Supplementary Data S1. Methods

Subjects
We retrospectively analyzed the effect of omalizumab in 27 patients with cholinergic urticaria (CholU) who were not adequately controlled with single or double dose of H1AH. The patients were enrolled at the Department of Allergy of 3 University Hospitals in Korea: Hallym University Dongtan Sacred Heart Hospital, Ajou University Hospital, and Seoul National University Hospital. This study protocol was approved by the Institutional Review Board of Hallym University Dongtan Sacred Heart Hospital (HDT 2019-08-004).

A diagnosis of CholU was made based on the clinical history and typical symptoms of the patients: numerous small-sized (1–5 mm) pruritic wheals caused by an increase in core body temperature after a hot bath, physical exercise, hot spicy foods, or emotional stress. Some patients felt stinging or tingling sensation instead of pruritus.

The medical records were reviewed retrospectively for demographic and laboratory data, such as serum total immunoglobulin E levels (reference range < 100 kU/L). Atopy was defined as 1 or more positive reactions to 12 common inhalant allergens by allergy skin prick tests or simultaneous multiple allergen tests (Advansure™ AlloScreen; LG Life Science, Seoul, Korea): Dermatophagoides pteronyssinus, D. farinae, birch, oak, grass mix, ragweed, mugwort, Japanese hop, Alternaria, and Aspergillus as well as dog and cat epithelia. An autologous serum skin test was performed following the method recommended by the EAACI/GA²LEN at least 3 days after termination of all medications for urticaria, including H1-antihistamines and corticosteroids.

Response to omalizumab was assessed by patient global assessment using the visual analogue scale (0: no urticaria to 10: the worst): 1) a complete responder was defined as a patient showing the absence of wheals and itching sense, 2) a partial responder was defined as a patient showing improvement of symptoms by 50% or higher, and 3) a non-responder was defined as a patient showing improvement of symptoms by less than 50%.

Statistical analysis
Data are presented as mean ± standard deviation (SD). Comparisons were made using the Kruskal-Wallis tests for categorical variables and the analysis of variance test for continuous variables among the 3 groups divided according to omalizumab response. A P value of < 0.05 was considered significant. Statistical analyses were performed using SPSS statistics 21 (IBM SPSS Inc., Chicago, IL, USA).