

Aquilion ONE Clinical Evidence: Dual Energy

[Iterative Reconstruction May Improve Diagnosis of Gout](#)

Torsten Diekhoff, Maximilian Kotlyarov, Jürgen Mews, Bernd Hamm, and Kay-Geert Armin Hermann

Invest Radiol. 2018 Jan;53(1):6-12

- The analysis using two phantoms demonstrated that AIDR3D standard and AIDR 3D Strong produced better results than FBP and should be applied clinically

[Osteitis: a retrospective feasibility study comparing single-source dual-energy CT to MRI in selected patients with suspected acute gout.](#)

Diekhoff T, Scheel M, Hermann S, Mews J, Hamm B, Hermann KA

Skeletal Radiol. 2017 Feb;46(2):185-190. doi: 10.1007/s00256-016-2533-1. Epub 2016 Nov 21.

- This paper extends the applications of the Virtual Non Calcium (VNC) image application to osteitis in small bones as seen in arthritic conditions. Other bone conditions such as Osteo Myeloma may also exhibit bone edema, and therefore can be evaluated with Dual Energy and the VNC image.

[Single source dual-energy computed tomography in the diagnosis of gout: Diagnostic reliability in comparison to digital radiography and conventional computed tomography of the feet.](#)

Kiefer T, Diekhoff T, Hermann S, Stroux A, Mews J, Blobel J, Hamm B, Hermann KG.

Eur J Radiol. 2016 Oct;85(10):1829-1834. doi: 10.1016/j.ejrad.2016.08.004.

- SPECT is capable to detect uric acid depositions with good sensitivity and high specificity in feet, therefore diagnostic confidence is improved. Using SPECT, inter-reader variance can be markedly reduced for the detection of gouty tophi.

[Impact of reduced-radiation dual-energy protocols using 320-detector row computed tomography for analyzing urinary calculus components: initial in vitro evaluation.](#)

Cai X, Zhou Q, Yu J, Xian Z, Feng Y, Yang W, Mo X.

Urology. 2014 Oct;84(4):760-5

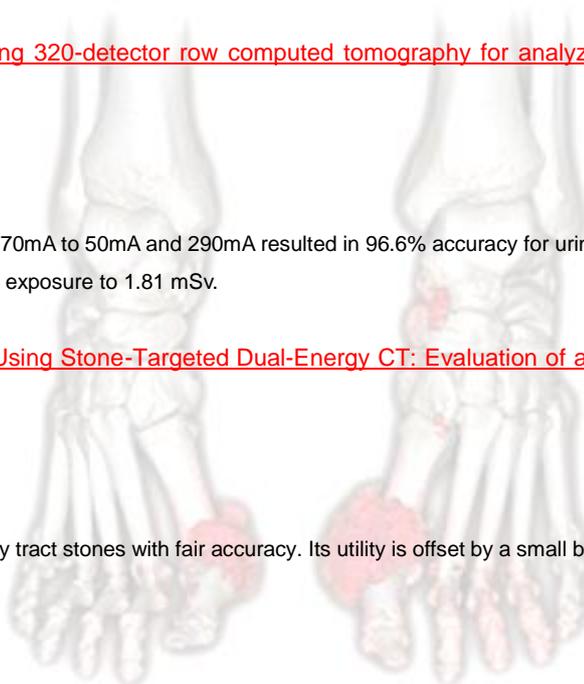
- Decreasing the DE tube currents from 100mA and 570mA to 50mA and 290mA resulted in 96.6% accuracy for urinary calculus component analysis while reducing patient radiation exposure to 1.81 mSv.

[Determining the Composition of Urinary Tract Calculi Using Stone-Targeted Dual-Energy CT: Evaluation of a Low-Dose Scanning Protocol in a Clinical Environment](#)

Chaytor RJ, Rajbabu K, Jones PA, McKnight L

Br J Radiol. 2016 Nov;89(1067):20160408

- DECT is able to determine the composition of urinary tract stones with fair accuracy. Its utility is offset by a small but significant supplementary radiation exposure



[Dual-energy CT virtual non-calcium technique for detection of bone marrow edema in patients with vertebral fractures: A prospective feasibility study on a single- source volume CT scanner.](#)

Diekhoff T, Hermann KG, Pumberger M, Hamm B, Putzier M, Fuchs M.

Eur J Radiol. 2017 Feb;87:59-65

- Detecting BME with single-source DECT is feasible and allows detection of vertebral compression fractures with reasonably high sensitivity and specificity. DECT might accelerate the diagnostic work-flow in patients with vertebral compression fractures in the future and reduce the number of additional MRI examinations.

[Dual-energy CT virtual non-calcium technique for detection of bone marrow edema in patients with vertebral fractures: A prospective feasibility study on a single- source volume CT scanner.](#)

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[Detection and characterization of crystal suspensions using single-source dual-energy computed tomography: a phantom model of crystal arthropathies.](#)

Diekhoff T, Kiefer T, Stroux A, Pilhofer I, Juran R, Mews J, Blobel J, Tsuyuki M, Ackermann B, Hamm B, Hermann KG.

Invest Radiol. 2015 Apr;50(4):255-60

- This phantom study shows that single-source DECT allows detection and characterization of crystal deposits when present in soft tissue at relatively low concentrations.

[First experience with single-source dual-energy computed tomography in six patients with acute arthralgia: a feasibility experiment using joint aspiration as a reference.](#)

Diekhoff T, Ziegeler K, Feist E, Kiefer T, Mews J, Hamm B, Hermann KG

Skeletal Radiol. 2015 Nov;44(11):1573-7.

- Our initial experience suggests that single source DECT is capable of distinguishing between tophaceous gout and other arthralgic diseases

[Acute vertebral fracture after spinal fusion: a case report illustrating the added value of single-source dual-energy computed tomography to magnetic resonance imaging in a patient with spinal instrumentation.](#)

Fuchs M, Putzier M, Pumberger M, Hermann KG, Diekhoff T.

Skeletal Radiol. 2016 Sep;45(9):1303-6

- Bone marrow assessment using DECT is less susceptible to metal artifacts than MRI, resulting in improved visualization of vertebral edema in the vicinity of fused vertebral bodies

[Measurement of electron density and effective atomic number by dual-energy scan using a 320-detector computed tomography scanner with raw data-based analysis: a phantom study.](#)

Tatsugami F, Higaki T, Kiguchi M, Tsushima S, Taniguchi A, Kaichi Y, Yamagami T, Awai K.

J Comput Assist Tomogr. 2014 Nov-Dec;38(6):824-7.

- Electron densities and effective atomic numbers can be determined by raw data based dual energy with high accuracy, which may help to improve accuracy in radiotherapy treatment planning.