

## **MR imaging of Gastric Carcinoma**

**Jae Mun Lee, M.D.**

*Department of Radiology Catholic Medical Center The Catholic University of Korea*

Gastric carcinoma is one of the common malignant tumors in Asia including Korea. Accurate determination of the extent of the tumor is essential for the proper management of gastric carcinoma. Until now, CT scan has been widely accepted as a staging tool because it not only can demonstrate the direct extension of tumor into contiguous organs and the presence of distant metastases. However, the accuracy of CT in the preoperative staging has been controversial and most investigators recently reported CT had some limitations in staging of gastric carcinoma.

MR imaging has its inherent advantages of high tissue contrast and multi-planar imaging capability. But the problems related to MR imaging of the gastrointestinal tract including stomach were long scan time, motion artifacts, lack of effective oral contrast agents and absence of an adequate surface coil for abdomen. But recently there was a significant improvement in MR techniques. We can obtain a set of MR images within a single breath-hold with fast MR techniques and therefore minimize the motion artifacts. Moreover, adequate surface coil developed for the abdomen, such as phase-array coil improved image quality.

In this presentation, MR techniques for the evaluation of the gastric carcinoma and MR staging of gastric carcinoma will be discussed, comparing with CT scan.

### **1. Technique**

MR imaging at 1.5T was performed immediately after the intramuscular injection of scopolamine to suppress the peristaltic motion artifact of bowel loops and the oral administration of water or effervescent granules as a contrast agent of bowel. Breath-hold 2D FLASH T1-weighted images in all three planes, turbo spin-echo T2-weighted axial images, and gadolinium-enhanced fat-suppressed 2D FLASH axial images were included.

Helical CT was performed 60 sec after initiation of IV contrast medium injection(2.5-3 ml/sec).

### **2. Results**

For T staging, MR imaging accuracy was higher than that of helical CT(73.3% and 66.7, respectively); however, the accuracies of the two modalities were not significantly different from each other(McNemar test,  $p>0.05$ ). Overstaging was noted in 6.7% of cases with MR imaging and 10% with helical CT. Understaging was noted in 20% of cases with MR

imaging and 23.3% with helical CT. For N staging, the accuracies of MR imaging and helical CT were 55% and 58.6%, respectively, with no statistical significance(overstaging, 10% and 6.9%; understaging, 34.5% and 34.5%, respectively).

### **3. Conclusion**

Breath-hold MR imaging was comparable to helical CT for the staging of gastric carcinoma. Compared with helical CT, fast MR imaging has some limitations(i.e., inevitable motion artifacts or nondifferentiation of the gastric wall in vivo study). Nonetheless, we can conclude that MR imaging could be useful alternative to helical CT because of its high resolution of soft tissue, its multiplanar imaging capability, and its lack of ionizing radiation. In addition, MR imaging could be useful for patients who cannot undergo CT because of renal impairment, pregnancy, or hypersensitivity to CT contrast materials.