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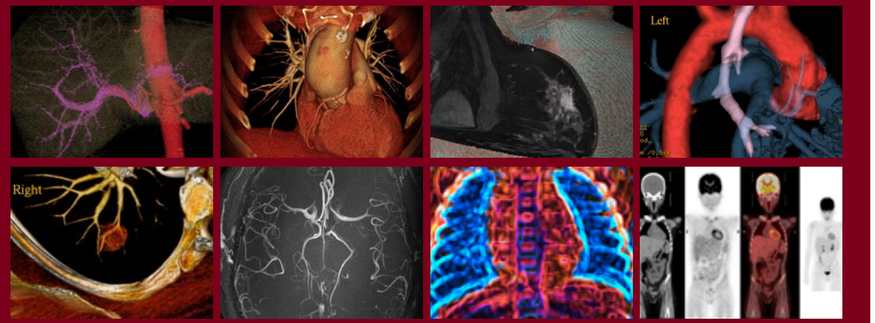

CME RADIOLOGY GRAND ROUNDS

Presents

"CT Technology: A Clinical Update

Dominik Fleischmann, MD
Professor of Radiology
Stanford University

Thursday, April 18, 2013
5:30 PM - 6:30 PM
LPCH Freidenrich Auditorium

**Reception to follow 6:30 PM - 7:00 PM*

Course Directors: Sanjiv Sam Gambhir, MD, PhD
Andrei Iagaru, MD

ABSTRACT

Computed Tomography (CT) is a powerful diagnostic imaging tool, with more than 70 million CT scans obtained in 2007 in the US alone. CT technology has dramatically evolved over the last decades, and substantial innovations are introduced into clinical practice in relatively short intervals. While novel powerful CT technology has allowed a wide range of new applications to emerge, this poses several challenges: (1) First, the essence of the innovations published in the technical literature (if published at all) is not necessarily easy to understand. The more digestible marketing material provided by the vendors is typically insufficient to assess and compare scanner capabilities. (2) Once purchased, the implementation of new CT technology into an existing practice is another challenge: New protocols have to be developed, and new applications have to be specified and coordinated with existing equipment. This is not straightforward, because clinical strengths and limitations of a new technology have not yet been evaluated. Early 'clinical' publications from 'luminary sites' tend to overstate the strengths of a new system. (3) Third, new scanner capabilities have substantially increased the complexity of CT scanner operation, not only for special applications. (4) Finally, there is growing public concern regarding radiation exposure from CT with recent regulatory reverberations in California. While the overall benefits of a clinically indicated CT are usually not in doubt, the rapid evolution of CT makes it difficult to design and interpret clinical effectiveness trials which require long study periods to complete.

This presentation will provide a brief overview of current CT scanner technology. Innovations in hardware, such as x-ray tubes, numbers of x-ray sources, detector bank design, as well as new scanning modes, dual energy / spectral CT, and new image reconstruction algorithms will be briefly explained.

The main portion of this talk will focus on the most recent CT scanner upgrades and purchases at Stanford Hospital and Clinics, as an illustration how new technology is embedded in a highly subspecialized academic practice. This will include a discussion of the scanner specifications, strengths and limitations of each machine, and how these factors determine expected applications, and scanner locations. This talk will also explain how we plan to implement new protocols, train technologists and house-staff, and maintain enterprise wide dose hygiene and regulatory standards.

Technical emphasis will be on latest dual-source CT technology (Siemens Flash; Stanford Hospital), and on latest iterative image reconstruction technology ('VEO', GE Discovery 750HD; SMIC). The second-generation dual-source technology provides unprecedented temporal resolution and acquisition speeds, for all acute, pediatric, and cardiovascular applications. Iterative image reconstructions have great dose savings potential, but the relationship between radiation dose, image noise, and image quality is fundamentally different when compared to current CT technology. This is important to understand in order to take advantage of the full capabilities of such new technology.

Accreditation

The Stanford University School of Medicine is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Credit Designation

The Stanford University School of Medicine designates this live activity for a maximum of 1.00 *AMA PRA Category 1 Credit(s)™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Cultural and Linguistic Competency

California Assembly Bill 1195 requires continuing medical education activities with patient care components to include curriculum in the subjects of cultural and linguistic competency. The planners and speakers of this CME activity have been encouraged to address cultural issues relevant to their topic area. The Stanford University School of Medicine Multicultural Health Portal also contains many useful cultural and linguistic competency tools including culture guides, language access information and pertinent state and federal laws. You are encouraged to visit the portal: http://lane.stanford.edu/portals/cultural.html