Interference of paraproteins in measurement of bilirubin, protein and glycated haemoglobin

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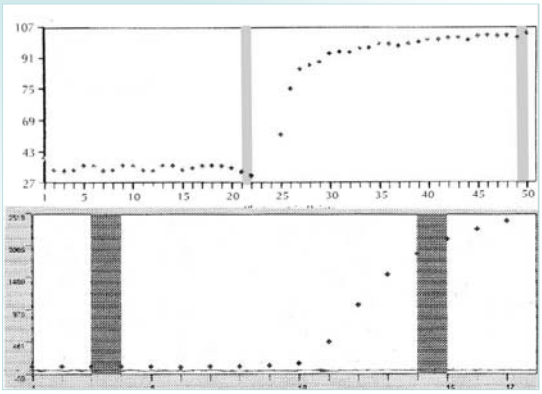
Introduction

Presence of monoclonal immunoglobulin (M-protein) can be source of various interferences during clinical chemistry assays. Due to many atypical properties of M-protein a number of assays can show either very high or very low concentrations of analytes. We report four case reports of M-protein interference that occured in our laboratory.

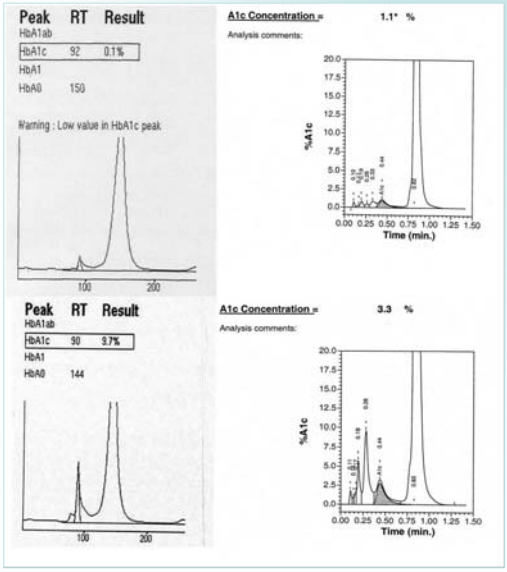
Case 1

Patient was found to have extremely high concentration of total bilirubin (546.0 mmol/l) in the presence of IgG kappa M-protein (84 g/l). Analysis was performed on Roche Modular analyzer. The measurement was repeated on Olympus analyzer AU400 and showed result within normal range.



Case 2+3

The interference of glycated hemoglobin (HbA1c) with M-protein was detected in other two patients with diabetes mellitus and presence of M-protein. This is so far the first report of such interference. One patient had IgA kappa M-protein at low concentration (4.8 g/l). The patient had well controlled diabetes and HbA1c level on routine measurement was extremely high (10.3 %).



The other patient had IgM lambda M-protein (27 g/l) and also well controlled diabetes. The result of HbA1c assay in this case was 1.1%, not corresponding with disease status as well.

Case 4

Case describes the interference of total protein estimation using standard biuret method in the presence of IgM lambda (45.1 g/l). The interference was encountered during external quality control anong laboratories in the Czech Republic. During analysis, all laboratories using Beckman-Coulter method returned results outside allowed 9% range. The mean concentration was 93.2 g/l instead of corect value 82.1 g/l. Kits from all other manufacturers returned predicted correct results.

Discussion and conclusion

Laboratory interferences during clinical chemistry analysis of samples containing M-protein are rare. The exact explanation of these observations is usually not very well known. Most often IgM M-protein is responsible for such interactions. Unique attributes of each M-protein do not allow creation of systematic review of predicable interferences. Interferences seem more to be of random occurence. It is necessary to pay special attention to abnormal laboratory results which do not correspond with the clinical condition of the patient. It is also necessary to use all the postanalytical phase tools not to miss such interaction.