

Diagnostic Confidence with Sub-Optimal Contrast

PURPOSE OF STUDY

Some patients cannot tolerate standard contrast doses for routine contrast enhanced CT exams, which limits the ability to identify pathology that could be diagnosed. This case study demonstrates the clinical improvement that applying the optimal monochromatic energies provides when evaluating vascular structures, compared to the 120 kVp conventional data set. The following is a summary of the case study abstract published for RSNA 2014.

Overview

Vessel visualization in a CT exam benefits from the use of iodinated contrast. The enhancement of the vessels is highly dependent on contrast volumes, concentrations and injection rates. However, higher volumes of contrast are not appropriate for patients that have a higher risk of contrast induced nephropathy (CIN), or some medical conditions such as diabetes or heart failure. The ability to decrease the dose of contrast material

while still obtaining the necessary vessel enhancement from a CT is key for clinicians to achieve diagnostic certainty.

This study, performed at University Hospitals Case Medical Center in Cleveland, Ohio, evaluated the use of monoenergetic reconstructions from the IQon Spectral CT to achieve acceptable aortic enhancement compared to a standard 120 kVp CT scan. When using reduced IV iodinated contrast (as low as 20cc), lower monoenergetic reconstructions significantly improved enhancement of the vessels including the aorta.

Chest and abdomen scans of eight regions of interest within the aorta were taken from 36 patients with a mean aortic enhancement of less than 200 HU. Subjective evaluation of the vascular enhancement and overall image noise was graded and monoenergetic images were created retrospectively from 40 to 180 keV, every 10 keV. The ideal MonoE was chosen, defined as the highest energy that provided a mean aortic attenuation greater than 200 HU while maintaining diagnostic quality. The MonoE was then compared to the 120 kVp CT scan.

94%

of studies met criteria for
successful monoenergetic
reconstruction

66%

average increase in
aortic enhancement

57 ±
6.4 keV

mean optimal energy

Results

Ninety-four percent of the studies met the criteria for successful monoenergetic reconstruction, with a mean optimal energy of 57 ± 6.4 keV (average \pm SD). Optimizing energy levels significantly increased aortic enhancement compared to the 120 kVp studies, by an average of 66%.

Conclusion

The Philips IQon Spectral CT provides the capability to improve contrast enhancement on patients that cannot tolerate routine iodine doses. Either prospectively or retrospectively, the user can lower the monoenergetic level on a contrast enhanced CT exam to further aid in diagnosis. The use of monoenergetic images will enable the ability to create CT angiograms from scans obtained with reduced IV contrast.

CLINICAL RELEVANCE

The Philips IQon Spectral CT enabled the creation of aortic angiograms for studies that otherwise may not have been diagnostic.

www.philips.com/IQon



Evaluating Optimal Monochromatic Energy Reconstruction on Aortic Angiography Obtained from Spectral Detector CT *Prabhakar Rajiah MD, FRCR (Presenter): Institutional Research Grant, Koninklijke Philips NV, Andrew Sher MD: Research Grant, Koninklijke Philips NV, Abed Ghandour MD: Nothing to Disclose, Rong Rong MD: Institutional Grant support, Koninklijke Philips NV, Amar Dhanantwari: Employee, Koninklijke Philips NV*

Results from case studies are not predictive of results in other cases. Results in other cases may vary.

© 2016 Koninklijke Philips N.V.

Philips Healthcare is part of

www.philips.com/healthcare

All rights are reserved.

the Royal Philips

healthcare@philips.com

Philips Healthcare reserves the right to make changes in specifications and/or to discontinue any product at any time without notice or obligation and will not be liable for any consequences resulting from the use of this publication.