

Spectral Insights in the ER: Iodine Mapping for CTPA Diagnosis

"In my center we scan approximately 600 CTA chest per month for suspected pulmonary embolism. Iodine mapping is included as routine for all CTPA scans suspected of PE."

"Integrating color iodine maps for routine reporting expedites diagnosis, optimizes patient care, and boosts confidence in detecting PE and other lung pathology."

Bruno Hochegger

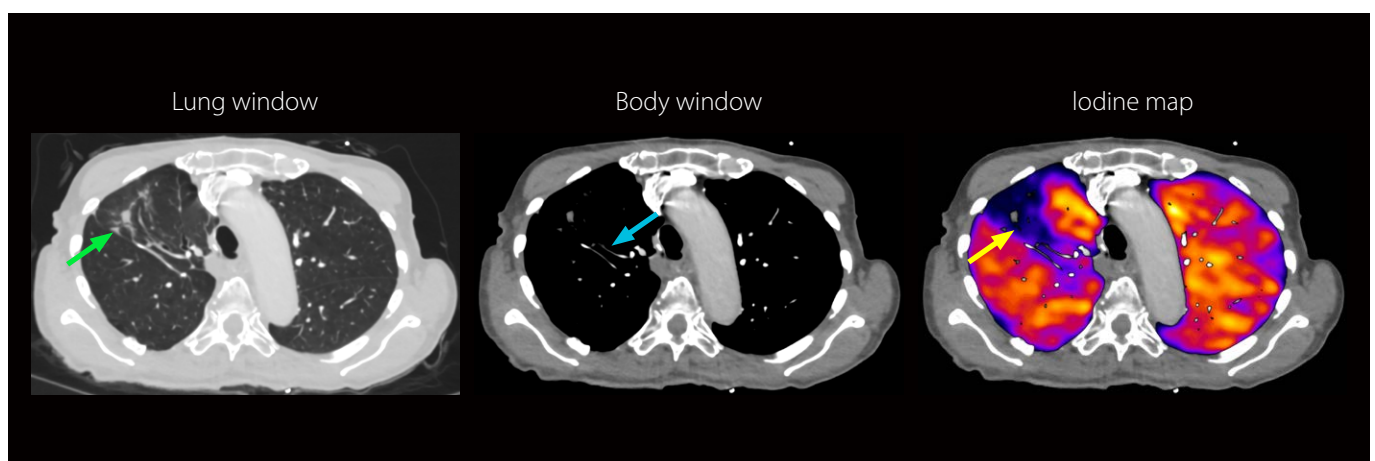
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Patient History

This patient arrived at the emergency department with shortness of breath. A spectral Computed Tomography Pulmonary Angiogram (CTPA) was requested to rule out pulmonary embolism.

