

Serum-soluble Fas levels as a marker to distinguish allergic and nonallergic rhinitis

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It is well known that allergic rhinitis is induced by the reaction of antigen and IgE antibody. On the other hand, vasomotor rhinitis is a nonallergic and noninfectious rhinitis, and its etiology is believed to be an imbalance of the autonomic nervous system.¹ Because the subjective symptoms of these 2 types of rhinitis are similar, it is difficult to distinguish between them. However, because effective therapy is different for each, rapid and definite diagnosis is important. Here we demonstrate for the first time that measurement of serum soluble Fas (sFas) levels could be a new way to distinguish allergic and vasomotor rhinitis.

METHODS

All patients with allergic rhinitis ($n = 29$) had Japanese cedar pollen-induced rhinitis. They all showed single sensitization to Japanese cedar pollen as determined by 5 or 7 kinds of RASTs and skin tests. Eosinophil infiltration in nasal discharge was observed in all patients with active allergic rhinitis. All patients with vasomotor rhinitis ($n = 12$), on the other hand, showed no sensitization as determined by 7 kinds of RASTs and skin tests. There was no eosinophil infiltration in their nasal discharge despite their subjective symptoms (nasal discharge, sneezing, and nasal blockage). All patients with allergic or vasomotor rhinitis had no other organic manifestations of their disease during the study. All patients with systemic lupus erythematosus (SLE; $n = 14$) fulfilled the criteria of the American Rheumatism Association.² Healthy individuals ($n = 23$) consisted of the volunteers who had no sensitization as determined by 7 kinds of RASTs and skin tests. They had no subjective symptoms and no histories of allergic, nasal, or collagen disease. Serum sFas levels in patients with allergic or vasomotor rhinitis were measured by a sandwich ELISA (Medical & Biological Laboratories Co, Nagoya, Japan) and were compared with those in healthy individuals as negative controls and patients with SLE as positive controls. The results were statistically analyzed by the Mann-Whitney U test.

Abbreviations used

sFas: Soluble Fas
SLE: Systemic lupus erythematosus

RESULTS

As shown in Fig 1, the serum sFas levels in patients with allergic rhinitis (0.55 ± 0.35 ng/mL) during the pollen season were less than one third of those in healthy individuals (1.57 ± 0.43 ng/mL). The serum sFas levels in more than 95% of the patients with allergic rhinitis were less than 1 ng/mL. Moreover, serum sFas levels in patients with allergic rhinitis (0.45 ± 0.28 ng/mL) out of season (ie, 1 month after the season) remained significantly lower ($P < .0001$) than those of healthy individuals. There were no differences in serum sFas levels between patients with vasomotor rhinitis (1.50 ± 0.38 ng/mL) and healthy individuals. The serum sFas levels in all patients with vasomotor rhinitis were greater than 1 ng/mL. As previously reported, levels in patients with SLE (2.55 ± 0.97 ng/mL) were significantly higher ($P < .002$) than those found in healthy individuals.³ The magnitude of sFas in patients with SLE and healthy individuals is comparable to the levels reported by Knipping et al,⁴ although it is more than an order of magnitude lower than the levels reported by Cheng et al.³

DISCUSSION

In this study we demonstrate that the levels of serum sFas in patients with allergic rhinitis were less than 1 ng/mL as opposed to greater than 1 ng/mL in patients with vasomotor rhinitis. These results suggest that the level of serum sFas could be one of the markers used to distinguish allergic rhinitis from nonallergic (vasomotor) rhinitis. The serum sFas level should be a marker to identify allergic subjects rather than active allergic inflammation because serum sFas levels in allergic subjects out of season remained low.

Fas is a cell surface molecule that delivers a signal for inducing apoptosis after stimulation with anti-Fas antibody or Fas-ligand. sFas, which is produced by alternative mRNA splicing, antagonizes anti-Fas antibody- or Fas ligand-induced Fas-mediated killing in a dose-dependent manner.^{3,5} Recently, a number of serum sFas

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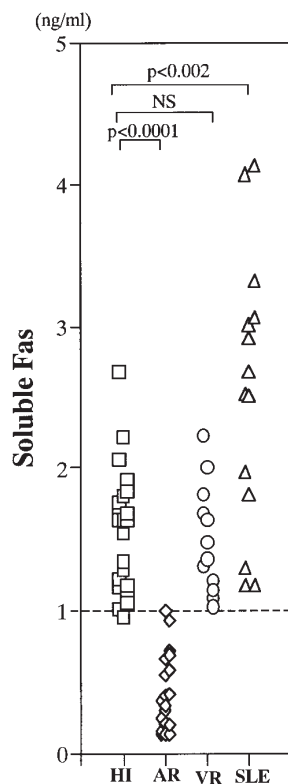


FIG 1. Levels of sFas in serum. *HI*, Healthy individuals; *AR*, patients with allergic rhinitis; *VR*, patients with vasomotor rhinitis; *SLE*, patients with SLE.

“elevated” diseases, such as autoimmune and severe infectious diseases and malignancies, have been reported.^{3,4,6} sFas was suggested to play a role in the pathogenesis of these diseases through downregulation of Fas-mediated apoptosis of activated lymphocytes and tumor cells.^{3,5,6} We have reported for the first time that allergic rhinitis is a serum sFas “reduced” disease. Together with the result of low levels in patients with allergic rhinitis out of season, there is a possibility that sFas might protect against allergic inflammation through upregulation of Fas-mediated apoptosis of allergy-inducing cells. Further study is needed to clarify the exact reason of correlation between sFas and allergic rhinitis.

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