

# Cardiology today

NEWS & PERSPECTIVE FOR THE CARDIOVASCULAR SPECIALIST

## PROTECTION II: Reduced tube voltage does not reduce image quality for coronary CTA

Radiation doses were lowered in patients without obesity when 100 kV tubes were used.

*By*

**Society of Cardiovascular Computed Tomography 4th Annual Scientific Meeting**

A coronary computed tomography angiography protocol using 100 kV tube voltage delivered a lower radiation dose without reducing image quality.

The researchers for the PROTECTION II study enrolled 400 patients with body weight <90 kg and stable sinus rhythm in the study. They randomly assigned patients to receive either coronary CTA with a tube voltage of 120 kV (n=198) or 100 kV (n=202). The primary endpoint was the demonstration of noninferiority in the diagnostic image quality compared with that of the 120 kV protocol. The radiation dose estimates, according to the researchers, were derived from the dose length product and conversion coefficient for the chest.

According to the researchers, patients who underwent coronary CTA with the 100 kV protocol had an image quality score of 3.30, compared with 3.28 in the 120 kV group ( $P=.742$ ). The mean radiation dose was reduced from 12.1 mSv in the 120 kV group to 8.4 in the 100 kV group ( $P<.0001$ ). The researchers reported that the 100 kV protocol was noninferior to the 120 kV protocol as demonstrated by the 95% confidence interval of the difference (-0.11 to 0.15), which did not cross the specified noninferiority margin of -0.2 ( $P=.0005$  for noninferiority).

“A tube voltage of 100 kV should be considered as standard scan protocol in non-obese patients to keep coronary CTA radiation exposure as low as reasonably achievable,” **Jörg Hausleiter, MD**, an associate professor of medicine at the German Heart Center in Munich, concluded in his presentation.” – *by Eric Raible*

**IMAGING**

**PROTECTION II**  
Prospective, Randomized Trial on Radiation Dose Estimates of CTA in Patients Scanned With the 100 kV Protocol

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Trial compared radiation doses between a 120 kV imaging protocol and 100 kV protocol in patients undergoing coronary CTA.

**Design:** prospective, randomized  
**Patients:** 400  
**Centers:** multicenter  
**Countries:** Germany

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**RESULTS:** Patients who underwent coronary CTA with the 100 kV protocol had an image quality score of 3.30, compared with 3.28 in the 120 kV group ( $P=.742$ ). The mean radiation dose was reduced from 12.1 mSv in the 120 kV group to 8.4 in the 100 kV group ( $P< .0001$ ). The 100 kV protocol was noninferior to the 120 kV protocol as demonstrated by the 95% confidence interval of the difference (-0.11 to 0.15), which did not cross the specified noninferiority margin of -0.2.  $P=.0005$ .

*Presented at: SCCT 2009.*

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For more information:

- Hausleiter J. Oral abstract 01. Presented at: [Society of Cardiovascular Computed Tomography 4th Annual Scientific Meeting](#); July 16-19, 2009; Orlando.

**PERSPECTIVE**

What PROTECTION II shows is that you can do 100 kV scanning and not impair image quality. You can have the same image quality, if you select your patients appropriately, as 120 kV. This means that you can have a substantially lower dose. Lowering the tube voltage to 100 kV lowers the radiation dose by about 40%, so you can have a tremendously low dose and the same image quality as 120 kV.

– **Stephan Achenbach, MD**

Professor of Medicine, University of Erlangen, Germany