Surface Guided Radiation Therapy
Dawn Wyatt – VisionRT

1. Why patient positioning is important? High dose radiation to affected area while protecting normal tissues. What role do marks and set-up positioning tools play in accurate treatment?
   a. Accurate patient set-up and tracking
   b. Don't know what happens after you leave the room
   c. Marks do not represent true position
   d. Breathing motion; single isocenter; independent moving parts
   e. Patients relax after set-up
   f. Accurate set-up and maintain that position throughout treatment
2. SGRT = surface guided radiation therapy. SGRT can help in 3 different ways: save time on set-up, reduce the use of immobilization devices; uses 4D CT data
   a. Surface tracking to be used in treatment room, rather than using marks
   b. Cameras with advanced algorithms, real time surface position of patient
   c. Constantly updating
   d. Can be used alone or with traditional imaging
   e. What is patient experience with immobilization?
   f. Using less immobilization is more … less set up time; patient feels more comfortable
   g. Tracking patient at all times; can stop treatment if patient moves outside treatment tolerance
3. Can monitor 1000's of points on patient's skin. If patient moves outside of tolerance, can pause treatment. How does this process work?
   a. Align RT---3 camera pods in treatment room
   b. During set up, pods project on patient surface
   c. Real time capturing 2 d images, software will turn 2D into 3D, with 1000's of different points
   d. All points are related to isocenter
   e. Constantly updating—create reference surface, comes from treatment plan/CT
   f. Creating patient in 3D---3D DRR
   g. Compares reference surface with actual patient position, gives feedback in 6 degrees of freedom.
   h. Aligning to what we are actually treating
   i. Instead of shifting couch laterally or vert, may be a patient position
   j. Efficient and accurate
4. DIBH—to move heart out of way on breast treatment. Challenging for therapists and patients. SGRT for breast and for other sites?
   a. Anywhere that patients can be treated, can use SGRT
   b. En face electron or intracranial SRS
   c. DIBH—breast is uneven surface, breast tissue moves depending on size of patient
   d. Can ensure proper inhale [vertical amplitude] and whole breast treatment area
   e. Real time coach---visual feedback that allows patient to see the motion of their breathing
   f. Checks breast position as well as breathing—ensures patient is getting treated correctly
5. How many changes can take place between set up and treatment? [LINK IN SHOW NOTES] Lung SBRT—felt so confident in SGRT, don't need a lot of immobilization. Less is More. Treatment

times have been reduced, makes positive difference in schedule. How does this improve efficiency and scheduling?

a. Align RT interfaces with record and verify systems
b. Bring patient into treatment room and place them on couch
c. Move the couch to treatment area, automatically given feedback as to patient position
d. Look at camera monitor to determine any re-positioning
e. Leave treatment room and film [if it is ordered] and treat
f. What if patient moves during/after imaging? May not be in correct area anymore
g. Shift—make shift; Align RT will allow you to re-capture surface area
h. If patient coughs or moves—have opportunity to hold off, start over, or treat
i. Paradigm shift from tattoos to 6 degrees of freedom

6. SGRT for extremities---improves accuracy. How does Align RT improve accuracy?

a. Sub-millimeter accuracy, for couch rotation, gantry position, and patient position [0.3 mm accuracy]
b. Work flow more efficient and accurate in treatment of extremities
c. Minimizes need for constant imaging—same scenario for every treatment site
d. By using Align RT for initial set up, find rotation or shift, would have to film and then re-set
e. Align RT allows for common shift across the whole body
f. Any anatomical site that multiple moving parts, like head and neck, provides accuracy for each of the moving parts

7. Misadministration or error. Patient not treated exactly as prescribed or intended. How does Align RT ensure accuracy and ease fear for therapists?

a. Align RT can detect swelling patient changes
b. Quantify surface changes—took patient back to sim and reviewed images. Breast expander had shifted and was no longer in correct place
c. Wouldn't have noticed changes with traditional patient marks
d. Loose in head and neck mask, cannot detect movement in mask
e. May not be able to see marks well or may make shift in wrong direction—Align RT shifts with DRR.
f. You may not be aware that patient slouches or jumps or wiggles … can't see on CCTV
g. Cannot unknow what you know

8. Educational and support community for SGRT community. What kind of training and education does it take to use SGRT and what education is provided/

a. Learning curve, take leap of faith away from marks and tattoos.
b. Look at new, more detailed information
c. 3 step training process and then follow-up
d. Anyone can be a member of SGRT community, forum and learning, sharing experiences
e. Free CE opportunities thru webinars and annual meetings
f. 2019—May 16-17 in Las Vegas—Annual meeting is free and free CE credits

9. You can't unsee what you've seen. Accuracy, work flow, and quality of patient care