

SS 2.7

18F-fluorodeoxyglucose positron emission tomography ([18F]-FDG PET)/MRI in locally advanced rectal cancer after preoperative chemoradiotherapy: a comparison with conventional imaging

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Purpose: To assess the accuracy of restaging after preoperative chemoradiotherapy (pCRT) with whole-body PET/MRI, pelvic T2-weighted (T2W) plus diffusion-weighted imaging (DWI) MRI (pelvic-MRI), pelvic T2W MRI (standard-MRI) and thoracoabdominal CT when predicting histopathologic TNM stage in locally advanced rectal cancer (LARC).

Material and methods: 26 patients with LARC underwent PET/MRI and CT before and after pCRT for TNM staging. 21 were treated with total mesorectal excision and 5 with transanal local excision. Histopathologic findings or a follow-up of at least 1-year were the reference standards. One radiologist evaluated pelvic MRI and CT. A second radiologist evaluated standard MRI. A third radiologist and a nuclear medicine physician assessed PET/MRI. T staging results were grouped in T0 and residual disease (T \geq 1). N stage was classified on a per-patient basis as positive or negative using MRI dimensional criteria (\geq 5mm per node), MRI lymph node global size reduction rate criteria (reduction $<$ 70%) and PET/MRI dimensional criteria and/or nodal FDG uptake.

Results: Sensitivity and specificity for ypT0 were 100%-85.7% for PET/MRI, 94.7%-85.7% for pelvic-MRI and 94.7%-57.1% for standard-MRI. For ypN+ with dimensional criteria, sensitivity and specificity were 100%-88.9% for PET/MRI and 75%-88.89% for pelvic-MRI. The values for pelvic-MRI changed to 87.5% and 72.2% using lymph node global size reduction rate criteria. PET/MRI correctly diagnosed two liver and one distant nodal metastases while missed a lung metastasis.

Conclusion: PET/MRI improves the accuracy of ycTN staging compared to MRI, but performs worse than CT in ycM staging. Initial results are promising; however, a larger cohort of patients should be examined introducing sequences for lung and gadolinium for liver metastases.