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Avoiding the Hippocampus in Cranial Radiotherapy Preserves Memory Function: Presented at WCLC

October 31st, 2013

Tags: Conference Dispatch Breast Cancer Lung Cancer Gynaecology/Obstetrics Pulmonary/Respiratory Medicine WCLC

By R.M. Hadfield, PhD

SYDNEY, Australia -- October 31, 2013 -- Conformal avoidance of the hippocampus during whole-brain radiotherapy (RT) significantly improves memory in patients with brain metastases for up to 6 months, without increased risk of relapse in the hippocampal avoidance region, according to phase 2 study results presented at the 15th World Conference on Lung Cancer (WCLC).

“These results are promising, and certainly place the hippocampus at the centre of our understanding of RT-related memory attacks,” stated lead author Vinai Gondi, MD, Cadence Health Brain Tumor Center, Chicago, Illinois, speaking here on October 29.

Dr. Gondi and colleagues conducted a study of whole-brain radiotherapy with hippocampal avoidance (HA-WBRT) in 100 eligible patients between March 2011 and November 2012. The Hopkins Verbal Learning Test–Delayed Recall (HVL–DR) was used to assess memory. Patients who received WBRT without HA were used as a comparison group.

In the control group, mean relative decline on HVL-DR at 4 months post RT was 30%. In patients receiving HA-WBRT, the mean decline in HVL-DR at 4 months post RT was 7.0% (P = .0003).

‘This preservation of HVL-DR delayed recall was retained at 6 months, with a 2.0% decline,’ noted Dr. Gondi.

The primary tumour in patients in this trial was non-small cell lung cancer (NSCLC) in 56% of patients, and breast cancer in 15%. When specifically examining the NSCLC cohort, mean relative decline in HVL-DR delayed recall was 8.8% at 4 months and 0.0% at 6 months.

The median progression-free survival was 5.9 months. Three patients (4.5%) developed progression in the hippocampal avoidance region, a lower rate than published estimates of 8.6% (Gondi et al, Radiother Oncol, 2010).

Adverse events (AEs) were predominantly grade 1 and 2 (n = 36), with fatigue and alopecia most common; there were only two grade 3 AEs (fatigue and headache), and no grade 4 or 5 AEs.

One strength of the study, the investigators noted, was the centralised quality-assurance process employed. Each site was required to pass a credentialing exercise involving hippocampal contouring and intensity modulated RT planning. ‘In all, 113 physicians and 84 community and academic and international institutions were credentialed in our techniques for hippocampal avoidance,’ noted Dr Gondi.

A downloadable hippocampal contouring atlas was made available from the Radiation Therapy Oncology Group (RTOG) website. The protocol specified a hippocampal maximum dose of 16 Gy or less.

At baseline, 51% of patients had no neurologic symptoms; the remainder had symptoms.

Phase 3 trials are warranted, the authors noted, and are currently under development through the RTOG.

Cranial RT has been associated with a decline in memory function, and is known to cause loss of hippocampal neurogenesis, suppressing new memory formation. A dose-response relationship has also been observed between hippocampal RT dose and decline in list-learning recall.

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[Presentation title: Memory Preservation With Conformal Avoidance of the Hippocampus During Whole-Brain Radiotherapy for Patients With Brain Metastases: Preliminary Results of RTOG 0933. Abstract O14.01]