A New Method to Reduce Radiation Dose in Multidetector CT while Maintaining Image Quality

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SUMMARY

UCLA scientists have developed an approach that reduces radiation dose to specific radiation- sensitive organs during a helical CT scan while maintaining image quality.

BACKGROUND

At more than 60 million scans per year in the U.S, computed tomography (CT) is a major contributor to the increased collective radiation received by patients. Concerns over ionizing radiation received by patients have been compounded by evidence for a small radiation-associated cancer risk from exposure comparable to a few CT scans. To address these concerns, various approaches to reduce radiation from CT scans have been developed, including tube current modulation (TCM), and intensity and energy adjustment of the x-ray. Although these techniques have had success at reducing overall radiation, they lack anatomical specificity, and ability to target specific radiation sensitive organs for radiation dose reduction.

INNOVATION

UCLA scientists have developed a method to specifically reduce radiation dose to selected organs during a conventional helical CT scan performed on a patient. This innovation exploits the significant dose variations when CT scanning is performed to reduce dose to targeted radiosensitive organs solely by varying the tube start angle in CT scans.

APPLICATIONS

- Reduce radiation dose to selected organs during helical CT scan.

ADVANTAGES

- For pediatric patients, radiation dose is reduced 40% to 60%
- Pregnant patients at early gestational stage (<10 weeks), dose reduction to fetus can be up to 35%
- This method could serve as a complementary approach to TCM for pediatric patients
- Image quality is maintained

STATE OF DEVELOPMENT

The method and calculations have been developed and tested by simulations using a CT model, which was rigorously validated by physical measurements. Software with graphical interface has been developed to provide optimal x-ray source positioning based on necessary inputs.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,058,302	08/28/2018	2009-759

RELATED MATERIALS

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OTHER INFORMATION

KEYWORDS

Imaging, computer software, diagnostic, imaging, computed tomography, x-ray source

CATEGORIZED AS

- **Computer**
  - Software
- **Imaging**
  - Medical
    - Diagnostics
    - Imaging

RELATED CASES

2009-759-0

▶ Reducing Dose to a Small Organ by Varying the Tube Start Angle in a Helical CT Scan

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