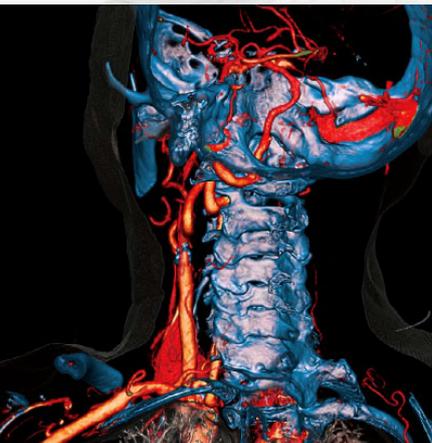




“With the Flash, Dual Energy becomes just part of CT making it routine and commonplace.”

Elliot Fishman, MD, FACR
Radiologist, Johns Hopkins Hospital
Baltimore, MD, USA



Current Challenges:

- Extra dose and time for unenhanced scanning prior to contrast studies e.g. in liver imaging.
- CTA in bony regions or calcified vessels require manual postprocessing and are prone to error.¹
- Single source CT is limited to one contrast and morphological information only.

Unique ‘Flash’ Solutions:

- Save dose and time with DE virtual non-contrast.
- Accurate DE bone and calcification removal to routinely see true degree of stenosis in < 1 min.²
- Always a second contrast that allows for tissue differentiation.

Single dose – Dual Energy

SOMATOM Definition Flash

Answers for life.

SIEMENS

Challenge:

Extra dose and time for unenhanced scanning prior to contrast
e.g. in liver imaging

For imaging of stroke and oncology patients

- In the US > 197.8 million diagnostic oncology procedures were performed in 2006.³ 1,444,920 new cancer cases and 559,650 deaths in 2007 making it the second leading cause of death after heart disease.⁴ Direct annual cost in the US is \$89.0 billion.⁵
- Stroke remains third leading cause of death. Each year, ~795,000 Americans suffer from stroke. Direct and indirect cost for 2009 is about \$68.9 billion.⁷

Solution:

Save dose and time with DE virtual non-contrast (VNC)

- In oncology, unenhanced CT serves for staging and evaluating clinically significant incidental findings.⁷ In the brain, it helps to evaluate the size of bleeding in subarachnoid hemorrhage, and hyperdense areas serve as early predictor of stroke.¹⁴ Also DE VNC seems to be a promising therapy monitoring in oncology patients who are undergoing anti-angiogenic drug treatment. The visualization of iodine content in tissue and a tumor shows treatment response within 10–15 days instead of eight weeks.¹⁵
- With the 'Flash' every scan can be a virtual non-contrast scan eliminating extra workflow steps and dose for the extra unenhanced scan.

Challenge:

CTA in bony regions or calcified vessels require manual postprocessing and are prone to error¹

Relevant in patients with arteriosclerosis and peripheral artery disease. This ranges from diseases of arteries and veins to lymph vessels.

- In 2007, a total of 5.9 million CTA procedures had been performed in the USA with an annual growth rate of 15%. Based on those numbers, almost 74% of US CT sites will be providing CTAs by the end of 2009.⁸
- Calcifications or bony structures close to vessels, for example in the skull base, can render the assessment of the vessel lumen.⁹ Manual bone/calcification removal is time-consuming and prone to errors.^{1, 10}

Solution:

Accurate DE bone and calcification removal to routinely see true degree of stenosis in < 1 min.

- The direct subtraction of bone is achieved in < 1 min.² with a high degree of accuracy as compared with conventional bone removal techniques.¹¹ Additionally, critical small vessels such as an accessory upper pole renal artery can easily be preserved.
- Using DE acquisitions, abdominal CTA segmentations can be performed, eliminating manual postprocessing steps and thereby significantly reducing reporting time.¹¹

Challenge:

Limited to one contrast and display of pure morphological information only

Relevant for coronary heart disease (e.g. for myocardial viability) and oncology patients (e.g. for the evaluation of tumor metabolism).

- Especially for the 197.8 million diagnostic oncology procedures, (US, 2006³), an immediate second contrast would be of major advantage for a faster and more reliable therapy decision.
- Usually the patients undergo a subsequent 20–30 min. PET/CT¹² or a 30 min. to 4 hour nuclear study¹³. Added to that, those modalities are often not in place at the institution or they are busy.

Solution:

Always a second contrast that allows for tissue differentiation

- The SOMATOM Definition Flash always adds a second contrast to your initial CT data. This allows for immediate incremental information like tissue differentiation.
- Situations where DE could help to aid and streamline the therapy decision are the differentiation of renal masses, identification and differentiation of uric acid and calcified stones, or the general assessment of perfusion defects for tissue viability at the onset of stroke.

¹ D. Fleischmann, et al., Computed Tomography Angiography: A case study of peripheral vessel investigation. MedVis 2001

² Internet link: <http://www.radiology.ucla.edu/radweb/sections/dcvil/news/DualEnergyCTImage.jsp>

³ U.S. Markets for Diagnostic Oncology Products, medtechinsight, Windhover Information, Inc. August 2007

⁴ Ahmedin Jemal, et al., Cancer Statistics, 2007, CA Cancer J Clin 2007;57:43–66

⁵ Cancer facts & figures 2008, American Cancer Society, 2009

⁶ Heart Disease and Stroke Statistics 2009 Update, Circulation 2009;119:e21–e181

⁷ Medhat M. Osman, et al. Clinically Significant Incidental Findings on the Unenhanced CT Portion of PET/CT Studies, Journal of nuclear medicine, Vol.46, Nr.8, August 2005

⁸ 2007 CT Market Summary Report, 2008 IMV Medical Information Division, Inc., March 2008

⁹ Jeffrey C. Weinreb, MRA, CTA Vie for Vascular Imaging Prominence, 24th Annual Course of the Society of CT & MR (SCBT/MR), Medscape 2001

¹⁰ P. T. Johnson, E. K. Fishman, et al. Automated Multidetector Row CT Dataset Segmentation with an Interactive Watershed Transform Algorithm: Part 2 - Body CT Angiographic & Orthopedic

Applications, Journal of Digital Imaging, Volume 21, Number 4 / Dezember 2008

¹¹ News from ISMRM 2008, Abdominal CTA With Direct Dual Energy Bone Subtraction, Diagnostic Imaging online, 18. September 2008

¹² Internet link: <http://www.radiologyinfo.org/en/info.cfm?PG=pet>

¹³ Internet link: <http://www.gmcimaging.org/spect-ct-radiology-gwinnett-radiology-atlanta-georgia.htm>

¹⁴ S. E. Kasner, Predictors of Fatal Brain Edema in Massive Hemispheric Ischemic Stroke. Stroke. 2001;32:2117-2123

¹⁵ Oncology poised to gain from perfusion studies, New Dimensions in CT Newsletter, Diagnostic Imaging Online, August 2008

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