

OPTIMISATION OF TRAUMA CT PROTOCOLS USING MODERN MSCT TECHNOLOGY.

Mats O. Beckman, M.D.

BACKGROUND

Patient irradiation dose due to diagnostic radiology is an increasing cause for concern.

Recent estimates are that in Sweden with a population of ca 9 Million people about 150 cancers per year are caused by diagnostic procedures. In other countries similar calculations can be made (UK 700) Gonzales et al Lancet 2004.(About 30000 cancers every year are diagnosed in Sweden.)

Computed tomography accounts for about 5% of the diagnostic procedures but for about 34% of the dose attributable to diagnostic radiology. (UNSCEAR 2000)

Doses delivered by CT of the brain to young children may impair intellectual development (Hall et al BMJ 2004)

An increase by 10-30% may occur with multislice CT. (ICRP)

What can be done to reduce the patient dose?

Adapt the delivered dose to the organ and structure examined.

-Brain, low contrast high dose

-C-spine high contrast low dose

Adapt the dose to the density of the organ/patient.

Adapt the dose to the contrast necessary for image interpretation.

Adapt the dose to the image quality necessary for diagnosis.

Don't scan the same area multiple times or with overlap.

Use computer resources to reconstruct images with overlap to improve the quality of reconstructions.

What is the optimum reconstruction interval?

Pitfalls in using current modulating techniques include patient positioning and the introduction of radioopaque items in the scanning field- anaesthesiological equipment as well as patient pocket contents.

Never lower doses so much that diagnostic value is lost!!

Demands on manufacturers: Better detectors with less radiation loss. Real time reconstruction algorithms. Adequate network solutions. Better reconstruction mathematics to avoid pitch artifacts.

Example of uses of MSCT:

C-spine examination at KUS- Solna: High "noise index", overlapping reconstruction, evaluation in workstation environment and combination with facial examination result in doses comparable to plain x-ray.