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Intrathecal Synthesis of β_2-Microglobulin and Lysozyme: Differential Markers of Nervous System Involvement in Patients Infected with Human Immunodeficiency Virus Type 1

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Summary: β_2-Microglobulin and lysozyme were determined in paired serum and cerebrospinal fluid samples from 137 patients, using immunofluorometry and ELISA, respectively. Of these patients, 54 were infected by human immunodeficiency virus type 1 (HIV1) (including 20 AIDS dementia patients), 73 were HIV1-seronegative with neurological diseases (meningitis (n = 10), multiple sclerosis (n = 29), other neurological diseases (n = 34)) and 10 were controls. Intrathecal synthesis of β_2-microglobulin occurred in each group. Conversely, lysozyme intrathecal synthesis was found only in meningitis (10/10) and in HIV1-infection (24/54). A pathological increase in β_2-microglobulin intrathecal synthesis ($\geq$ 2 mg/l) was observed in 45 patients (34 HIV1-infected patients and 11 HIV1-seronegative patients with neurological diseases). Serum concentration and intrathecal synthesis of β_2-microglobulin were correlated only in the 20 AIDS dementia patients. The cerebrospinal fluid β_2-microglobulin and lysozyme concentrations were correlated in the 54 HIV1-infected patients only. Blood CD4 + T-cell count was correlated negatively with β_2-microglobulin intrathecal synthesis but not with lysozyme intrathecal synthesis. These data suggest that in the absence of any central nervous system opportunistic process the increase of β_2-microglobulin intrathecal synthesis ($\geq$ 2 mg/l) may be a reliable marker of central nervous system involvement in HIV1-infected patients. Intrathecal synthesis of lysozyme was related principally to HIV1-encephalitis and central nervous system opportunistic processes.

Introduction

Encephalitis due to human immunodeficiency virus type 1 (HIV1)-infection (i. e. HIV1-encephalitis or the AIDS-dementia complex) is mainly encountered in the late stages of infection (1). However, recent pathobiological studies have suggested that early involvement of the central nervous system may frequently occur (2–4). There are very few biological markers in clinical practice which effectively predict, diagnose, and follow neurological involvement in HIV1-infection.

β_2-Microglobulin is a low molecular mass (M_r 11 800) protein non-covalently bound to class I molecules of the major histocompatibility complex. β_2-Microglobulin restricts antigen presentation (5) and elevated serum β_2-microglobulin concentrations appear to be highly predictive of the onset or worsening of HIV1-disease (6–9). β_2-Microglobulin concentrations in cerebrospinal fluid (CSF) can be elevated in both asymptomatic HIV1-infected patients and AIDS patients (10, 11), suggesting that CSF β_2-microglobulin concentrations could indicate clinically neurological