Clinical Audit - Radiation Safety of Double Contrast Barium Enema (DCBE) in Adult Patients

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Introduction
Colorectal carcinoma is one of the most common cancers in Hong Kong. Methods to examine the large bowel include colonoscopy, CT virtual colonography and double contrast barium enema. Despite the emergence of colonoscopy and CT colonography, DCBE is still frequently performed at our institute to assess the colon. It is also the most common fluoroscopic examination carried out in our department. Therefore, it is essential to monitor the radiation safety of the procedures so as to ensure patient safety.

Objectives
We aim to evaluate the dose area product and fluoroscopy time of DCBEs performed for adult patients at our institution, and to compare with data from the literatures.

Methodology
All double contrast barium enema studies performed for adult patients in the period of 1st Jan, 2014 to 30th Jun, 2014 were reviewed. Incomplete examinations, e.g. due to patient incontinence were excluded. Clinical data, radiation dose and fluoroscopy time of procedures were retrieved from ePR (Electronic Patient Record) and PACS (Patient Archiving and Communication System). Student T-test was used for statistical analysis. Diagnostic reference level from British data was used as standard [1]. The target was set at >90% dose area product per examination <21 Gycm2; and >90% fluoroscopy time per examination <2.6 minutes.

Result
A total of 342 (n=342) complete examinations were performed during the period. Mean age of subjects was 62.6-year-old, male to female ratio was 0.9:1. Mean total dose area product (DAP) was 3.67 Gycm2, with none of them exceeding the diagnostic reference level. Mean fluoroscopy time was 0.32 minute, with only 2.3% of cases exceeding the diagnostic reference level. Subgroup analysis showed that higher trainees performed DCBEs with significantly less fluoroscopy time than basic trainees (0.09 compared with 0.47 minute, P-value 0.00001). On the contrary, total dose area product (DAP), dose area product attributed to fluoroscopy (DAPF) and dose area product attributed to digital radiograph (DAPDR) were comparable in both groups. Our radiologists, both higher and basic trainees, performed equally well in term of radiation dose of DCBEs. Targets could be met for both indicators. DAP of our examinations was just ~17.5% of international diagnostic reference level. Evening taking smaller body size of Asian population into consideration, our result was still well above the standard. Fluoroscopy time was slightly but significantly longer in basic trainee group. Intermittent instead of continuous fluoroscopic screening during examinations should be advocated to keep the radiation dose to patient as low as reasonably practicable.