SUPPLEMENT

Visual Assessment of Arterial Enhancement Pattern of 89 Intrahepatic Mass-Forming Cholangiocarcinomas

Methods

Two radiologists (with 9 years of abdominal CT interpretation) retrospectively evaluated arterial enhancement patterns of 89 intrahepatic mass-forming cholangiocarcinomas (IMCCs), by two methods; binary or tertiary classification. They were informed that the 89 patients had a histopathologic diagnosis of IMCC; however, they were blinded to the recurrence status of each lesion.

For the binary classification of each lesion, the lesions that showed an enhancement, compared with those of normal liver parenchyma during arterial phases, were classified as arterial phase hyperenhancement (APHE), according to the attenuation of the predominant parts of the lesions (50%), or otherwise no APHE.

For the tertiary classification of each lesion, non-rim (diffuse or inhomogeneous hyperenhancement), rim (peripheral rim enhancement), or no APHE (iso- or hypoenhancement) was determined. Interobserver agreement was evaluated using an unweighted or weighted kappa test. The reviewers ultimately reached a consensus. Univariable analysis or multivariable analysis (with clinicopathologic parameters mentioned in the main text) were performed to predict recurrence-free survival using Cox proportional hazards regression.

Results

Interobserver agreement of binary classification was 0.30 (95% confidence interval [CI]: 0.09–0.51), while that of tertiary classification was 0.56 (95% CI: 0.37–0.75). In the univariable analysis to predict recurrence-free survival, APHE of binary classification showed significance (hazard ratio [HR]: 0.412, 95% CI: 0.210–0.826, $p = 0.012$) and non-rim APHE of tertiary classification showed significance (HR: 0.296, 95% CI: 0.098–0.887, $p = 0.030$) compared to no APHE (Supplementary Table 1). However, visual assessment of arterial enhancement pattern did not yield significant factors in the multivariable analysis.

Supplementary Table 1. Visual Analysis Results of Arterial Enhancement Pattern

	Visual Assessment		Interobserver Agreement
	Hazard Ratio (95% CI)	*P*	Kappa† (95% CI)
Binary classification			0.30 (0.09–0.51)
No APHE			
APHE*	0.412 (0.210–0.826)	0.012	
Tertiary classification		0.094	0.56 (0.37-0.75)
No APHE			
Rim APHE	0.781 (0.435-1.403)	0.409	
Nonrim APHE*	0.296 (0.098–0.887)	0.030	

*Statistically significant markers. Reference variable for statistical analysis was no APHE for each binary or tertiary classification, †Unweighted Kappa was calculated for binary classification, while weighted Kappa was calcuated for tertiary classification. APHE = arterial phase hyperenhancement, CI = confidence interval