ANIMAL MODEL FOR THE STUDY OF EOSINOPHILIC ESOPHAGITIS

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Eosinophilic esophagitis (EoE) is a prevalent disorder characterized by eosinophil infiltration of esophageal mucosa. EoE is an allergic inflammatory condition that is different from gastroesophageal reflux disease (GERD). Many symptoms of EoE, such as pain, dysphagia and nausea/vomiting can be attributed to impaired function of esophageal nerves. The understanding of EoE would greatly benefit from a simple model amenable to the study of changes in nerve function. AIM: To develop an animal model of EoE suitable for the study of acute effect of eosinophilic inflammation on esophageal afferent nerves. We hypothesized that localized application of an allergen into the esophagus of allergic guinea pig will induce eosinophilic inflammation in the esophageal mucosa and submucosa. METHODS: We injected the antigen ovalbumin (OVA, 0.1%) into the surgically exposed cervical esophagus in the OVA-sensitized guinea pigs. The esophageal tissue was harvested 2 days later and the inflammatory response was quantified in the thin (12µm) transversal histological sections by counting the eosinophils visualized by Giemsa staining. RESULTS: We found that the OVA injection into the cervical esophagus evoked a massive eosinophil infiltration in the mucosa of adjacent middle portion of the esophagus in 8 of 10 sensitized animals. The maximum eosinophil count was 121±22 per high power field (hpf). This was significantly higher than the counts in animals that received a vehicle injection or no injection (6±1 per hpf, n=9, p<0.01). In the esophageal mucosa, the eosinophils were more often located in the subepithelial layers (75%) than in the epithelium (25%, p<0.01). CONCLUSION: The injection of allergen into the esophagus of allergic guinea pigs mimics eosinophilic mucosal infiltration found in patients with eosinophilic esophagitis. This model should be useful for the study of acute effects of eosinophilic inflammation on afferent nerves innervating esophageal mucosa.