

Abstract: Implementation of (Low Dose) CT Protocols

Christopher Cagnon, PhD., AAPM 2012 Spring Meeting

As a result of several well publicized incidents involving CT and recognition of the modality as the greatest contributor to the population's medical radiation dose, health care institutions are re-examining their imaging protocols and resultant patient dose. Rapidly evolving CT technology and concerns over pediatric dose require generic scan protocols be adapted to consider both changing scanner capabilities and patient size. Widespread implementation of vendor/scanner specific dose adaptation technologies such as tube current modulation introduce additional variables which can result in unanticipated results if not understood by the user.

While CT scan protocols often have significantly greater impact on diagnostic efficacy and patient dose than scanner calibration and should be tailored to specific clinical application, in actual practice protocol development and review is a process that is often poorly documented or overlooked altogether. An effective protocol review program starts with defining roles and responsibilities of the players involved. The medical physicist is an important team member who needs to understand all of the protocol variables in the context of the scanner design and their impact on patient dose and image quality. The Radiologist must be satisfied that the exams are tailored to a task specific clinical need and are of sufficient diagnostic quality at the lowest practical dose. As the physician, they are also ultimately responsible for the successful implementation of the protocols themselves. The CT technologist of course actually selects and/or modifies the appropriate protocol and administers the exam itself. They are frequently the individuals who have received the most training and are the most familiar with scanner capabilities and the clinical requirements of the exam.

This symposium will explore the roles of the individuals involved with CT protocols and describe the technical variables used in the protocols and their impact on dose and image quality. Current efforts of the Image Gently (pediatric CT dose) and Image Wisely (adult dose) campaigns will be reviewed and processes suggested for assessing, standardizing, and customizing CT protocols.

Learning objectives for this symposium include:

- 1) Understand the basis for concern over CT protocol implementation and the need for a team oriented review of same.
- 2) Defining and understanding the multiple technical factors that comprise a CT protocol and how they impact patient dose and/or image quality.
- 3) Understand how scan protocol factors and technology have evolved and can vary amongst manufacturers.
- 4) Understand how dose adaptive technologies can impact patient dose
- 5) Understanding proposed processes for reviewing and standardizing protocols within a clinical environment.