

Evaluation of Blood Eosinophil Measurements Between Local and Central Laboratories

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RATIONALE Patients with higher eosinophil counts have been reported to derive greater benefit from treatment with biologics targeting type 2 inflammation. Eosinophil counts are therefore used to guide patient management. Limited information on the variability of measuring eosinophils is available. The purpose of this study was to evaluate variations between local and central laboratory measurements and whether the time-period between sample collection and analysis at the laboratory influences the reported levels. **METHODS** An institutional review board approved this study and informed consent was obtained from all participants. White blood cell count with differentiation was performed on blood samples from 62 subjects (30 asthma patients and 32 controls). Ten samples were collected from each subject and sent to one central and nine local/regional laboratories for comparison. Eosinophil counts were reported as absolute number and percent of the total white blood cell population. Within subject variability and variability between local and central laboratories were assessed by: (i) plotting eosinophils counts ordered by median values of each subject; (ii) Bland-Altman plots of difference in eosinophil counts (local-central) against mean eosinophils; (iii) correlating values between central and each local laboratory. Difference plots assessed eosinophil counts by time from collection to analysis. **RESULTS** Higher within-subject variability between measurements from different laboratories was observed with increasing absolute eosinophil counts. Correlation between eosinophil counts measured by the central laboratory and each local laboratory was high (Pearson correlation=0.83-0.95). Mean eosinophil counts from seven local/regional laboratories were higher (range 10-40 cells/ μ l) than the central laboratory; the other two laboratories had mean values 10 cells/ μ l and 30 cells/ μ l lower than the central laboratory. Mean (SD) time from collection to analysis at the central laboratory was 25.1 (3.9) hours and mean (SD) eosinophil counts were 150 (90) cells/ μ L. Longer time from sample collection to analysis was associated with a small reduction in absolute eosinophil counts. The laboratory with the shortest time from collection to analysis (mean [SD] 7.6 [3.4] hours) reported higher eosinophil counts (mean [SD] 170 [110] cells/ μ l) and the laboratory with the longest time to measurement (mean [SD] 31.2 [3.7] hours) reported the lowest eosinophil count (mean [SD] 120 [90] cells/ μ l). **CONCLUSION** These data illustrate a good correlation between eosinophil counts measured at different laboratories. However, eosinophil counts tended to be higher in local/regional laboratories and lower with longer time between sample collection and analysis. These findings should be taken into consideration when using blood eosinophils for patient management.

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