HEALTHCARE DELIVERY

Indications for the use of bronchial thermoplasty in severe asthma

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The burden of severe asthma and the unmet need

There are almost 3 million asthma sufferers in South Africa (SA), which ranks fourth highest in asthma mortality globally. In a subset of about 5% of asthma patients, the disease remains uncontrolled despite optimised therapy and good adherence. These individuals experience substantial morbidity, time off work or school, and increased mortality. Severe asthma consumes a disproportionate amount (up to 80%) of asthma-related healthcare resources. Oral corticosteroids, alternative oral agents and biological agents such as omalizumab, when appropriate, are often required to improve or maintain control.[14] These therapies are associated with substantial cost and adverse events, and efficacy remains suboptimal. Better tools are urgently needed. A procedure called bronchial thermoplasty (BT) has recently been validated in randomised control trials and is now endorsed by several international guidelines, including the Global Initiative for Asthma (GINA) guideline, the British Asthma Guideline, and the UK National Institute of Clinical Excellence (NICE) guideline. We recommend BT as a potential therapeutic intervention for severe uncontrolled asthma, provided that it is performed by an experienced pulmonologist at an accredited centre and done within the broader context of appropriate management of the disease by doctors experienced in treating difficult-to-control asthma.

Efficacy, safety and duration of benefit

The efficacy of BT has been confirmed in two feasibility studies[7,8] and three randomised controlled trials.[9-11] Collectively, these studies have shown that BT improves asthma control and asthma-related quality of life scores. However, most important in patients with severe asthma are reductions in exacerbations, asthma-related emergency room visits, and the need for oral corticosteroids. Two long-term prospective follow-up studies have shown that these benefits are sustained for up to 5 years.[12,13] Three long-term studies have shown that BT is safe and not associated with any long-term adverse events such as bronchiectasis or airway stenosis.[12-14] Short-term adverse effects of the procedure, which occur in 5 - 10% of cases, include precipitation of an exacerbation that may require short-term hospital admission. No pneumothorax, intensive care unit-related admissions, or fatalities have been reported so far among the over 4 000 patients who have undergone the procedure. On the basis of these data, the use of BT for severe asthma has been endorsed by several international guidelines including the 2014 British Thoracic Society/

**When should BT be considered?**

BT should be considered in difficult-to-treat asthma when the usual recommended measures described in treatment guidelines have been considered.

- Treatment should have been assessed and optimised by a clinician experienced in managing severe asthma, and should include the following steps: (i) confirmation of the diagnosis of asthma; (ii) exclusion by relevant investigations of alternative diagnoses that can masquerade as asthma, such as chronic obstructive pulmonary disease, cardiac failure, bronchiectasis, vocal cord dysfunction, endobronchial sarcoidosis and tuberculosis, obstructive airway lesions and inhaled foreign bodies, among others, as potential causes of or contributors to patients’ symptoms (BT is not indicated in bronchopulmonary aspergillosis); (iii) consideration and where possible correction of comorbid medical or psychosocial factors that contribute to the failure of asthma control (comorbid conditions include gastroesophageal reflux disease, rhinosinusitis and drug allergies); (iv) attempt at non-pharmacological measures such as removal, where possible, of contributing environmental and occupational allergens or factors that precipitate or worsen asthma; and (v) finally, and importantly, optimal pharmacological measures indicated for the treatment of severe asthma (described as steps 4, 5 and 6 in different guidelines) must have been employed under supervision for at least 3 months, with careful checking and confirmation of good inhaler technique and adherence to the drugs. The treatments described on steps 4 and higher are maintenance treatment with at least medium to high doses of inhaled corticosteroids with or without long-acting beta-2-agonist (LABA), a long-acting antimuscarinic (tiotropium has recently been approved in many countries for the treatment of severe asthma), slow-release theophylline, and a leukotriene modifier (montelukast).

Finally, patients may have received or be taking maintenance oral corticosteroids, or have received treatment with omalizumab.

- Omalizumab is an injectable monoclonal antibody recently approved for use in SA for patients with severe allergic asthma. Disadvantages of maintenance oral corticosteroids are their short- and long-term side-effects, while the use of omalizumab is limited by cost, lack of efficacy in a significant proportion of patients, and the necessity for indefinite use.

**Conclusion**

BT is indicated in patients with severe asthma who remain uncontrolled despite optimal work-up and medical therapy. BT should only be performed by an experienced pulmonologist at an accredited centre, preferably as part of a national or international registry or a prospective study, so that long-term safety and efficacy can be evaluated. Performed under these strict conditions and according to these recommendations, BT is a useful addition to the treatments available for this debilitating and life-threatening condition.