Pollen-food syndrome among Italian children: molecular endotypes

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Background: Pollen food syndrome (PFS) is heterogeneous with regard to triggers, severity, natural history, comorbidities and response to treatment. Our study aims to classify different endotypes of PFS based on IgE sensitization to panallergens.

Methods: We examined 1271 Italian children (age 4-18y) with seasonal allergic rhinoconjunctivitis (SAR). Foods triggering PFS were acquired by questionnaire. Skin prick tests were performed with commercial pollen extracts. IgE to panallergens: Phl p 12 (profilin), Bet v 1 (PR-10) and Pru p 3 (nsLTP), were tested by ImmunoCAP FEIA. An unsupervised hierarchical agglomerative clustering method was applied within PFS population.

Results: PFS was observed in 300/1271 children (24%). Cluster analysis identified five PFS endotypes linked to panallergen IgE sensitization: 1) Co-sensitization to ≥2 panallergens (“multi-panallergens PFS”); 2-4) sensitization to either profilin, or nsLTP, or PR-10 (“mono-panallergens PFS”); 5) no sensitization to panallergens (“no-panallergens PFS”). These endotypes showed peculiar characteristics: 1) “multi-panallergens PFS”: severe disease with frequent allergic comorbidities and multiple offending foods; 2) “Profilin PFS”: OAS triggered by Cucurbitaceae; 3) “LTP PFS”: living in Southern Italy, OAS triggered by hazelnut and peanut; 4) “PR-10 PFS”: OAS triggered by Rosaceae; 5) “no-panallergens” PFS: mild disease and OAS triggered by kiwifruit.

Conclusions: In a Mediterranean country characterized by multiple pollen exposures, PFS is a complex and frequent complication of childhood SAR, with five distinct endotypes marked by peculiar profiles of IgE sensitization to panallergens. Prospective studies in cohorts of PFS patients are now required to test whether this novel classification may be useful for diagnostic and therapeutic purposes in the clinical practice.