

Radiation necrosis clinical features

1. decreased [cognition](#)

a) dementia may develop following XRT in as little as 1 year post-XRT. Incidence was higher when doses of 25–39 Gy were given in fractions > 300 cGy

b) children: may attain lower IQ by ≈ 25 points, especially with >40Gy whole brain XRT. Measurable IQ differences occur in children radiated before age 7, but more subtle deficits occur even in older children

2. radiation necrosis

3. injury to anterior optic pathways

4. injury to hypothalamic-pituitary axis \rightarrow hypopituitarism \rightarrow growth retardation in children; see radiation injury to pituitary

5. primary hypothyroidism (especially in children)

6. may induce formation of new tumor: tumors most commonly identified as having increased incidence following radiation treatment are gliomas (including glioblastoma), meningiomas, and nerve sheath tumors.

Skull base tumors have been reported following EBRT

7. malignant transformation: e.g. after SRS for vestibular schwannomas

8. leukoencephalopathy: profound demyelinating/necrotizing reaction 4–12 mos after combined RXT and methotrexate, especially in children with acute lymphoblastic leukemia (ALL) and adults with primary CNS tumors

see [Whole brain radiotherapy side effects](#).

Phases

Radiation effects are divided into 3 phases:

1. acute: occur during treatment. Rare. Usually an exacerbation of symptoms already present. Probably secondary to edema. Treat with \uparrow steroids

2. early delayed: few weeks to 2–3 mos following completion of XRT. In spinal cord \rightarrow Lhermitte's sign. In brain \rightarrow post-irradiation lethargy & memory difficulties

3. late delayed: 3 mos–12 yrs (most within 3 years). Due to small artery injury \rightarrow thrombotic occlusion \rightarrow white matter atrophy or frank coagulative necrosis.

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Last update: **2024/06/07 02:53**

