

Deep Learning Reconstruction for Low-Dose Dual-Energy CT Pulmonary Angiography: Optimization of Energy Levels and Assessment of Subsegmental Arteries

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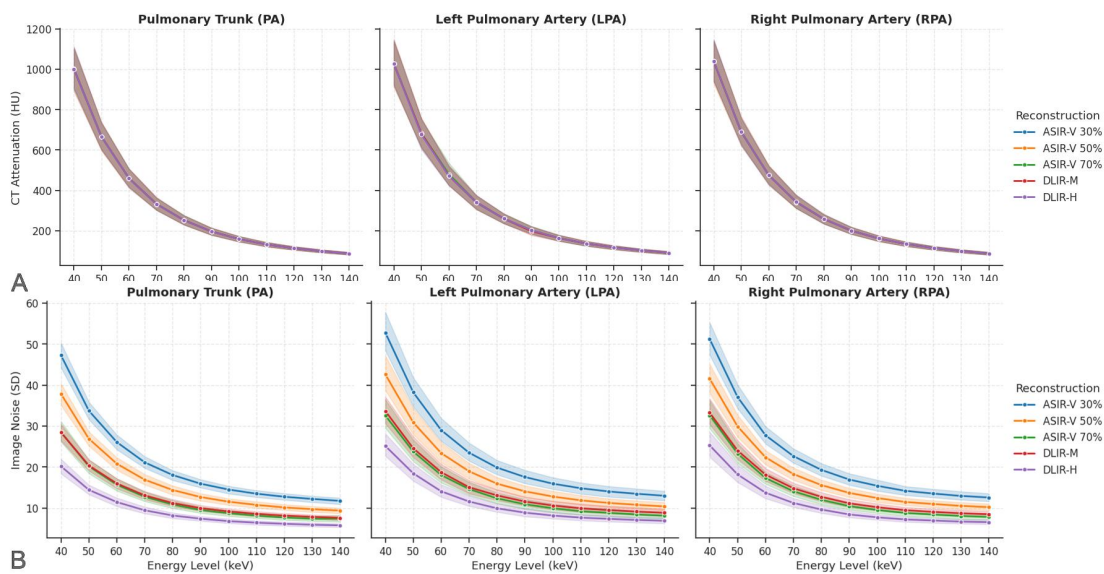


