PET predicts early response to treatment for head and neck cancer patients

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Determining the optimal treatment course and predicting outcomes may get easier in the future for patients with head and neck sqaumous cell carcinomas (HNSCCs) with the use of an investigational imaging agent. Research published in the October issue of The *Journal of Nuclear Medicine* shows that positron emission tomography (PET) imaging with 3'-deoxy-3'F-18-fluorothymidine (18-F-FLT) during treatment and early follow-up has the potential to predict therapeutic responses and identify patients needing close follow-up to detect persistent or recurring disease.

Typically, tumor response to therapy is monitored by assessment of tumor size change by anatomic imaging modalities. While several studies have shown that F-18-fluorodeoxyglucose (FDG) PET may be used to assess response, the agent may produce false-positive findings. Authors of the study "Usefulness of 3'-Deoxy-3'F-18-Fluorothymidine PET for Predicting Early Response to Chemoradiotherapy in Head and Neck Cancer" sought to determine if F-18-FLT, a recently introduced imaging agent, would also be useful in predicting response to therapy for HNSCCs.

"In experimental models, reduced FLT uptake preceded reduced FDG uptake, suggesting that decreased cell proliferation precedes changes in glucose metabolism," noted Hiroshi Hoshikawa, MD, lead author of the study. "However, there are few clinical studies comparing FLT-PET and FDG-PET findings for radiotherapy."

In the study, 28 patients with HNSCCs underwent F-18-FLT and

F-18-FDG PET imaging prior to treatment with radiation therapy, four weeks after the start of therapy and five weeks after the conclusion of therapy. Uptake of both of the agents was measured in primary and metastatic lesions.

During the radiation therapy, F-18-FLT uptake disappeared in 34 of 54 lesions (63 percent); the negative predictive value was 97 percent. F-18-FDG uptake also had a high negative predictive value (100 percent) during radiation therapy, but only nine lesions (16 percent) showed absence of FDG. In addition, the specificity and overall accuracy of F-18-FLT were significantly higher than F-18-FDG PET both during and after radiation therapy. These findings indicate that F-18-FLT PET is more useful for assessing early loco-regional clinical outcomes and helpful for avoiding unnecessary radical surgery.

"With the development of new molecular imaging agents, it's now up to clinical researchers to utilize them to assess the characteristics of malignant tumors and their therapeutic response to chemotherapy, radiotherapy and molecular targeting therapy," said Hoshikawa. "We hope that our findings will be helpful in understanding the significance of F-18-FLT-PET."

More information: interactive.snm.org/index.cfm? … D=1110&FileID=219756

Provided by Society of Nuclear Medicine