SPIO-MR lymphography for detection of lymphatic pathway in patients with thoracic esophageal cancer

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Purpose: To visualize lymphatic pathways draining from the primary esophageal cancer.

Methods and Materials: MR lymphography (MRLG) was undertaken in 20 patients with thoracic esophageal cancer. A total of 2ml (22.4 mg as iron) ferumoxides was administered into the submucosal layer of the peritumoral areas. This study investigated the time for reaching the regional lymph nodes (first group, n=11) and the direction of lymphatic pathways draining from the tumor (second group, n=9). The first group: 2D-fast SPGR (FSPGR) images (TR/TE=90/4.2 msec, flip angle=90°) were consecutively acquired at the neck and upper thorax before and 20, 40 and 60 min after administration. The second group: FSPGR and spin echo T1-weighted images (TR/TE=660/90 msec) were acquired at the neck, upper thorax and upper abdomen after administration. Coronal (3-mm section thickness, 0-mm interspace) and axial (4-mm-section thickness, 1-mm interspace) images were obtained.

Results: In the first group, the decreased signal intensity of lymph nodes was clearly recognized 32.2 ± 16.2 min after injection of ferumoxides. Histopathological finding revealed the entrapment of ferumoxides particles were entrapped by macrophages in the lymph nodes. In the second group, three patients showed decreased signal intensity of neck lymph nodes and all of the patients showed decreased signal intensity of upper abdominal ones. The anatomical location of the lymph nodes was precisely recognized.

Conclusion: MR lymphography was able to identify lymphatic pathways having decreased signal intensity after submucosal administration of ferumoxides. The present results suggest that this new technique is potentially useful for determining the removal area of the lymph nodes in patients with thoracic esophageal cancer.

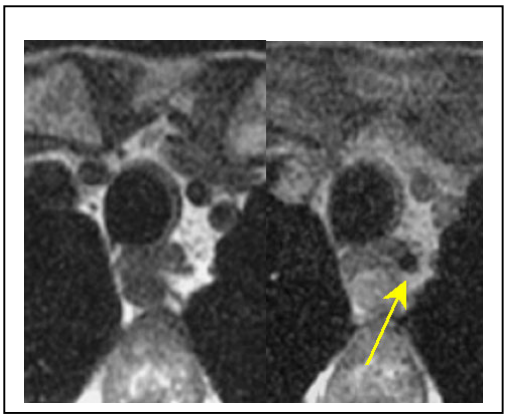

Fig.1 Spin echo T1 weighted image of the superior mediastinum (left) and SPGR image of the same level (right)
SPGR image showed the decreased signal intensity of paraesophageal lymph node (arrow).

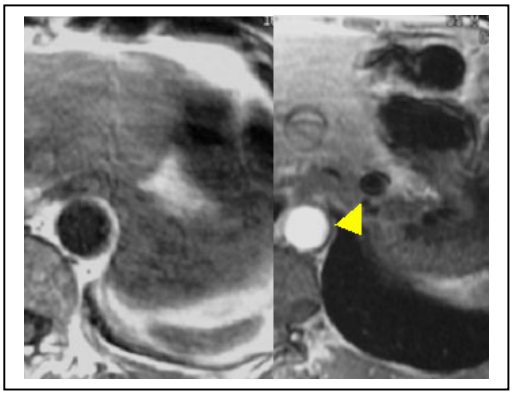

Fig.2 Spin echo T1 weighted image of the upper abdomen (left) and SPGR image of the same level (right)
SPGR image showed the decreased signal intensity of cardiac lymph node (arrow head).