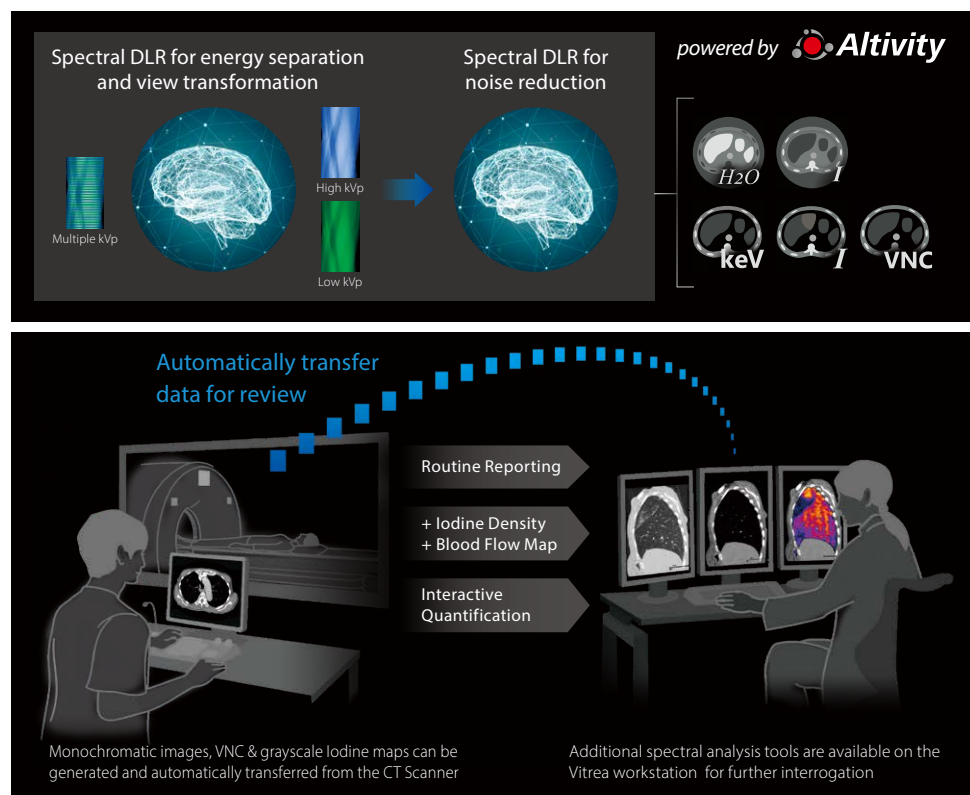
Result



In the CTPA body window image, a potential sub-segmental filling defect (blue arrow) is visible, but a definitive determination is challenging without additional information. Ground glass opacities are also observed in the lung window (green arrow) further complicating the evaluation. However, according to Prof Hochegger, with the iodine map a clear perfusion deficit corresponding to the possible filling defect becomes apparent (yellow arrow). This supplementary information proves invaluable, significantly enhancing the confidence in identifying a perfusion abnormality in the region under review.

Technology

Canon's Spectral CT technology incorporates rapid kV switching and patient-specific mA modulation with Deep Learning Reconstruction (DLR). DLR processes multi-energy raw data, achieving precise energy separation and noise reduction resulting in clear spectral images. Output images can be sent directly to PACS, and advanced image analysis can be performed on the Spectral Analysis application on the Vitrea Platform.



Conclusion

Spectral greatly improves the detection of acute pulmonary embolism by overcoming the limitations of standard CTPA. The capability of spectral CT to offer color-coded iodine maps, allows for a more thorough assessment of pulmonary embolism^{1,2}. This encompasses the diagnosis of perfusion abnormalities caused by thromboembolisms, as well as the detection of both recent and long-standing blood clots in the pulmonary arteries^{1,2}.

The combined anatomical and functional assessment capabilities of spectral enhance the accuracy of diagnosis and the management of patients with suspected pulmonary embolism^{1,2}.

1. Farag A, Fielding J, Catanzano T. Role of Dual-energy Computed Tomography in Diagnosis of Acute Pulmonary Emboli, a Review. *Semin Ultrasound CT MR*. 2022 Aug;43(4):333-343.
2. Hong YJ, Shim J, Lee SM, Im DJ, Hur J. Dual-Energy CT for Pulmonary Embolism: Current and Evolving Clinical Applications. *Korean J Radiol*. 2021 Sep;22(9):1555-1568.



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Key Benefits

- Detect local perfusion differences
- Display local iodine concentration
- Detect/rule out contrast enhancement

Acquisition

Scanner Model: Aquilion ONE / PRISM Edition
Scan Mode: Ultra Helical Spectral
Collimation: 0.5 mm x 80
Exposure: Rapid kV Switching, ^{SURE}Exposure
Rotation Time: 0.5 s
CTDIvol: 6.4 mGy
DLP: 232.7 mGy·cm
Effective Dose: 3.26 mSv
k-factor: 0.014*

* American Association of Physicists in Medicine (AAPM) Report 96, 2008

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