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Diagnostic performance of MR in pancreatic neuroendocrine tumor (PNET) according to WHO 2010 classification

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PURPOSE: According to WHO 2010 classification, PNETs classified into NET G1, NET G2, and NEC. To investigate accuracy of MR for staging and determine whether the imaging features are different between PNETs according to WHO 2010 classification.

MATERIALS AND METHODS: Thirty-nine patients with surgically proven PNET(NET G1 = 24; NET G2 = 12; NEC = 3) underwent preoperative contrast-enhanced MRI and diffusion-weighted imaging (b = 0, 500 mm^2/s). Two radiologist retrospectively accessed MR findings including margin, SI on T2WI and T1WI, enhance patterns, degenerative change, duct dilation, presence of diffusion restriction, and Apparent Diffusion Coefficient (ADC) values. They also accessed T-, N-stage, and tumor size. Statistical analyses were performed using Chi-Square tests and ROC analysis.The κ statistics was used to interobserver agreement.

RESULTS: T- and N-stage included T1 in 9, T2 in 16, T3 in 14, and N1 in 3. Statistically specific findings for NEC compared with NET were ill-defined borders (p = 0.001) and hypo-SI on the venous (p = 0.016) and delayed phase (p = 0.019). ADC value showed statistical difference between NET G1 and G2 (1.60×10^{-3} vs. $1.24x \times 10^{-3}$ mm^2/s, p = 0.007). The AUC of ADC valuefor differentiate NET G1 to G2 was 0.743. The sensitivity and specificity were 70% and 86%. Tumor size (3.9 ± 2.7 cm)on MR wasn't statistically difference from pathologic size (3.8 ± 2.1 cm, p = 0.452). The accuracy for T-stage was 77% (n = 30) and 85% (n = 33) and N-stage was 92% (n = 36) and 87% (n = 34) with substantial agreement ($\kappa = 0.78$, $\kappa = 0.79$). T-stage showed statistical difference according to tumor grade (p < 0.001), but there were no statistical difference tumor size (p = 0.252) and N-stage (p = 0.565).

CONCLUSION: Ill-defined borders and hypo-SI on the venous- and delayed- phase are common findings of NEC and ADC value are helpful for differentiate NET G1 to G2. MR is useful for preoperative evaluation of T-, N-stage, and tumor size of PNET. T-stage showed statistical difference according to tumor grade.