Systemic neutrophilia during anaphylaxis in humans

Fabrícia Carolino, Ana Reis Ferreira, Josefina R. Cernadas
Serviço de Imunoalergologia, Centro Hospitalar São João, E.P.E., Porto, Portugal

Aims: To assess changes in WBC count (WBC-C) occurring during an episode of anaphylaxis in human subjects.

Methods: We conducted a search for hospitalizations in any unit of our institution (tertiary hospital) between Jan/10 and Jul/15 with an ICD9 code of anaphylaxis (995.0, 995.6, or 999.4). Medical records were reviewed and patients not fulfilling the currently accepted diagnostic criteria (Sampson HA et al. 2006) were excluded, as well as those without WBC-C performed during the episode.

Results: From Jan/10-Jul/15, 35 inpatients had one of the searched ICD9 codes. We excluded 9 (25.7%) patients not fulfilling anaphylaxis criteria, and 5 (14.3%) with no WBC-C, leaving 21 (60.0%) to be included in the analysis (61.9% females, 52.1±25.6 years). Seventeen (81.0%) patients had anaphylactic shock. There were cardiovascular (CV) manifestations in 19 (90.5%) patients; 12 (57.1%) had mucocutaneous involvement and 12 (57.1%) respiratory signs/symptoms. Adrenaline was scarcely used. Drugs were the main suspect (n=17, 81.0%); only 7 (33.3%) patients were referred to an Allergist. Tryptase levels were determined in 4 (19.0%) patients and were increased in 3. During the anaphylactic episode, 12 (57.1%) patients presented a de novo increase in peripheral relative and absolute neutrophil counts (mean±SD: 85.8±5.9% and 13.8±7.1x10⁹/L, respectively), 8 (66.7%) also with leucocytosis; 5 (23.8%) patients had a fall in blood neutrophils. Two (9.5%) fatal outcomes occurred (1 with neutrophilia).

Discussion: The limited sample size may be explained by the decision of including only hospitalized patients, fact that may justify the greater percentage of anaphylactic shock. Our analysis revealed clear reduced tryptase-dosing rates and adrenaline underuse. Although it is the common understanding that anaphylaxis associates with blood neutropenia, an increase in systemic neutrophils has been previously described in non-human anaphylaxis models and changes in blood-leukocyte populations were pointed as possible markers for severe shock in mice.

Conclusion: To the authors’ knowledge this is the first study to describe the occurrence of systemic neutrophilia in humans in the context of anaphylaxis. Despite the limited sample size, our study is ongoing and the authors believe that this is a promising field of research in understanding the complexity of anaphylaxis.