Recurrent Ovarian Cancer: Comparison of Diffusion-Weighted Imaging and T2-Weighted Imaging in Accurately Localizing Tumor Recurrence

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Purpose: To compare accuracy in the detection and localization of recurrent ovarian cancer with diffusion-weighted imaging (DWI) and T2-Weighted Imaging (T2WI) on 1.5 T MR and determine whether imaging information can be used to predict survival.

Methods: A total of 21 women (median age, 55.2 years) who were suspected of having recurrent ovarian cancer underwent MR examination before exploratory surgery at 1.5 T MR. Axial T2WI and DWI of each patient was acquired, covering abdomen and pelvic cavity. T2WI and DWI were independently analyzed by two genitourinary radiologists with different experience in MR (3 and 8 years, respectively). Images of each patient were grouped into five general regions for the purposes of analysis. Tumor presence, number of lesions, and the size and minimal apparent diffusion coefficient value (ADC$_{min}$) of the largest lesion were recorded for patient and region. Surgical histopathologic findings were used as the reference standard. Receiver operator characteristic (ROC) curves were used to compare the accuracy in the detection and localization of recurrent ovarian cancer with DWI and T2WI and hazard ratios were calculated.

Results: Recurrent diseases were confirmed at pathologic examination in 16 patients after exploratory surgery, with 61 positive regions. Readers' AUCs in detection of recurrence for region were 0.61 and 0.73 for T2WI and 0.80 and 0.85 for DWI (P <0.05), while 0.70 and 0.78 for T2WI and 0.86 and 0.89 for DWI for patient (P<0.05). 9 patients died. At T2WI, size and number were significantly associated with poor survival for readers 1 and 2 (P <0.05). At DWI, ADC$_{min}$ of peritoneal deposits were also significantly associated with poor survival for readers 1 and 2 (P < 0.01).
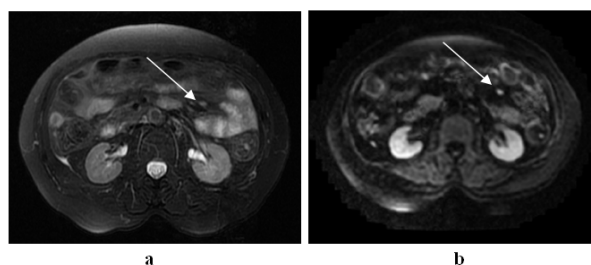

Figure 1: Recurrent ovarian cancer in a 78-year-old woman. (a) T2WI shows a small peritoneal implant in the abdomen (arrow). (b) DWI shows hyperintensity in this lesion (arrow). Results of pathologic examination at exploratory surgery confirmed the presence of a deposit from a serous papillary carcinoma.

Discussion: To our knowledge, many researchers have evaluated recurrent ovarian cancer by contrast-enhanced CT, PET/CT and conventional MR in their studies, especially by PET/CT, but only few reports focused on DWI [1]. The accuracy in the detection and localization of recurrent ovarian cancer with DWI needs to be determined by more studies. Our results suggest that DWI may have higher levels of accuracy than T2WI both at the patient level and at the region level. With DWI, more patients can be diagnosed accurately and more lesions may be detected, which is of great importance for the evaluation and treatment of ovarian cancer patients. Meanwhile, we also found that number of lesions, the size and ADC$_{min}$ of the largest lesion were all significantly associated with poor survival. This result is concordant with those of prior studies in which researchers investigated the value of PET/CT as a surveillance tool in patients with ovarian cancer [2].

Conclusion: Compared with T2WI, DWI may improve accuracy in the detection and localization of recurrent ovarian cancer on 1.5 T MR. Some imaging findings can be used to predict survival.

References

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