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### Added value of diffusion-weighted MR imaging for predicting malignant ampullary obstructions

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**PURPOSE:** To evaluate the added value of diffusion-weighted (DW) imaging in combination with 3.0-T conventional MR imaging compared with conventional MR imaging alone for predicting malignant ampullary obstructions.

**MATERIALS AND METHODS:** Twenty-three patients with ampullary carcinoma and 39 patients with benign ampullary obstruction who underwent conventional MR and DW imaging were enrolled. The standard of reference was histopathologic findings in the surgical specimen or clinical follow-up results for over 18 months (mean, 20.6 months). Two observers independently reviewed a set of conventional MR images and a combined set of conventional MR and DW images and rated them by using a five-point scale. Diagnostic performance was evaluated for each observer with receiver operating characteristic (ROC) curve analysis. Accuracy, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were assessed. Pairwise comparison of the ROC curves was used to compare diagnostic performance between the two image sets; the McNemar test was used to compare accuracy, sensitivity, and specificity. For quantitative analysis, the apparent diffusion coefficient (ADC) value of the region of interest was measured. Mean ADCs were compared between two groups.

**RESULTS:** The diagnostic performance (area under the ROC curve [Az]) with respect to malignant ampullary obstruction of both observers was improved significantly after additional review of DW images: Az improved from 0.923 to 0.992 (p = .029) for observer 1 and from 0.910 to 0.992 (p = .025) for observer 2. The diagnostic accuracy, sensitivity, specificity, PPV, and NPV of combined conventional MR and DW images were higher than those of conventional MR imaging alone. Interobserver agreement of confidence levels was good for conventional MR imaging alone ($\kappa$ = 0.790) but was excellent for the combined set of DW and conventional MR images ($\kappa$ = 0.922). Mean ADC ($1.23 \times 10^{-3}$ mm$^2$/sec) of the ampullary malignancy group was significantly lower than that ($1.69 \times 10^{-3}$ mm$^2$/sec) of the ampullary benignancy group (p < .001).

**CONCLUSION:** Adding DW imaging to conventional MR imaging can improve the prediction of malignant ampullary obstruction compared with conventional MR imaging alone.