Pentavalent Technetium-99m-dimercaptosuccinic Acid [99mtc(V)-dmsa] Brain Spect Versus Proton Magnetic Resonance Spectroscopy (1h-mrs) in Assessment of Glioma Recurrence Post Radiotherapy

E. Ahmed, MD, H. Moustafa, MD, A. Amin, MD, M. El.Tokhe, MD.
Nuclear Medicine department, NEMROCK center and radiology departments, Cairo University, Egypt

Introduction

The differentiation between recurrent tumor progression and radiation therapy effects in subject previously treated for glioma is problematic. Computed tomography and magnetic resonance imaging offer imperfect discrimination between viable tumor and post radiation necrosis/gliosis. Both 99mTc(V)-DMSA brain SPECT and 1H-MRS may be useful for differentiate between tumor recurrence and radiation necrosis. **The aim of this study** was to compare 99mTc(V)-DMSA brain SPECT versus 1H-MRS for detection of viable glioma after radiation therapy.

Methods

Both exams were performed on 24 glioma patients, previously operated upon and treated with radiotherapy. SPECT images were acquired 3 hours post 740 MBq of 99mTc(v)-DMSA administration with a dual-head gamma camera. Tumor to normal (T/N) uptake ratio was calculated as: mean counts of tumor ROI (T) ÷ mean counts of mirror symmetric normal ROI (N). 1H-MRS was performed using a 1.5 T system equipped with a spectroscopy package. SPECT and 1H-MRS results were compared with pathology after new surgery or with follow-up.

Results

SPECT and 1H-MRS showed recurrence in 9 patients (confirmed by biopsy or follow up) and both were negative in 6 patients. SPECT and 1H-MRS disagreed in 9 cases of recurrence (7diagnosed as positive for viable tumor by brain SPECT& 2 by 1H-MRS). SPECT and 1H-MRS sensitivity in detecting recurrence as compared with surgical biopsy or follow up was 88.8% and 61.1% respectively with an accuracy of 91.6% & 45.8.% respectively.

Conclusions

99mTc(V)-DMSA brain SPECT is more accurate in detecting and differentiating glioma recurrence from post radiation changes as compared to 1H-MRS.