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Autor(en) des Beitrags:      Kortmann, RD; Timmermann, B; Taylor, RE; Scarzello, G; Plasswilm, L; Paulsen, F; Jeremic, B; Gnekow, AK; Dieckmann, K; Kay, S; Bamberg, M

Titel des Beitrags:          Current and future strategies in radiotherapy of childhood low-grade glioma of the brain Part II: Treatment-related late toxicity

Abstract:                  Background: For more than 60 years, radiation therapy has been an integral part in the management of childhood low-grade glioma. As this tumor carries an excellent long-term prognosis, the risk of Late effects is of particular clinical importance and impinges upon radiotherapeutic treatment strategies. Material and Methods: Studies on the use of radiation therapy in children with Low-grade glioma were systematically reviewed for data on radiotherapy-induced side effects on brain parenchyma, endocrine dysfunction, growth retardation, neurocognitive dysfunction, vasculopathy, and secondary neoplasms. Results: Data on late effects are scarce and heterogeneous. Past reports included only retrospective series from the 1930s to present days, a time during which treatment policies and radiation techniques widely varied and considerably changed in recent years. Often, considerable uncertainty existed regarding pretreatment health status and radiotherapy-related factors (e.g., total dose, dose per fraction, treatment fields). In spite of these shortcomings and often conflicting observations, it appears that especially younger children and children with neurofibromatosis (NF) are at risk of endocrinopathies in terms of growth retardation and developmental abnormalities, as well
as neurocognitive dysfunction expressed as problems in the psychosocial environment such as in education and occupation. However, both observations may be attributed to the higher proportion of NF in the very young who frequently develop large tumors spreading along the entire supratentorial midline. The risk of radiation-induced disturbances in visual function is low (no case reported). Young children with NF appear to have an increased risk of vasculopathies. 33 cases of moyamoya disease were found (preferably in the very young), 18 of whom were NF-positive. Other cerebrovascular accidents (24 cases, of whom 14 were NF-positive) and secondary neoplasms (15 cases, of whom only five occurred in field - four were high-grade astrocytomas) are a rare condition. The latter cannot be distinguished from late relapses with malignant transformation. Modern treatment techniques appear to reduce the risk of radiation-induced late effects. Conclusions: More studies and clear definitions of clinical endpoints such as neurocognitive and endocrinological outcome are needed in order to clarify the impact of radiation therapy on the risk of late sequelae. Presently, the strategy to postpone radiotherapy in the younger children, especially with NF, is justified to reduce the risk of late effects. These information and the contribution of tumor, surgery and chemotherapy will help to define the role of radiation therapy in the future management of childhood low-grade glioma and whether the use of highly sophisticated and expensive treatment techniques is justifiable. The recently initiated prospective study of the APRO (Pediatric Radiooncology Working Party) on documentation of dose prescription to organs at risk and the network of the GPOH to explore late effects as well as the forthcoming prospective SIOP/GPOH (International Society of Pediatric Oncology/German Society of Pediatric Oncology and Hematology) LGG 2003 trial are addressing these issues.