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EDITORIAL

Exercise-induced Bronchoconstriction and its Relevance in Public Health

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Editorial referring to the article: Exercise-Induced Bronchoconstriction: A Frequent, but Neglected Cause of Chest Pain

The case report from Castro et al., entitles *Exercise-Induced Bronchoconstriction: A Frequent, but Neglected Cause of Chest Pain*, opportunely sheds light on a highly relevant question in terms of public health, as it treats important aspects that encompass from the diagnosis to the pharmacological treatment of Exercise-Induced Bronchoconstriction (EIB).[1-3]

EIB often leads to an isolated cough, as well as thoracic and abdominal pain, which should always be contemplated after having discarded other causes of dyspnea and exercise-induced chest pain.[1-4] It is an acute airway obstruction that is transitory and spontaneously reversible, and occurs during and after exercise and physical effort, regardless of the previous diagnosis of bronchial asthma. EIB normally arises 2 to 5 min after exercise, reaching a peak at 10 min and disappearing in up to 60 min.[2,4,5]

EIB in children and adolescents tends to cause limitations in physical activities at school and in sports practitioners, limiting physical performance, in all cases worsening the quality of life and favoring a sedentary lifestyle, one of the main risk factors for all-cause mortality.[2,5-7] It should also be considered that in athletes, when not diagnosed and treated, it can seriously impair performance and competitiveness, making sports careers unfeasible.[5-7]

In the general population, the prevalence of EIB varies from 5% to 20%, which is even higher in athletes, with a prevalence between 30% and 70%, even in the diagnosis of bronchial asthma, which occurs more often among the elite or olympic-level athletes who must face cold, dry air and high levels of inhalable pollutants[2, 3, 5-7]. In the exercise tests, it is estimated that 50% of the asthmatic patients and 40% of the atopic patients with no previous history of asthma present a positive result for EIB.[2,8,9]

In patients without asthma, EIB can be controlled by a number of non-pharmacological methods and by the use of short-acting β2-agonists prior to exercise, recommended as a first-line pharmacological treatment. In patients with asthma, EIB is often associated with a poor control of asthma, although it can occur in well-controlled individuals as well, as long as they do not exercise. In these patients with asthma, the use of inhalable corticosteroids, together with short-acting β2-agonists, is recommended, and is widely and consensually considered to be first-line treatment.[8-10]

In elite athletes, the diagnosis and treatment of EIB are heavily supported by documents from international institutions, including the *European Respiratory Society (ERS)* and the *Academy of Allergy and Clinical Immunology (EAACI)*,[10] and are further backed by formal advice from the World Anti-Doping Agency (WADA) and the International Olympic Committee (IOC), which allow the use of inhalable corticosteroids, together with short-acting β2-agonists, medications that can be consumed with no risk of sports punishments, so long as the standard protocol for therapeutic use exemption has been followed.[10-12]

In the context of EIB, related to the Cardiopulmonary Exercise Testing (CPET), which includes the spirometry conducted before and many times after exercise, the most relevant spirometry variable is the forced expiratory volume in the first second (FEV1), during the forced vital capacity (FVC) maneuver. In this protocol, the measurements of FEV1 should be taken before, immediately after, and at 5, 10, and 15 min of recovery. According to the reduction in relation to the basal level, this measurement enables the classification

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of mild EIB when the drop is found between 10% and 24%, moderate EIB between 35% and 49%, and severe EIB when ≥50%.[8,13,14]

If bronchoconstriction occurs during exercise, and is the reason why the exam is interrupted, then: 1) frequently the peak of effort is equal to or above the second ventilatory threshold (LV2), resulting in the respiratory quotient (relation of VCO2/VO2) equal to or less than 1.0; b) the relations between VO2/workload and VO2/FC (pulse of O2) appear normal; and c) the VO2 and the FC peak remain above the predicted values.[15]

It is also important to consider that in the CPET conducted following high intensity protocols, short duration, and high ventilatory increment, the analysis of the support flow volume during and after exercise enables the detection of exercise-induced vocal cord dysfunction, which, though less common, can be the cause of exercise-induced dyspnea, with or without concomitant bronchospasms.[16]

Finally, although in individual care the EIB diagnosis should ideally be based on the anamnesis, the physical exam, spirometry, and bronchial provocation tests, considering their repercussion in public health and seeking the adoption of a plausible strategy in the context of Primary Health Care, have been recommended so that, with or without the diagnosis of bronchial asthma, suspected patients are applied questionnaires based on symptoms, which are valid, of easy use, and that have a good correlation with the reduction in the FEV1 after exercise or physical effort and the bronchial provocation tests.[2]

In conclusion, the CPET, associated with spirometry, makes it possible to quantify the ventilatory flows and volumes, thus accurately defining the diagnosis of EIB. Moreover, the CPET can contribute to specify the physical-pathological mechanisms responsible for the limitation to exercise, which are useful for the definition of preventive measures and pertinent treatments. Nevertheless, in Primary Health Care, one must also consider the need to disseminate the information and the easily applied, systematic use of resources, such as validated questionnaires, which enable the development of a broad public health strategy.

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