C-Reactive Protein Measurement Variation and the Taiwan Population Distribution

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Objective: C-reactive protein (CRP) is a well-known indicator of inflammation and atherogenesis. One of the issues related to CRP levels is the analytical process. This must be considered and standardized to avoid potential misclassification of cardiovascular risk. We collected two groups of patients (13 patients per group) and each patient had samples collected using three different types of collection system, namely Li-Heparin, SST II and K\textsubscript{2}EDTA. Using these samples, CRP and hsCRP levels were measured using either a Beckman LX-20 or a Beckman Immage analyzer. Results showed that different tubes/methods resulted in no significant statistical variation in the CRP values. Furthermore, the level of imprecision for CRP measurement by either Immage or LX-20 met the criteria stated in manufacturer’s claims (<10\%). The sensitivity of both analyzers was 0.02-0.03 mg/dL (0.8-9.3\%). CRP was shown to be fibrously stable at 4 °C for 28 days. Distribution of collected CRP results stratified and showed no statistically significant relationship (r\textsuperscript{2}=0.001) according to sample age, using a population of 2674 individuals from a health care department. The median hsCRP concentration for the various age groups was 0.20-0.31 mg/dL. To evaluate the false negative rate on CRP measurement, we also collected positive blood cultures from 1031 cases involving 1418 bacterial strains. The CRP results of the samples available from the same or the next day were used for comparison. The false negative rates for CRP measurement varied with different bacterial infections: Escherichia coli 5.2\% (10/194), Klebsiella pneumoniae 4.6\% (3/65), Pseudomonas aeruginosa 7.7\% (2/26), and Staphylococcus aureus 8.5\% (4/47). Based on the results of this study, the precision and sensitivity of CRP analysis by Beckman LX-20 or Beckman Immage analyzer were evaluated. Furthermore, a closer evaluation at the false negative rate for CRP measurement was achieved. Our results emphasized importance of specimen collection and storage, but did not support previous findings that hsCRP reference value is increased in proportion to age.

Key words: C-reactive protein, atherogenesis, imprecision, sensitivity