

# Preoperative Detection and Staging of Esophageal Cancer by Diffusion-Weighted MR Imaging and FDG-PET.

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## Background:

Recent studies show that diffusion-weighted imaging (DWI) has high contrast and can be helpful in detecting cancerous tissue (1, 2). It is reported that the addition of DWI to conventional T2-weighted imaging improved the detection of prostate cancer (3). The purpose of this study was to compare the diagnostic accuracy of DWI with FDG-PET in preoperative assessment of esophageal cancer.

## Patients and methods:

Twenty-four patients (M:F=22:2, ranging from 48 to 82 y.o.) with histologically-proven esophageal cancer underwent both MRI, including DWI, and FDG-PET scans within 15 days (mean 4.4 days). MR images were obtained using a 1.5-T MR imaging system with a phased-array coil. Diffusion-weighted images were obtained by the single-shot echo planar imaging technique using the following imaging parameters: TR/TE=4000-4400/74, b factors=0, 500, and 1000 sec/mm<sup>2</sup>, SENSE reduction factor of 2, and NEX of 3. For the PET scan, after at least a 4-hour fast, approximately 370 MBq of <sup>18</sup>F-FDG was injected intravenously, and image acquisition of the whole body was obtained 50 minutes later. All patients underwent surgery after the imaging studies, and histopathological findings were used as a standard reference. The detectability of the primary tumor and the diagnostic accuracy of lymph node metastases were evaluated. Correlation between the apparent diffusion coefficient (ADC) and standardized uptake value (SUV) was calculated.

## Results:

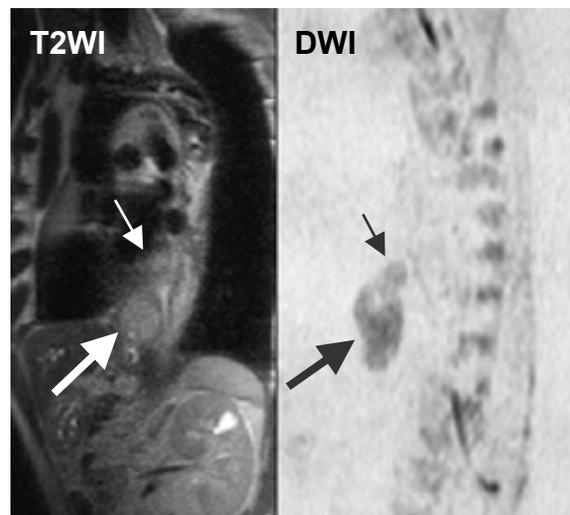
For primary tumors, DWI revealed an abnormal signal in 22 of 24 patients (92%), whereas FDG-PET showed abnormal uptake in 20 of 24 patients (83%). For lymph node metastases, sensitivity, specificity, and accuracy of DWI were 60%, 88%, and 70%, respectively, whereas those for FDG-PET were 50%, 88%, and 63%, respectively. The sensitivity of DWI was slightly higher than that of PET, but neither was entirely satisfactory. Semiquantitative analysis showed that there was no statistical significant correlation between ADC and SUV ( $r=0.148$ ,  $p=0.654$ )(FIG. 1). In this series, FDG-PET demonstrated other malignant tumors, such as colon cancer and oral floor cancer due to its advantage of scanning the whole body.

## Conclusion:

In preoperative detection and staging of esophageal cancer, DWI yielded a higher diagnostic accuracy than FDG-PET, which however provided unexpected findings in 2 of 24 patients. DWI and FDG-PET may play a complementary role in determining the most appropriate therapeutic strategy.

## References:

- 1) Squillaci, E., et al, J. Exp. Clin. Cancer Res. 23:39, 2004
- 2) Woodhams, R., et al, J. Comput. Assist. Tomogr. 29:644, 2005.
- 3) Shimofusa, R., et al, J. Comput. Assist. Tomogr. 29:149, 2005.



Esophageal cancer (arrow) and lymph node metastasis (small arrow).

FIG. 1

