Conclusion: This software provides an accurate prediction of perfused liver parenchyma from a virtual point of treatment placed on a proximal CBCT. Investigation of its intraprocedural value for intra-arterial liver-directed therapies planning is warranted.

Abstract No. 249

Prediction of Recurrence Following HCC Resection Using Artificial Intelligence: A Systematic Review of 23,693 Patients

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Purpose: The main purpose of this study is to review artificial intelligence algorithms such as machine learning (ML) and deep learning (DL) that use radiomic features to predict the early recurrence of hepatocellular carcinoma (HCC) after resection.

Materials and Methods: A systematic search was performed in Scopus, PubMed, Embase, Google Scholar, and Web of Science. The reported accuracy, predictive values, and AUC from individual studies were derived, and the results were evaluated based on the "Standards for Reporting Diagnostic accuracy studies" (STARD) guidelines. Study subcohort categories were as follows: ML-radiomics, DL-radiomics, ML-non-radiomics, and DL-non-radiomics model.

Results: Overall, 39 studies (23,693 overall patients), including 22 (1,492 patients, validation group), 3 (204 patients, validation group), 10 (5,849 patients, validation group), 4 (420 patients, validation group) in ML-radiomics, DL-radiomics, ML-non-radiomics, and DL-non-radiomics predicted the recurrence following HCC resection, respectively. The overall accuracy was 0.71 (95% CI, 0.69-0.76), 0.75 (95% CI, 0.71-0.78), 0.64 (95% CI, 0.61-0.67) and 0.71 (95% CI, 0.54-0.88), respectively and AUC was 0.71 (95% CI, 0.69-0.76), 0.77 (95% CI, 0.71-0.81), 0.59 (95% CI, 0.49-0.69), and 0.72 (95% CI, 0.63-0.74) for ML-radiomics, DL-radiomics, ML-non-radiomics, and DL-non-radiomics models, respectively. C-indexes of models, which measure accuracy of recurrence prediction were 0.7 (95% CI, 0.64-0.73) and 0.66 (95% CI, 0.64-0.67) in the ML-radiomics model (1,358 patients) and ML-non-radiomics model (12,475 patients). Time to recurrence (TTR) was reported to be 18 months (range, 7.5-38.2) in the four studies (272 patients).

Conclusion: The combined models integrating ML or DL with radiomics features extracted from imaging modalities may be a potential imaging biomarker for non-invasively identifying patients at significant risk of early HCC recurrence following resection.

Abstract No. 250

Pancreatic Venous Anatomy for Trans-Portal Treatment of Pancreatic Cancers using Pressure Enabled Drug Delivery (PEDD)

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Purpose: To define variability of pancreatic venous drainage in preparation for Pancreatic Retrograde Venous Infusion (PRVI™) trials with Pressure Enabled Drug Delivery (PEDD™) for locally advanced pancreatic ductal adenocarcinoma.

Materials and Methods: 117 triple-phase liver CT scans from November 2020 to October 2021 were reviewed. One mm axial images, coronal and sagittal reconstructions were reviewed from portal, arterial, and venous phases. The presence of pancreatic cancer was noted. Diameter, visible length, angle of insertion into draining vein, tortuosity, and presence of intra-parenchymal collateralization were recorded for each pancreatic vein seen. To identify veins that might be appropriate targets for PRVI via catheters with PEDD, veins greater than 10 or 20 mm in length were noted. The diameter of veins at the origin and 20 mm from the origin were measured if applicable.

Results: 350 veins were seen in 117 CT scans. The mean number of pancreatic veins visible per patient was 2.99 with a standard deviation of 1.00. 285 veins were best seen in the portal phase, 14 in the arterial phase, 41 in the venous phase, and 10 with a combination of arterial and portal phase. 172 veins drained the pancreatic head, 69 the body and 109 the tail. The pancreatic head drained into the portal vein (70) or SMV (90). The tail drained primarily into the splenic vein (95) while the body had more variable drainage with 15 veins draining into the portal, 12 into the SMV and 38 into the splenic vein. 10 of 22 patients with pancreatic tumors had veins draining tumors.

293 veins were between 2 and 6 mm in diameter at the origin (83.7%) Of those, 208 were at least 10 mm long (59.4%). 118, 32, and 58 drained the head, body and tail respectively. 119 veins were at least 20 mm long (34%). Mean number of pancreatic veins longer than 20 mm visible per patient was 1.42 with a standard deviation of 0.56. 92 veins were seen in the portal, 6 in the arterial, and 18 in the venous phase. 85 veins drained the pancreatic head, 16 the body and 18 the tail. Mean lengths were 34.47 mm, 23.44 mm and 29.52 mm from the head, body and tail.

Conclusion: Based on CT findings, vein diameter and angle are consistent with the ability to canulate the veins from portal access. 83.7% of veins had adequate diameters and 59.4% were of at least 10 mm in length.

250.1.

	Vessel Measurements (mm) ±SD				Tortuosity (%)			
	Origin Diameter	Diameter at 2 cm	Length	Angle	None	Mild	Moderate	Severe
Head	3.22±1.13	3.20±1.19	22.39±15.25	86.73±36.86	30.2	37.2	27.3	5.3
Body	2.88±1.34	2.72±1.29	13.76±6.85	86.23±31.42	42	37.7	13	7.3
Tail	2.82±0.87	2.64±0.93	13.08±9.58	94.54±35.69	67.9	22	7.3	2.8