Should we control the pineal status of patients following brain radiotherapy?

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In addition to cognitive deficits and dementia, endocrine disturbances are one of the major late adverse effect of brain radiotherapy (1). Thus, hypothalamic-pituitary hormone deficiencies following cranial irradiation have been extensively studied, and a high frequency of growth hormone deficiency has been reported (2). However, the incidence and severity of pineal deficiency after cranial irradiation have retained little attention. In human, the pineal gland lies in the center of the brain, behind the third ventricule. This neuroendocrine gland produces both peptides (such as arginin vasotocin) and indolamines (such as melatonin) (3). Regarding the possible function of melatonin in brain physiology, it must be pointed out that this pineal hormone has recently been shown to exert neuroprotective activity in a variety of experimental neuropathologies in which free radicals are involved (4,5). Hence, reductions in melatonin could increase the consequences of the late adverse effects of radiotherapy on cognitive and neuropsychological disturbances. Moreover, pineal gland can be involved in the regulation of tumour growth through the anticancer activity of melatonin (6), a point of peculiar concern if we consider the use of radiation therapy in the management of patients with brain metastases. In this regard, it is noteworthy that inhibition of the pineal function may stimulate mammary carcinogenesis (7). Taken together, these points raise the importance of evaluating the pineal status of patients after brain radiotherapy when the pineal gland falls within the fields of irradiation. Careful monitoring of plasma or cerebrospinal fluid melatonin could be used as a marker of the changes in the pineal functions, and should lead to the inclusion of pineal hormones in the optimal management of hormone deficiencies consecutive to brain radiotherapy.

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