CT Lung Screening at the Radiation Dose of a Chest X-ray

Patient history

An 80 year old woman with a long smoking history presented with a 3 month history of shortness of breath and weight loss. She was referred for a chest X-ray and then a CT scan of the chest.

Technology

The examination was performed with the latest energy filter technology called SilverBeam. This filter, specifically designed for Aquilion CT scanners, optimizes the x-ray beam by filtering out the low energy photons. Low energy photons do not contribute to image quality but increase dose and scattered radiation.

When combined with Canon Medical's Advanced intelligent Clear IQ Engine (AiCE) technology, SilverBeam filter can harness the power of artificial intelligence to deliver high-resolution and low-noise images for applications such as lung screening.

Findings

The chest X-ray demonstrates hyperexpanded lungs. It is not possible to exclude malignancy or emphysema.

The SilverBeam scan provided excellent image quality, and the use of AiCE resulted in a significant improvement in image quality compared to FBP. The SilverBeam AiCE images demonstrate severe generalized emphysema, particularly affecting the lower lobes bilaterally which was not seen on the chest x-ray. Lung malignancy can be confidently excluded and no further investigations were needed.

"SilverBeam combined with AiCE Deep Learning Reconstruction could mark the end of the chest x-ray."

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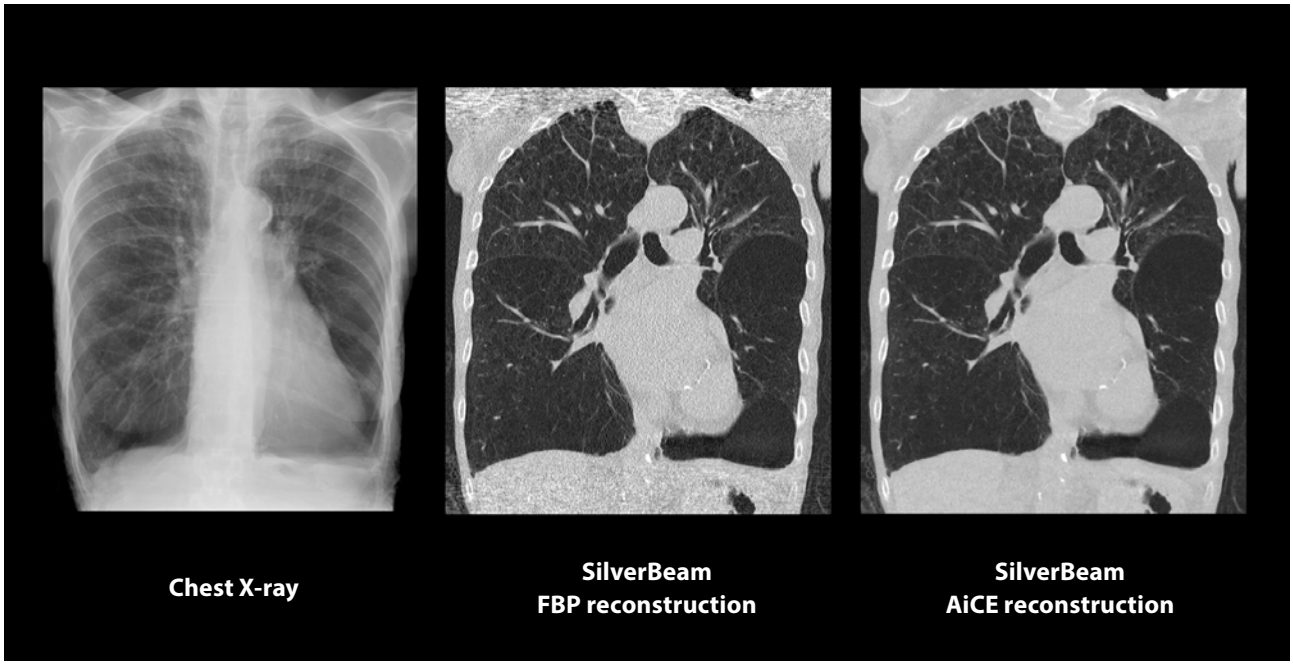


Acquisition

SCANNER MODEL:
Aquilion Serve

SCAN MODES:
Scano and Helical scan

COLLIMATION:
0.5 mm x 80

EXPOSURE:
120 kV, 50 mA

ROTATION TIME:
0.5 s

TOTAL CTDI VOL:
0.22 mGy

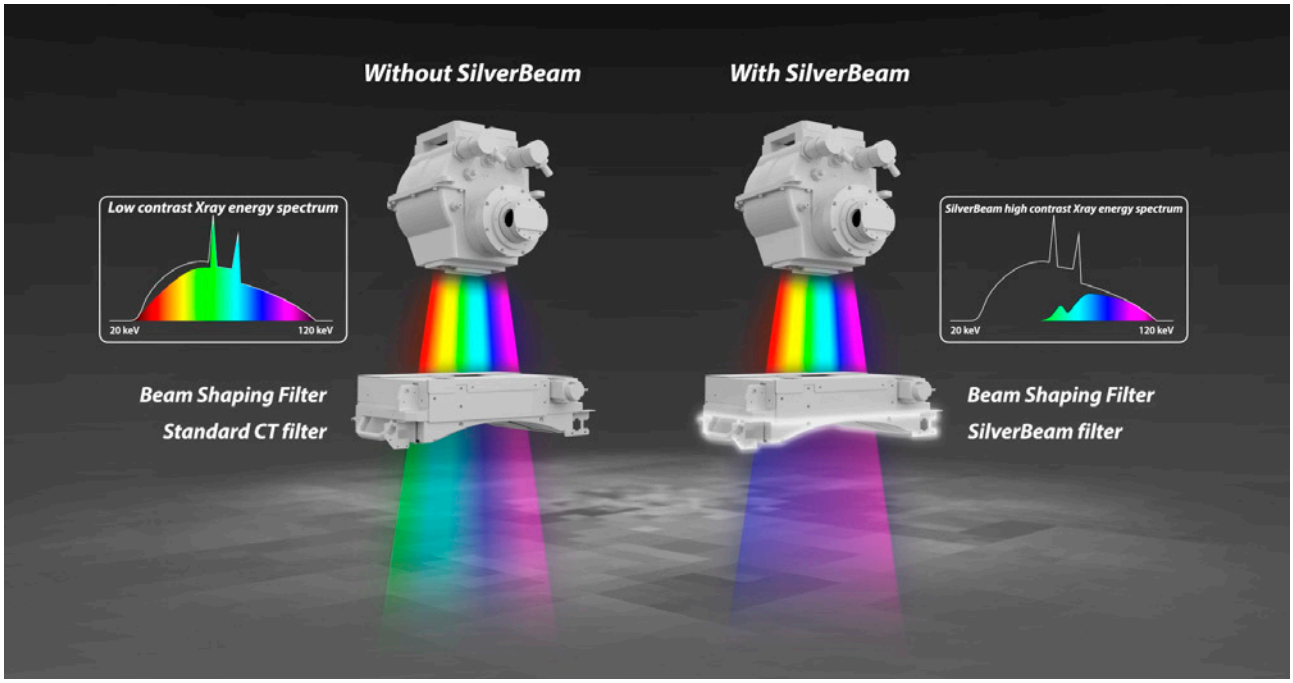
TOTAL DLP:
8.69 mGy-cm

TOTAL EFFECTIVE DOSE:
0.12 mSv

K-FACTOR:
0.014*1

Reference

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



SilverBeam, leverages the photo-attenuating properties of silver to selectively remove photons from a polychromatic x-ray beam leaving an energy spectrum designed for low dose lung screening as shown in the image above.