

Increased Focal Hemosiderin Deposition in Pediatric Medulloblastoma Patients Receiving Radiotherapy at a Later Age Kristen Yeom MD; Robert M. Lober MD PhD; Sonia Partap MD; Nicholas Telischak; Rachel Tsolinas; Patrick Barnes; Michael S. B. Edwards MD, FACP, FACS Stanford Hospitals and Clinics



Learning Objectives

To determine the clinical relevance of incidental focal hemosiderin deposition in the brain following treatment for medulloblastoma.

Introduction

Focal hemosiderin deposition (FHD) is common on brain MRI after treatment of childhood medulloblastoma (MB). We sought to determine its clinical significance and relationship to patient age, radiation dose, and cognitive outcomes.

Methods

A single institution retrospective study of 93 MB patients from 1998 to 2011 identified 41 with a negative baseline MRI and at least two posttreatment MRI scans with T2* gradient recalled echo (GRE). The number and cumulative rate of FHD detectable by GRE was compared between patients with early (six years and younger) and late (seven to 21 years) age at RT, and between lowdose (1800 to 2340 cGy) and high-dose (2920 to 4380 cGy) RT.

Results

Median age at diagnosis was 7.3 (range 0.9 to 21.0) years, follow-up was 5.8 (range 0.8 to 13.4) years, and five-year overall survival was $81 \pm 7\%$. Of school age children, 21/30 (70%) required special education, and the median intelligence quotient (IQ) of 10 tested patients was 100 (range 50 to 118). Thirty-three (80%) patients had FHD after a median latency of 1.9 (range 0.1 to 5.9) years. Ninety-four percent (436/465) of lesions arose in the supratentorial brain, whereas 6% (29/465) occurred in the brainstem or the cerebellum. There were no spinal lesions found. The median cumulative lesion rate was one (range 0 to 14.5) per year and was higher with late age at RT (2.2 versus 0.5 per year, p = 0.002), but not different with RT dose (p =0.395). There was no correlation with IQ or need for special education. No lesions bled or produced symptoms requiring surgical intervention.

Conclusions

More FHD was observed in children treated at older ages for MB. There was no relationship to radiation dose or cognitive outcomes, and no lesions required surgical intervention.







A. Multiple focal lesions detected by GRE scans in medulloblastoma patients previously treated by irradiation presumed to represent capillary telangiectasias or cavernous malformations. B. Characteristic lesion is easily identified on both FSE T2-weighted image and on the GRE image (white arrow). However, a smaller right occipital lobe lesion (black arrow) seen on the GRE image is difficult to identify on the FSE T2-weighted image.







A. Three punctate lesions (small arrow) coalesced into one large lesion (big arrow) 1 year later. B. Note evolution of the lesions over the course of 10 years (left to right) on GRE (top) and correlative T1 or T2 images (bottom), including lesion increase and decrease in size (long black arrows), hemorrhage (short white arrow), new lesion formation (short black arrow), and "popcorn" like appearance (long white arrow) 10 years later. C. Some lesions became more faint (long arrow) and invisible (small arrow) over time (3 years). Note the first two sets of GRE images are at 1.5T, and the third image at 3.0T