



Service Priorities and Programmes
Electronic Presentations

Convention ID: 16

Submitting author: Dr Cheuk Hang Sunny LAM

Post title: Resident, Kwong Wah Hospital, KWC

Radiation dose reduction using adaptive statistical iterative reconstruction (ASIR) equipped CT machine

Lam CH(1), Chan YK(1), L Yeung(2), Fong CY(1)

Department of Radiology, Kwong Wah Hospital (1) Department of Radiology, Our Lady of Maryknoll Hospital (2)

Keywords:

iterative

Radiation dose

CT

Introduction

New CT reconstruction algorithms can be used to reduce radiation doses. Filtered back projection (FBP) is the standard algorithm used to create CT images but it produces noisy images when the tube current is low. Iterative reconstruction is an alternative reconstruction algorithm that can remove the noise from low-dose images using a variety of mathematic models. Adaptive Statistical Iterative Reconstruction (ASIR, GE Healthcare) is a newly developed iterative reconstruction algorithm. Starting with the image produced by the FBP algorithm and using a noise model as a reference, ASIR uses matrix algebra to repeatedly transform the pixel Hounsfield values until they converge to a final value. Compared with FBP, this results in less image noise at a given radiation dose. Alternatively, this allows equivalent image noise at a reduced radiation dose.

Objectives

The aim of this audit is to assess the amount of radiation absorbed by the patients through calculating the effective doses obtained during CT examinations using ASIR equipped GE VCT in OLMH and to compare with radiation dose absorbed by patients using GE VCT (not ASIR equipped) in KWH.

Methodology

From Sep 2012 to Dec 2012, 360 consecutive cases referred from different units were collected in the survey period. A newer model of GE VCT (ASIR equipped) was used for all cases. The degree of ASIR blending varies from 30% to 40% in examinations of different body parts. The exposure factors including KV, mAs and noise index were adjusted according to the departmental protocols and the medical pathologies. The Dose-Length Product (DLP) was displayed automatically in terms of dose report after each CT examination. The data were then recorded and calculated for effective doses accordingly.

Result

The mean effective doses of examinations performed with ASIR equipped VCT in

OLMH are significantly lower in general. Dose reduction in thorax (PC), abd+pelvis (PC), thorax+abd+pelvis and adrenal CT examination are up to 49.8%, 24%, 51.5% and 69% respectively compared with the result in KWH. The image quality was assessed by interviewing different independent radiologists and there was no qualitative loss of diagnostic value.