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Title: Assessing the risk of future severe asthma exacerbations using CARAT questionnaire and lung function

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Body: Background: We aimed to compare lung function (LF) and CARAT results between individuals with and without severe asthma exacerbations (S-Exa) during a 1 year follow-up and to estimate the risk of future S-Exa (FS-Exa) according to patient/LF characteristics and CARAT scores. Methods: Retrospective cohort including adults with asthma and rhinitis (AR) that performed spirometry and completed CARAT in 2011 in an Allergy Department (n=397). S-Exa was defined as an episode of progressive increase in respiratory symptoms needing a burst of oral corticosteroid. Information on S-Exa was collected from clinical records considering a 12 month follow-up period (FS-Exa) and the 4 weeks previous to the evaluations (recent S-Exa). AR control was defined as CARAT total score (CARAT-T)≥24; lower airways/asthma (L) control as CARAT-L>15; upper airways (U) control as CARAT-U>8. Results: From 269 patients with complete information, 12%(31) had ≥1 FS-Exa. Individuals with FS-Exa, when compared with those without, were predominantly female (90 vs 70%; p=0.017), had higher BMI (28.9 vs26.8, p=0.035) and a higher prevalence of recent S-Exa (48 vs18%, p<0.001); they had, on average, lower CARAT-T (13.8 vs17.5, p=0.006) and CARAT-L scores (8.6 vs11.8, p=0.001) and lower %FEV1 (81.5 vs96.4, p<0.001). In univariate Cox regression, recent S-Exa (OR=3.28[1.46-7.41]), uncontrolled asthma (4.27[1.01-18.01]) and higher BMI (1.07[1.00-1.15]) associated with increased risk of FS-Exa; higher %FEV1 associated with lower risk (0.96[0.95-9.98]). Conclusions: This study suggests that recent severe asthma exacerbations, %FEV1, BMI and asthma control assessed with CARAT may be used to predict future asthma exacerbations.