RO-ILS® RADIATION ONCOLOGY INCIDENT LEARNING SYSTEM
Sponsored by ASTRO and AAPM

CLARITY PSO
A Patient Safety Organization

RO-ILS CASE STUDY 06:
INSUFFICIENT IMAGING FOR SET-UP

Background:

Image guided radiation therapy (IGRT) is a common and widely utilized modality. Daily imaging prior to initiating treatment ensures that the patient is in the correct position and that the intended treatment is delivered to the correct area. To verify positioning and treatment area, the patient must be imaged so that information is available in all three dimensions. The most common method of obtaining this is to take kV images from source angles that are separated by 90 degrees, or orthogonal angles, and then compare these images to the reference images generated by the treatment planning system. The patient or field position can then be adjusted to match the reference images. This process is referred to as kV-kV imaging. Most clinics have limitations on how much adjustment can occur before treatment is given versus when further investigation is required.

Event Summary:

- A patient undergoing a course of radiation therapy was noted to have lost weight.
- The treating radiation therapists performed kV-kV imaging and noted that the images obtained did not match the reference images.
- The therapists adjusted the patient position in an attempt to better match the reference images.
- The therapists re-imaged the patient; however, only a lateral image was obtained.
- Using only the lateral image, the therapists applied the resulting shifts to the patient.
- The patient was treated with these shifts applied.

Lessons Learned:

Radiation therapists utilizing IGRT must be fully cognizant of the need to obtain images that yield information in all three dimensions. In this case, after the adjustment of the patient following the initial, unsatisfactory kV-kV images, the therapists only obtained a lateral kV image to evaluate the effects of their adjustment of the patient position. A lateral image only contains information about the patient's location and position in two dimensions (anterior-posterior and superior-inferior). Information about the patient's position in the right-left direction cannot be obtained from a lateral image. A second image, either anterior or posterior, must be taken and used to analyze the patient's position and field location in three dimensions. While this should be evident to all individuals working in radiation oncology, it is important to note that even the simplest errors do occur. Various contributing factors, whether rushing or distraction, can initiate an event that seems very apparent in retrospect.

It was not indicated in the RO-ILS event form if this resulted in a geometric miss of the target, however, a geometric miss is entirely possible in this scenario. Therefore, department policy should indicate that a complete set of images must be taken following adjustment of the patient's position to ensure accurate positioning of the patient and treatment isocenter. The second therapist can also review shifts and double-check that the necessary images were taken. Lastly, software for automated kV-kV setup requires two images and therefore could be considered as an additional safeguard.

Further Reading:

The American Society of Radiologic Technologists (ASRT) provides a course on portal imaging on their website at: http://asrt.mycrowdwisdom.com/diweb/catalog/item/id/127200/q/t=6453&t=6720&c=40 This course could be used as a refresher for department staff on the correct procedures for utilization of IGRT.

