

Cardiology today

NEWS & PERSPECTIVE FOR THE CARDIOVASCULAR SPECIALIST

PROTECTION I: Radiation dose from cardiac CTA varied according to system, other factors

Mean radiation dose from CTA was lower than in recent studies.

By

Radiation doses from cardiac CTA varied according to the CT system being used, along with other factors, results from an observational study suggested.

Researchers from the PROTECTION I study set out to evaluate the magnitude of radiation dose patients received resulting from cardiac CTA. They enrolled 1,965 patients and quantified the radiation dose by measuring dose-length product. The majority of patients (n=1,893; 96%) were scanned using 64-slice CT systems, with a small number (n=72; 4%) scanned using 16-slice CT systems. Most patients undergoing 64-slice CT scans (1,197 of 1,546; 77%) had a BMI of 20 to 30.

According to the researchers, 11 of 14 variables had associations with dose-length product. A 10-kg increase in patient weight was associated with increased dose-length product (relative effect on dose-length product, 5%; 95% CI, 4%-6%), as was absence of a stable sinus rhythm (10%; 95% CI, 2%-19%). Electrocardiographically controlled tube current modulation (-25%; 95% CI, -23% to -28%) and 100-kV tube voltage (-46%; 95% CI, -42% to -51%) were associated with decreases in dose-length product. A 1-cm increase in scan length was associated with an increase in dose-length product (5%; 95% CI, 4%-6%). The use of a Siemens single-source 64-slice CT system was associated with lower dose-length product than the other 64-slice systems used in the study.

“The PROTECTION I study demonstrates that radiation dose of 12 mSv for cardiac CTA is currently comparable with other diagnostic procedures but that this dose varies significantly between study sites and CT systems,” the researchers wrote. “Radiation exposure can be reduced substantially by uniformly applying the currently available strategies for dose reduction, but these strategies are used infrequently.”

Potential to reduce dose further

Anthony DeFrance, MD, treasurer of the Society for Cardiovascular CT, sees the results of the PROTECTION I study as potentially positive for cardiac CT.

“Recent studies have shown the mean radiation dose at about 16 or 16.2 mSv, and this one shows the median dose as 12 mSv. That is a good finding for cardiac CT,” DeFrance told *Cardiology Today*.

DeFrance also pointed out that the dose-reduction techniques used by the researchers could potentially reduce radiation doses in practice if duplicated in other imaging centers.

“[W]e are down to 12 mSv, and we have the potential to get it down lower if more centers start utilizing techniques like lowering kV and using prospective scanning,” he said. “If we train people, put quality control measures in place and measure doses so that people become

more aware, the tools are there to really get the dose down for the patients.” – by *Eric Raible*

JAMA. 2009;301:500-507.

IMAGING

PROTECTION I

Prospective Multicenter Study on Radiation Dose Estimates of Cardiac CT Angiography in Daily Practice I

Trial designed to assess magnitude of radiation doses in patients undergoing cardiac CTA and the association of dose-reduction strategies to the radiation dose.

Design: cross-sectional, prospective, observational

Patients: 1,965

Centers: 50

Countries: Europe, United States

RESULTS: A 10-kg increase in patient weight was associated with increased dose-length product (relative effect on dose-length product, 5%; 95% CI, 4%-6%). The absence of a stable sinus rhythm (10%; 95% CI, 2%-19%) was also associated with an increased dose-length product. Electrocardiographically controlled tube current modulation (-25%; 95% CI, -23% to -28%) and 100-kV tube voltage (-46%; 95% CI, -42% to -51%) were associated with decreases in dose-length product. A 1-cm increase in scan length was associated with an increase in dose-length product (5%; 95% CI, 4%-6%).

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