

Occupational respiratory diseases

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Is the ratio of rye flour-specific IgE to total IgE more suitable to predict the outcome of challenge test in bakers than specific IgE alone?

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Question Usually the diagnosis of baker's asthma is based on specific inhalation challenge (SIC) with flours. However, since SIC is time-consuming and risky, alternative methods to diagnose flour allergy are of great value. To a certain extent the concentration of flour-specific IgE (sIgE) predicts the outcome of SIC. The aim was to evaluate whether the ratio of rye flour-sIgE to total IgE improves SIC prediction in comparison to sIgE alone.

Methods Ninety-five bakers with work-related symptoms of asthma and/or rhinitis were challenged with rye flour. Total IgE, sIgE to rye flour and their ratio (sIgE/total IgE) were analysed using SIC as gold-standard. To evaluate diagnostic performances, the cut-offs reaching a 95% positive predictive value (PPV) and receiver operator characteristics (ROC) including the area under the curve (AUC) were calculated. Atopy was defined by at least one wheal reaction ≥ 3 mm with any environmental allergen in skin prick test.

Results Sixty-three bakers (66%) showed a positive SIC. Rye flour-sIgE concentrations ranged from <0.35 kU/L to >100 kU/L (median 1.31 kU/L), total IgE from 2.3 to 4161 kU/L (median: 98.5), and the ratio of sIgE/total IgE was between 0 and 19.1% (median: 2.3%). Total IgE and sIgE concentrations as well as the ratio of sIgE/total IgE were significantly higher in bakers with a positive SIC than in those with a negative SIC result ($p < 0.0001$, $p < 0.0001$, and $p = 0.023$, respectively). Rye flour-sIgE values >2.46 kU/L had a 95% PPV for SIC-proved rye flour allergy. At this cut-off, sensitivity was 62% and specificity 93%. A maximum PPV of 92% (sensitivity 19%, specificity 97%) could be achieved with the ratio sIgE/total IgE $>8.1\%$. The ROC analysis showed an AUC of 83% for sIgE alone and 64% for the ratio. Furthermore, ROC analyses stratified according to atopy gave higher AUCs for sIgE alone than for the ratio.

Conclusion Both, rye flour sIgE and the ratio of sIgE/total IgE, were significantly correlated with the outcome of SIC with rye flour in 95 symptomatic bakers. However, sIgE was a better predictor for SIC outcome than the ratio of sIgE/total IgE.