Noninvasive Biomarkers Identify Eosinophilic Esophagitis: A Prospective Longitudinal Study in Children

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Abstract

Background: Esophageal histology is critical for diagnosis and surveillance of disease activity in eosinophilic esophagitis (EoE). A validated noninvasive biomarker has not been identified. We aimed to determine the utility of blood and urine eosinophil-associated proteins to identify EoE diagnosis and predict esophageal eosinophilia. Methods: Blood and urine were collected from children undergoing endoscopy with biopsy. Absolute eosinophil count (AEC), plasma eosinophil-derived neurotoxin (EDN), eosinophil cationic protein (ECP), major basic protein-1 (MBP-1), galectin-10 (CLC/GAL-10), Eotaxin-2 and Eotaxin-3, and urine osteopontin (OPN) and matrix metalloproteinase-9 (MMP-9) were determined. Differences were assessed between EoE and control, and with treatment response. The capacity to predict EoE diagnosis and esophageal eosinophil counts was assessed. Results: 183 specimens were collected from 56 EoE patients and 15 non-EoE patient controls; 33 EoE patients had paired pre- and post-treatment specimens. Plasma (CLC/GAL-10, ECP, EDN, Eotaxin-3, MBP-1) and urine (OPN) biomarkers were increased in EoE compared to control. A panel comprising CLC/GAL-10, Eotaxin-3, ECP, EDN, MBP-1, and AEC was superior to AEC alone in distinguishing EoE from control. AEC, CLC/GAL-10, ECP, and MBP-1 were significantly decreased in patients with a good response to treatment compared to patients with a poor response. AEC, CLC/GAL-10, ECP, EDN, OPN, and MBP-1 each predicted esophageal eosinophil counts utilizing mixed models controlled for age, gender, treatment and atopy; AEC combined with MBP-1 best predicted the counts. Conclusions: We identified novel panels of eosinophil-associated proteins that along with AEC are superior to AEC alone in distinguishing EoE from control and predicting esophageal eosinophil counts.

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