

Pancreatic Venous Anatomy for Trans-portal treatment of pancreatic cancers using pressure enabled drug delivery (PEDD)

Michael G Kwong, Hannah Spears, Jack Patee, Gordon McLennan

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 & sagittal reconstructions were reviewed from portal, arterial, & 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, & 10 with a combination of arterial & portal phase. 172 veins drained the pancreatic head, 69 the body & 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 & 38 into the splenic vein. 10 of 22 patients with pancreatic tumors had veins draining tumors.

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

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