) may occur and confuse the differential diagnosis. Ruling out or identifying these problems is generally not difficult. Subsequently, it is important to identify the subgroups of patients at highest risk and to target them with specific treatment strategies.

We recommend a stepped-care approach to asthma therapy, based on carefully controlled use of two classes of drugs available for the treatment of asthma: bronchodilators and antiinflammatory agents. Direct bronchodilators include the beta sympathomimetics, anticholinergics, and methylxanthines. Only two anti-inflammatory agents are available: corticosteroids and cromolyn sodium.

In mild asthma, inhaled sympathomimetics appear to be safe and the most effective treatment to control symptoms and to maximize airflow. Patient education on administration is critical to the efficacy of aerosol therapy. Using a spacer device with a metered dose inhaler makes administration easier and will increase bronchial deposition. Anticholinergics and theophylline have a minor role in most therapeutic regimens. In addition to beta-agonist, therapy in a young atopic patient should start with cromolyn sodium administered on a regular basis.

The second step in most stable asthmatic patients should include inhaled corticosteroids. It is generally true that every asthma patient needs inhaled corticosteroids on a regular basis. Occasional exceptions include those who have mild asthma—perhaps one episode a month—who do well with a prn beta-agonist.

Step three includes the use of systemic steroids. These agents, either oral or parenteral, are reserved for patients who are not well controlled by the above measures or who have a more serious and acute disease. These agents are very effective for acute therapy but they are fraught with well known steroid related complications.

If steroid side effects develop, steroid-sparing strategies can be used. Patients who take the combination of troleandomycin and methylprednisolone can reduce their steroid dosage without impairing asthma control. This is a good approach for the severely asthmatic patient who is steroid dependent.

The use of methotrexate, a potent anti-inflammatory agent, as an alternative to corticosteroid therapy has received much attention recently, but the agent's efficacy remains to be fully determined, and we do not recommend its use at this time.

Immunotherapy can have a minor role in asthma control if traditional therapy with anti-inflammatory and beta-agonist agents is ineffective. However, allergenic extracts are not standardized, and objective studies are relatively lacking. There is a clear indication for immunotherapy in the setting of episodic asthma associated with rhinorrhea and avoidable contact with allergens.

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