Figure: CT Attenuation (HU) across Pulmonary Arteries

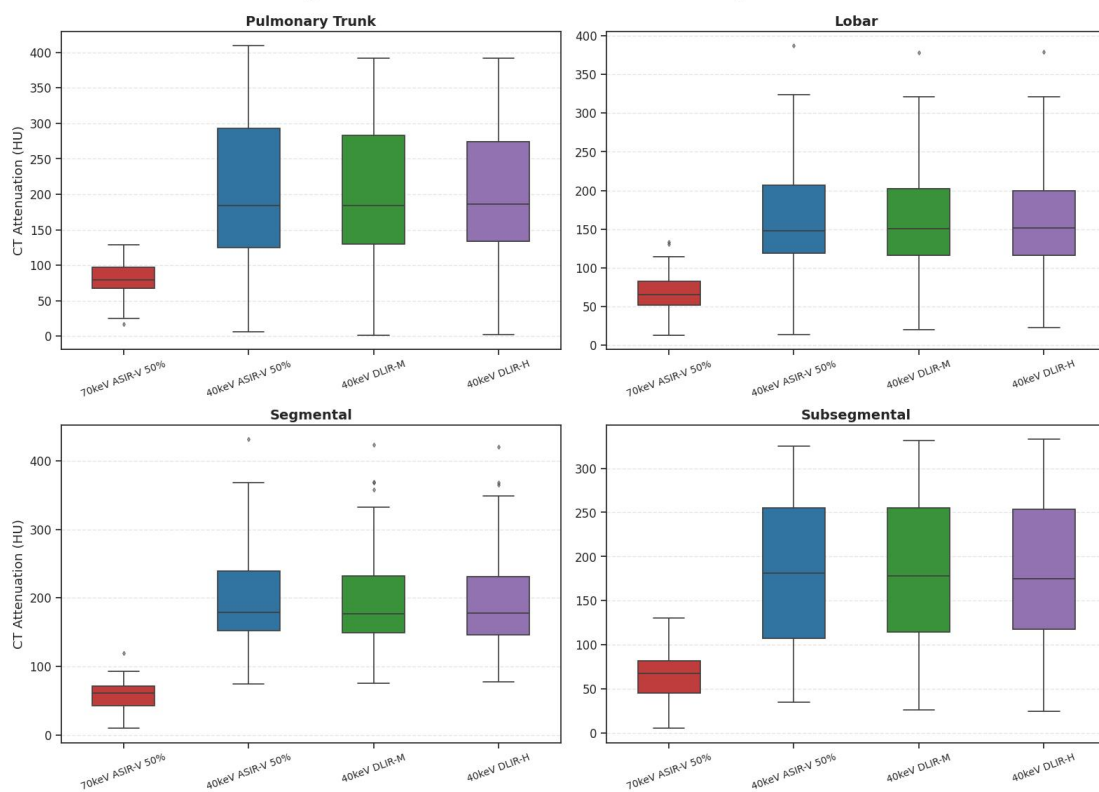


Figure: Image Noise (SD) across Pulmonary Arteries

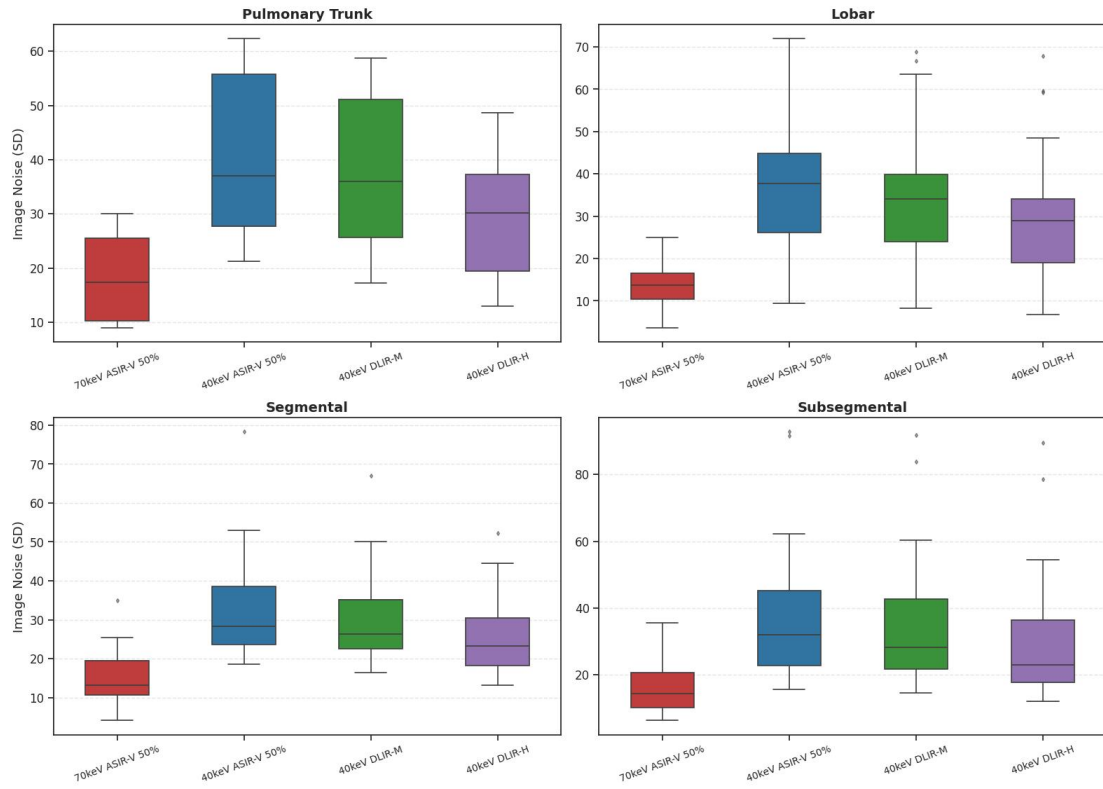
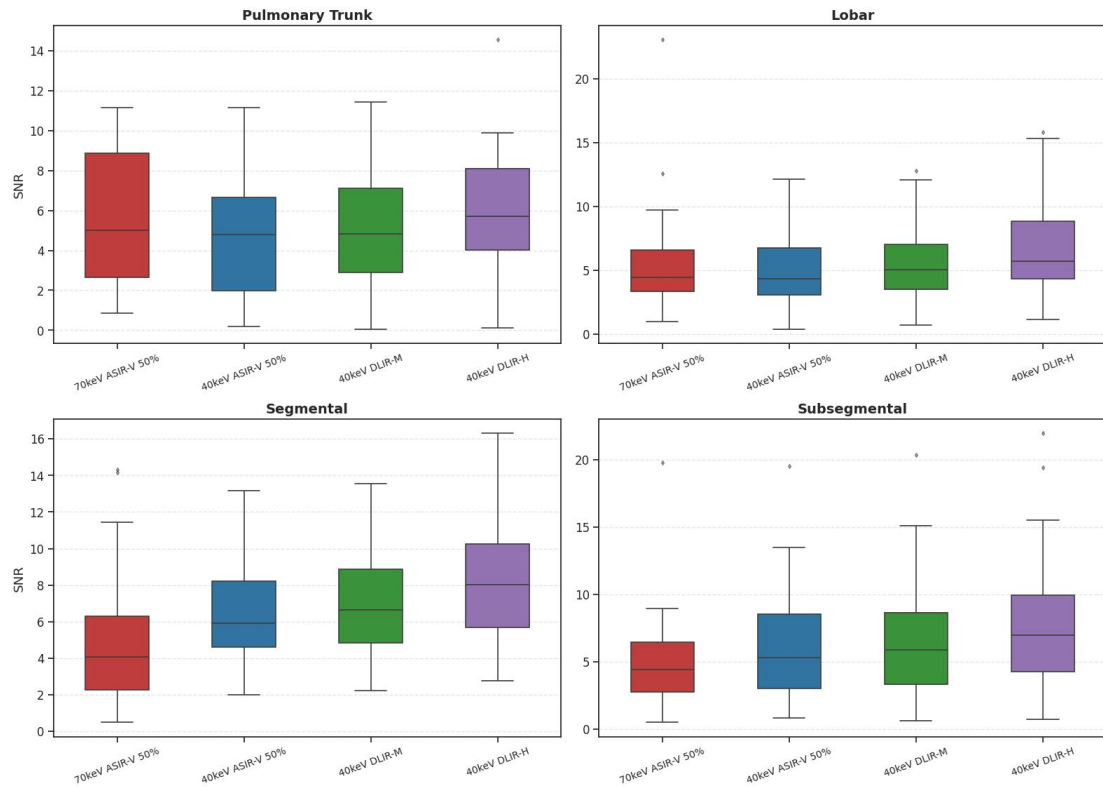


