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CNS disorders induced by radiation therapy of the brain

Introduction: CNS radiation therapy is commonly used to treat a variety of CNS tumors including primary and metastatic tumors of the brain or prophylactically in an attempt to prevent the development of metastases like in small cell lung cancer. The treatment dose and volume depend on the histology, location, and size of the tumor and sometimes radiation administered to treat CNS neoplasms can result in a variety of acute, subacute, and delayed clinical syndromes of the brain of which the most important in clinical practice is radionecrosis which is irreversible and occurs 1 to 3 years after radiation and the neurologic symptoms depend on the location and size of necrotic lesion. These disorders are important because their presentation can mimic tumor recurrence. Cerebral radiation necrosis often occurs after focal EBRT or brachytherapy and it is very uncommon after WBRT.

Material and methods: This is a case study about 60 years old man with initially squamous cell carcinoma of the lung in IIIA stage with complete pathologic response on the treatment of primary tumor and disease free survival of 2 years when he developed headaches accompanied by instability in walking, right eye homonymous hemianopia and hemiparesis. Brain MRI revealed brain metastases in cerebellum (1,5cm), right occipital (1,5cm) and temporal (2 cm) lobe. The whole brain RT (30Gy: 3Gy/10fr) was delivered with sequentially chemotherapy.

Result: The patient had 12 months disease free interval but then the same symptoms in more aggressive form occurred and brain MRI showed focal radionecrosis.

Conclusion: RT of the brain can lead to necrosis and the dose which gives a 5% probability of a given late effect 5 year after treatment for whole brain RT is 45Gy. Sometimes necrosis can occur with even lower doses, which probably depends of some other endogenic factors which can be subject of further investigations.