Q Sepharose microcolumn chromatography: a simple hemoglobin A_2 quantitation method for detection of beta-thalassemia carrier

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Quantitation of hemoglobin (Hb) A_2 with microcolumn chromatography on a new anion exchanger, Q Sepharose, and a currently in use, Diethylaminoethyl (DEAE) Sephadex were compared with high performance liquid chromatography (HPLC) to ascertain their relative accuracy, precision and reproducibility. Three hundred and fifty blood specimens, including 50 samples with genetically proven beta-thalassemia heterozygote were examined. Three blood samples with abnormal Hb were excluded from the study. The mean ($\pm$ SD) Hb A_2 proportion in normal and beta-thalassemia heterozygotes were: 2.70 ± 0.40 and 6.16 ± 1.21, respectively, determined by Q Sepharose microcolumn chromatography; 2.77 ± 0.38 and 5.55 ± 1.12, respectively, determined by DEAE Sephadex microcolumn chromatography; and 2.65 ± 0.31 and 5.40 ± 0.92, respectively, determined by HPLC. The diagnostic accuracy of Q Sepharose and DEAE Sephadex microcolumn chromatography were 100% for sensitivity, specificity, positive and negative predictive values. Correlation coefficient value (r^2) of Q Sepharose microcolumn chromatography and HPLC was 0.986 ($p<0.001$), DEAE Sephadex microcolumn chromatography and HPLC was 0.988 ($p<0.001$). Both microcolumn chromatography methods were found to be reliable, reproducible and well suited for large scale surveys. Nevertheless, with reusable property and convenience, Q Sepharose microcolumn chromatography may be an alternative mean for Hb A_2 determination in the population.

Key words: Q Sepharose, microcolumn chromatography, hemoglobin A_2, beta-thalassemia