

Molecular & structural variant specific detection of HCG – does it matter?

Ulf-Håkan Stenman, Kristina Hotakainen and Anna Lempiäinen. Department of Clinical Chemistry, Biomedicum, Helsinki University Central Hospital, FIN-00014 Helsinki University, Finland

Introduction: Various forms of hCG occur in circulation and urine both during pregnancy and in cancer and specific detection of these enhance the diagnostic value. We have evaluated the clinical validity of hCG, its hyperglycosylated form (hCG-h), the free β -subunit hCG β , and the core fragment (hCG β cf) in pregnancy and various forms of cancer.

Methods: Time-resolved immunofluorometric assays were used to determine the hCG variants in serum and urine of patients with trophoblastic disease, testicular cancer, and nontrophoblastic cancers.

Results: In trophoblastic disease, a proportion of hCG β /hCG exceeding 5% is associated with malignant disease. In seminomatous testicular cancer, hCG β alone is elevated before therapy in 40%, while both hCG and hCG β are elevated in 17%, and neither one in 43%. In nonseminomatous cancers, hCG is elevated in 73% and hCG β in 79% and either one 80%. Determination of hCG β increases the frequency of marker positive relapses from 32% to 59%. In patients with nontrophoblastic cancers, hCG β has been found to be elevated in 25 – 70% of the cases. In ovarian cancer about 30% have elevated concentrations of hCG β and this is strongly associated with adverse prognosis. In most cases, the concentrations of hCG β + hCG are below the upper reference limit of “total hCG” and thus the clinical value of hCG β can only be achieved by specific determination of this variant. Specific differences in the carbohydrate structure of hCG are observed in pregnancy and various forms of cancer. Most of hCG produced in cancer is hyperglycosylated.

Conclusions: Determination of hCG and hCG β with specific and sensitive assays for each form provides unique information especially in testicular and trophoblastic tumors. In nontrophoblastic cancer, an elevated serum hCG β indicates adverse prognosis.

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