



Review

The use of bronchodilators in the treatment of airway obstruction in elderly patients

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Abstract

Ageing is associated with important anatomical, physiological and psychosocial changes that may have an impact on the management of obstructive airway diseases (asthma and chronic obstructive pulmonary disease (COPD)) and on their optimal therapy. Ageing-related modifications might be responsible for a different effectiveness of bronchodilators in the elderly patients as compared to younger subjects. Furthermore, the physiological involution of organs and the frequent comorbidity, often interfere with pharmacokinetics of bronchodilator drugs used in asthma and COPD. This review will focus on the use of bronchodilators in the elderly, with particular attention to the achievable goals and to rationale, utility and pitfalls in using the inhalation therapy in this age group. β_2 -agonists, anticholinergics and methylxanthines will be discussed and their side effects in the elderly will be considered.

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1. Introduction

Management of asthma [1] and chronic obstructive pulmonary disease (COPD) in the elderly is a topic of increasing interest since ageing is associated with important

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anatomical, physiological and psychosocial changes that may have an impact on obstructive diseases and on their optimal therapy. Stiffening of the chest wall, reduction of lung elastic recoil and diminished respiratory muscle strength are known to affect respiratory mechanics in this type of population [2]. The loss of the lung elastic recoil due to aging results in reduced maximal expiratory flow rates and in an increase of the resting functional residual capacity.

Ageing-related modifications in lung mechanics, in receptor populations, in nervous control, etc. are likely to interfere with clinical presentations. In comparison with younger subjects, these modifications might be responsible for a different effectiveness of bronchodilators in the elderly patients. In addition, changes in organs or systems other than lung (liver, kidney, heart), either due to physiological involution or to frequent comorbidity, often interfere with the pharmacokinetics of the bronchodilator drugs used in asthma and COPD.

Furthermore, older age is characterized by various aspects of disability (memory problems, loss of coordination and muscle strength, hearing and visual loss) that may often decrease the ability to regularly follow the treatment schedules or to handle complex devices, such as metered-dose inhalers (MDI) or powder dispensers, thus limiting the compliance to the prescribed therapy.

Adverse reactions related to polypharmacy and comorbidity are more frequent in the elderly: on one hand, bronchodilators might worsen coexisting diseases (such as cardiac arrhythmias); on the other, medications often used by elderly patients, like β -adrenergic blockers or non-steroidal anti-inflammatory drugs, might elicit or worsen bronchoconstriction.

Therefore, particular attention should be paid to the adaptation of treatment schedules for asthma and COPD in the elderly and above all to the specific issue of bronchodilators. The present review will be focused on this issue.

2. Adaptation of treatment strategy

Asthma control in the elderly cannot be achieved without an appropriate treatment strategy that takes into account the age-related peculiarities of this patients group. The international guidelines for treatment of asthma in the elderly [1] identify four “components”, which are of prominent importance in the management. Although these components are similar to those for adults, they have been adapted to the peculiar characteristics of the older age. The four identified components include: creation of a partnership between patients and physician, objective monitoring, environmental control and pharmacological therapy. Among them, the creation of a partnership is particularly critical in the aged: the involvement of the elderly in an active partnership, e.g. leading the old patient to share the responsibilities of self adaptations of medications is a difficult task, which requires a preliminary and careful

evaluation of mental status, of mood, of social and economic constraints. Not easier may be the task of environmental control since in the majority of cases the elderly respiratory patient’s life is restricted in confined environments, exposed to a substantially greater risk of indoor pollution due to poor hygiene. Similarly, the objective monitoring and pharmacological therapy deserve a special attention from physician when the attended patient is an old man or woman.

The specific need of a careful objective monitoring comes out from the observation that the elderly asthmatics have a blunted sensitivity to dyspnea-related stimuli compared with younger patients [3,4]. The clinical implication of this finding is that elderly patients might be less aware either of the presence or severity of the bronchoconstriction. Therefore, spirometric assessment and monitoring of the lung function with appropriate methods is mandatory. In spite of physical and mental limitations, that frequently affect these subjects, a reliable spirometry may be obtained in the vast majority of the elderly ambulatory patients, as demonstrated by a multicenter study based on a rigorous quality control program [5].

3. Goals in the use of bronchodilators in the elderly

Asthma and COPD are chronic diseases in which therapeutic intervention aims at controlling symptoms and, if possible, at slowing down the loss of lung function over the time that characterizes these diseases to a various extent. The achievement of the desired therapeutic and clinical goals may be more difficult in the elderly rather than in the younger patients. Therefore, treatment should be individualized to each specific condition.

One of the most important goals of treatment is maintaining an acceptable level of health-related quality of life. However, treatment itself may be a burden, particularly in case of a cumbersome and costly schedule. This may contribute to the impairment of perceived health status of elderly patients, particularly in case of administration of multiple drugs and use of complex inhalation devices. As consequence in the elderly much more than in any other age group, the choice of optimal treatment of asthma and COPD should be the result of a reasonable compromise between medical needs and individual limitations. In this perspective, application of tailored educational and training programs for the use of suitable medications and devices could contribute to achieve the best possible results in individual patients.

4. Inhalation therapy

Inhalation therapy is the method of choice for asthma and COPD management. It is the most important and effective way to administer bronchodilators in all ages [6,7]. In addition, inhalation route allows a more rapid achievement of therapeutic effect and reduction of side effects because of lesser systemic distribution of the drug [8].

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