

Interstitial brachytherapy with iodine-125 seeds for low grade brain stem gliomas in adults: Diagnostic and therapeutic intervention in a one-step procedure

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Introduction

Brainstem glioma in adults is a rare and poorly characterized disease. Therapeutic alternatives are mainly limited to external beam radiation as surgery is only indicated for exophytic tectal gliomas and the role of chemotherapy is still undefined. However several reports in the literature underlined the necessity to confirm histopathologically the presence of a brain stem glioma due to diagnostic inaccuracy of preoperative magnetic resonance imaging (MRI). Therefore we suggest the management of patients with brain stem glioma by stereotactic biopsy and implantation of I125 seeds for interstitial radiosurgery in a single step procedure as an alternative to external radiation therapy.

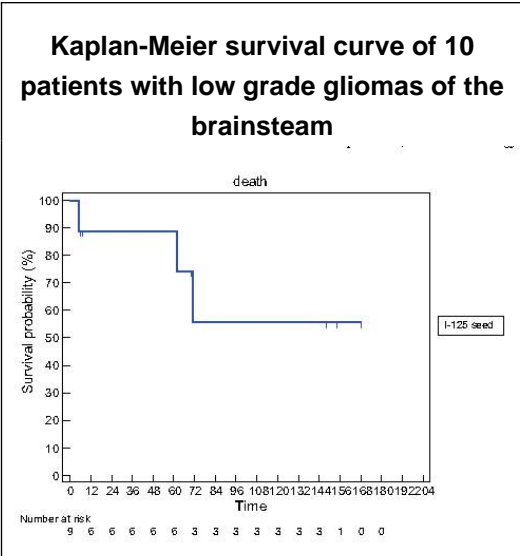
Methods

Ten patients with well-circumscribed lesions of the brainstem and histological confirmation of low grade glioma treated with stereotactically implanted I-125 seed in our department between 1995 and 2012 were retrospectively analyzed.

Results

In 9 patients the lesion was treated with one I-125 seed and in one patient, 2 spatial separated lesions were implanted, therefore a total of 11 I-125 seeds were implanted. The mean volume of the 11 lesions was 2.76 ml (range: 0.5–7.2 ml).

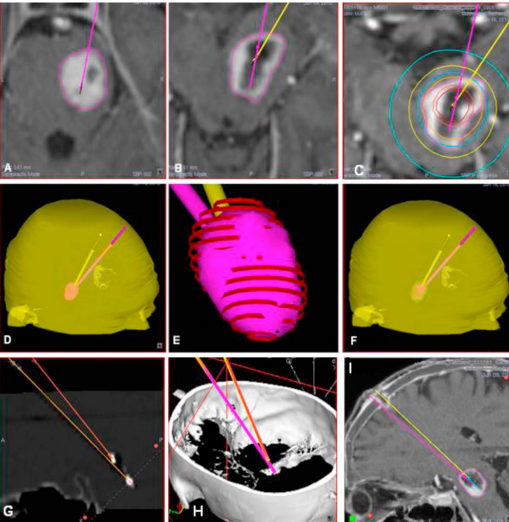
Mean activity of the seeds was 6.23 mCi (range: 1.5–11.1 mCi), mean duration of irradiation was 28.5 days (range: 21–41 days) and mean effective dose rate was 9.16 cGy/h (range: 6.2–12 cGy/h). The 30 days perioperative morbidity and mortality rate was 0%. Median follow up was 72.5 month (range 5–168 months). Six of ten patients were free of progression until last follow up.



Conclusions

In our experience at the University Clinic in Freiburg Germany, interstitial radiosurgery based on MRI is a safe and effective method to diagnose and treat low grade gliomas of the brain stem. Furthermore randomized studies are needed to confirm the therapeutic impact of this method in comparison to external beam radiation of brain stem gliomas.

Software planning of patient with a right mesencephalic lesion.



First a stereotactic biopsy is performed. A portion of the tissue is stained intraoperatively by the attending neuropathologist for the frozen section and evaluated. In order to achieve a precise conformation dose of the lesion, planning required implantation of 2 I-125 seeds for 25 days. Total I-125 seed activity was 5,1mCi for a total dose of 6000cGy with a mean of 10EDLcGy/h. Histological diagnoses was astrocytoma WHO GII. Last follow up was at 62 months.

Learning Objectives

To report on iodine-125 (I125) interstitial irradiation in the treatment of low grade brain stem gliomas in adults.

References

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