AbstractID: 9222 Title: Operation Logic of Coventional FluoroscopyAutomatic Brightness Control

Purpose: New generation of fluoroscopic imaging systems are equipped with spectral shaping filters complimented with sophisticated automatic brightness (and image quality) control logic called fluoroscopy curve or trajectory. Such fluoroscopy curves were implemented first on cardiovascular systems, and are now available on conventional fluoroscopy equipment. This study is to investigate the control logic operations under the fluoroscopy and spot filming/acquisition modes of a conventional fluoroscopy system typically installed for Upper-Lower GI Examination Suites, Interventional Endoscopy Laboratory, Gastrointestinal Laboratory and Pain Clinics.

Method and Materials: A brand new GE Precision 500D fluoroscopy system was chosen for the investigation which was installed in the middle of February 2008. Two radiation detectors were employed to monitor the patient and image intensifier air kerma dose and dose rate as functions of increasing PMMA plastic phantom thickness. The measurement protocol utilized by the AAPM TG 125 was followed as much as possible with some exceptions due to the mechanical constraints. The image quality was evaluated with the NEMA-SCAI phantom at 4", 8", and 12" total phantom thicknesses.

Results: The data analysis and the graphs obtained from this study showed extensive use of copper filters (up to 0.3 mmCu) similar to the cardiovascular imaging systems (up to 0.9 mmCu). However, it is with fewer steps of copper filters and less power input to the x-ray tube, reflecting the differences of clinical applications, and complexity of examinations. As expected, it also showed somewhat narrower dynamic range the imaging system is able to cover with reasonable "penetration" as opposed to that of cardiovascular imaging systems.

Conclusion: It is shown that compared against previous generations of fluoroscopy systems, the new conventional fluoroscopy systems equipped with spectral shaping filters provide reduced patient dose while maintaining reasonable (better than just acceptable) image quality. In-depth discussion will be provided at the presentation.