Figure: SNR across Pulmonary Arteries



Score	Image Noise	Edge Clarity	Noise Texture	Overall Quality
1	Severe; non-diagnostic	Blurred; non-diagnostic	Poor; impairs confidence	Poor; non-diagnostic
2	Marked; reduces confidence	Moderate blurring	Suboptimal;affects confidence	Suboptimal; below acceptable limits
3	Moderate; acceptable	Slight blurring; acceptable	Acceptable	Acceptable for diagnosis
4	Mild; near optimal	Good sharpness	Good; close to optimal	Good; minor imperfections
5	Minimal; excellent	Sharp delineation	Excellent; natural texture	Excellent; diagnostic quality

Variables	P1	P2	P3	P4	P5	P6
Pulmonary Trunk (<i>n</i> = 13)						
CT Attenuation	0.013	0.010	0.008	0.980	0.980	0.980
Image Noise (SD)	< 0.001	0.001	0.011	0.317	0.077	0.191
SNR	0.972	0.998	0.897	0.995	0.671	0.810
CNR	0.130	0.086	0.013	0.555	0.249	0.343
Lobar Pulmonary Artery (<i>n</i> = 35)						
CT Attenuation	< 0.001	< 0.001	< 0.001	0.925	0.948	0.995
Image Noise (SD)	< 0.001	< 0.001	< 0.001	0.267	0.006	0.051
SNR	0.716	0.664	0.080	0.474	0.054	0.145
CNR	0.100	0.011	< 0.001	0.353	0.022	0.118
Segmental Pulmonary Artery (<i>n</i> = 27)						
CT Attenuation	< 0.001	< 0.001	< 0.001	0.869	0.836	0.931
Image Noise (SD)	< 0.001	< 0.001	< 0.001	0.397	0.014	0.071

SNR	0.023	0.008	< 0.001	0.489	0.043	0.111
CNR	0.291	0.084	0.010	0.436	0.059	0.219
Subsegmental Pulmonary Artery (<i>n</i> = 35)						
CT Attenuation	< 0.001	< 0.001	< 0.001	0.944	0.963	1.000
Image Noise (SD)	< 0.001	< 0.001	< 0.001	0.477	0.031	0.120
SNR	0.226	0.084	0.005	0.622	0.142	0.290
CNR	0.046	0.007	< 0.001	0.424	0.045	0.133

Anatomical Region / Variable	ICC	95% CI
Pulmonary Trunk (<i>n</i> = 13)		
Image Noise	0.95	(0.91, 0.97)
Edge Clarity	0.98	(0.97, 0.99)
Noise Texture	0.94	(0.90, 0.97)
Overall Quality	0.91	(0.85, 0.95)
Lobar Pulmonary Artery (<i>n</i> = 35)		
Image Noise	0.89	(0.85, 0.92)
Edge Clarity	0.89	(0.85, 0.92)
Noise Texture	0.88	(0.84, 0.91)
Overall Quality	0.85	(0.79, 0.89)
Segmental Pulmonary Artery (<i>n</i> = 27)		
Image Noise	0.87	(0.82, 0.91)
Edge Clarity	0.86	(0.80, 0.90)

Noise Texture	0.87	(0.81, 0.91)
Overall Quality	0.89	(0.85, 0.93)
Subsegmental Pulmonary Artery ($n = 35$)		
Image Noise	0.9	(0.87, 0.93)
Edge Clarity	0.91	(0.88, 0.93)
Noise Texture	0.91	(0.88, 0.94)
Overall Quality	0.94	(0.91, 0.96)
