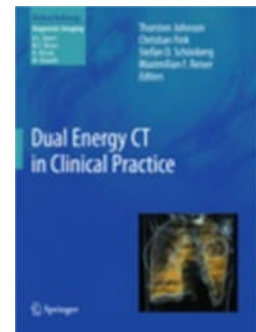


### *Dual Energy CT in Clinical Practice*

*Author(s):* Johnson/Fink/Schoenberg/Reiser  
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*The concept of dual energy CT (DECT) was realised by Godfrey Hounsfield who, as early as 1973, wrote “two pictures are taken of the same slice, one at 100kV and the other at 140kV.... so that areas of high atomic numbers can be enhanced. Tests carried out to date have shown that iodine ( $z = 53$ ) can be readily differentiated from calcium ( $z = 20$ ).” This prophetic statement did not become clinically viable until 2006 when technology caught up with theory.*

*Dual Energy CT in Clinical Practice reviews both the physical principles behind the concept and the clinical possibilities that have so far been explored.*

*The first 50 pages are devoted to physics and instrumentation. This really is worth reading, particularly as there are several different ways of obtaining dual energy information, each one championed by a different manufacturer.*

*Tantalisingly, note is made of the development of single photon detectors that can detect the exact energy of every x-ray photon passing through the body, paving the way for true CT molecular imaging. This will deliver greatly enhanced tissue differentiation on a scale that is awe-inspiring, but development still has a long way to go. A final chapter in this section discusses post-processing with emphasis on three different image types, namely blended, material-selective and energy-selective. The remainder of the book is devoted to clinical applications, with examples mainly using the dual source technique.*

*Applications hinge on the ability of DECT to distinguish calcium, iodine and urate separately and reliably from other tissues. Thus, beautiful CT angiograms can be obtained free of bone and calcified plaque. Examples of lower limb angiography are particularly impressive.*

*Urate imaging allows confident diagnosis of uric acid stones in the urinary tract and also the diagnosis of gout.*

*Separating iodine from the other components of the scan allows the production of perfusion maps useful in pulmonary embolism imaging and myocardial perfusion. Perfusion imaging of lung tumours helps in both diagnosis of malignancy and monitoring response to treatment.*

*The increased sensitivity to iodine enhancement might promise greater conspicuity of small hepatic and pancreatic tumours, but initial results do not overwhelm.*

*As each chapter is written by a different author there is rather a lot of duplication of material, particularly relating to physical principles and instrumentation. I feel the editors should have been stricter here and tried to make the book more of a whole rather than a collection of monographs. Also there are too many wrong words, grammatical errors and even some neologisms – have you ever come across the word “which’s”? It sort of makes sense but is a new one to me!*

*However, I learnt a lot from this book and was excited by the possibilities of DECT. For anyone with anorak tendencies or an interest in the future of CT, I would recommend they seek out a copy, although the price is somewhat prohibitive.*

*At the moment DECT is not quite there and I don't know if it may end up as another bell/whistle added to every CT scanner (rather like power Doppler and harmonic imaging on ultrasound machines), to be used once in a while. But maybe it will occupy a more fundamental position. Perhaps with the development of single photon detectors we will witness a quantum (excuse the pun) leap in the world of imaging.*

*Hounsfield GN (1973) Computerised transverse axial scanning (tomography): part I. Description of system. Br J Radiol 46:1016-1022.*

***This book can be purchased through the RAD Magazine Book Service at the discounted rate of £141.75. (Price correct as at August 17, 2011). For more information please call (01371) 812960.***