Service Priorities and Programmes

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First Audit of effective dose of CT exam. in OLMH

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Introduction

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. Adaptive Statistical Iterative Reconstruction (ASIR, GE Healthcare) is a newly developed iterative reconstruction algorithm. Starting with the image produced by the FBP (Filtered back projection) 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. The data was then compared with the same CT machine in KWH but without the ASIR equipped.

Objectives

1) Implementation of a radiation monitoring project on the newly installed Computed Tomography Machine. 2) Set up a baseline for radiation dosage monitoring for CT examination in OLMH for future reference.

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. The data was compared with the third audit report on effective dose of CT examinations (except brain) in Kwong Wah Hospital.

Result

In this audit, the radiation dose CT examinations performed with ASIR algorithm is significantly lower, up to 69%. The image quality was assessed by interviewing different independent radiologists and there was no qualitative loss of diagnostic value. The current protocol is using a milder ASIR of 30% blending in abdomen (PC) compared with rest of the torso examinations in which 40% ASIR was used. In some literature, image from 70% ASIR can still produce reasonable diagnostic value. More aggressive strategy can be contemplated in abdomen (PC) examination in the future. In this audit, CTDI was not calculated. In future audit, it could be included for better assessment of radiation dose exposure.