Big Bore CT

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Obesity in the USA

• 2009: Obesity rose in 23 states (BMI>30)
• No state had a decline
• Nearly 2/3 of states have rates > 25%
• Colorado is best at 18.9%
• Costs: $75B billion direct costs, $139B total (6% total health care dollars)
• Costs projected to double every decade
OBESITY TRENDS* AMONG U.S. ADULTS
BRFSS, 1991 and 2006-2008 Combined Data
(*BMI >30, or about 30 lbs overweight for 5’ 4” person)

1991

2006-2008 Combined Data

Source: Behavioral Risk Factor Surveillance System, CDC.
Imaging response

- Higher table weights
- Big bore or open CT, MRI
- Lower frequency US transducers
- Room redesign
- Lifting strategies
Big bore CT

• Recently available from several manufacturers
  – GE, Philips, Siemens, Toshiba
• Uses: Bariatrics, radiation Rx planning, trauma, intervention, ICU patients
• 80-90 cm bores available (conventional=70 cm), 16-40 channels
• Be sure to check table weight limit (may not be as high as you think)
• Get extended field of view if an option
  – Increases recon from 50 cm to 65-80 cm
Artifact from patient out of field of view
Big bore CT

• Conventional CT bores=70 cm
• However, table takes up 15-18 cm top-bottom, so not all space is usable
Conventional CT: Patient was touching sides of bore

Big Bore CT: lots of working space for needles, probes, etc.
Retroperitoneal biopsy: tremendous working room
Hoyer lift

• Consider a lift if purchasing a big bore CT
Why aren’t all CT’s big bore?

• Simple answer: Angular momentum $L=r \times mv$
  
  $r=$radius, $m=$mass, $v=$velocity
Why aren’t all CT’s big bore?

- Tube/detectors weigh about 1 ton
- Tremendous G-forces generated as it rotates
- Wear on bearings, other support structures
- Gantry speed limited (~.5 S), therefore some limitations to certain protocols (CCTA)
- Tube current limited (increased distance means need more current to penetrate)
Image Quality

• No different between large bore, standard bore for same absorbed radiation dose
• However, no 64 detector row scanners yet available
Radiation Dose

• Need to increase mAS by ~25% to compensate for increased distance
• However, absorbed dose to patient is ~25% less
• Therefore, no difference in absorbed dose
• However, bariatric patients need higher dose to penetrate tissue