Re-irradiation for Ependymoma

National guidelines for the Swedish Workgroup of Paediatric Radiotherapy (SBRG)

Background

Ependymoma is the third most common CNS tumour in children. Standard treatment is surgery (preferably macroscopically radical resection) and subsequent local radiotherapy to 59,4 Gy. Despite this treatment approximately one third of ependymoma patients will experience recurrence and require further treatment (1). Several studies have shown that re-irradiation could offer long-term disease control and that re-irradiation could be given with acceptable side effects (1-4). In a study from St Jude Children's Research Hospital including 101 patients re-irradiated for ependymoma, the 10-year cumulative incidence of grade ≥3 radionecrosis was 7,9% (1).

Re-irradiation

- There should be a minimum of 9 months between end of primary radiotherapy and re-irradiation.
- When possible, surgery should be performed ("maximum safe resection") before re-irradiation.
- All patients with a recurrence that is not a local recurrence only (i.e. distant metastases or an intracranial recurrence, but not in the site of the primary tumour) should, if possible, be treated with CSI and a local boost to 54 Gy.
- CSI and subsequent boost should also be considered for patients with local recurrence only (5, 6), especially if the tumour expresses 1q-gain, since these tumours show a metastatic pattern of recurrence to a larger extent (1).
- Toxicity after prior radiotherapy and the age of the child must be taken into consideration before deciding on possible re-irradiation and the size of the target volume.

<u>CSI at re-irradiation</u>
1,8 Gy x 20, total dose 36 Gy, 5 fractions/week

<u>Local radiotherapy</u>
1,8 Gy x 30, total dose 54 Gy, 5 fractions/week. Same dose for intracranial and spinal targets.

GTV = tumour bed + any residual tumour (current tumour bed at recurrence)

CTV_54(boost) = GTV + 0-5 mm

Stereotactic radiotherapy or Gamma Knife could be used for treatment of local recurrences.

Dose constraints at re-irradiation (cumulative doses)

Brainstem (4)

- Dmax 91,5 Gy_{EQD2}
- D2 cc 82,6 Gy_{EQD2}
- V115 Gy_{EQD2} 13,4%
- V59 Gy_{EQD2} 7,5 cc

Spinal cord

- Partial re-irradiation: D2% 70 Gy_{EQD2}
- Re-irradiation of complete circumference: D2% 66 Gy_{EQD2}

Global cumulative maximum dose should not exceed 113,4 Gy (RBE).
Dose to the brainstem should not exceed prescribed dose at re-irradiation.

References

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