Proton from a Rad Therapist's Perspective
Tiffany Knabb--Ackerman Cancer Center

1. How is proton therapy different than conventional radiation therapy?
    a. From therapist standpoint--machine is different
    b. Photon vs proton [particle therapy]
    c. Machine is the biggest challenge, so different
    d. All the x, y, z planes are different; 0 and 180 reversed
2. Particle beam therapy---what does this mean in relationship to gamma radiation/linear accelerator?
    a. Protons carry positive charge, heavier than photons
    b. Protons slow down while traveling in body
    c. Burst of energy, deposit energy at burst
    d. Exit dose with conventional photon therapy; no exit dose with proton
3. Equipment and why is machine the hardest thing for therapists to understand? How is it different from conventional? How does this affect scheduling
    a. Mevion machine
    b. Large gantry, takes up 3 story space
    c. Table does most of the movement, arm moves around patient
    d. Applicators changed throughout the day
    e. Beam line, each machine has its own beam line
    f. 18 minute time slots, most patients fit into this 18 minute spot
4. Simulation and immobilization devices? How are they different and what has to be taken into account for proton simulation? How is it different considering proton specific issues?
    a. Simulation is similar to conventional
    b. Nothing in the way of the beam path
    c. Vac locks, gowns, etc have to be out of the way
5. Patient set-up? What is taken into account to determine best treatment position?
    a. Gantry extended with applicators, make sure there is enough separation
    b. Verification simulation day on 1st day
    c. Ensure that there is enough range
    d. Patient in proper position on table
    e. 1 therapist controls table and gantry, 1 therapist watching patient
6. Patient is simulated … does facility have to run 2 plans [photon vs proton] for insurance reimbursement and best treatment practices? What does set-up look like? How does the table move and what are compensators?
    a. Patient lies on table with immobilization
    b. Table moves into position
    c. Line patient with lasers
    d. On-board imaging
    e. Make adjustments to table and take additional fields
    f. 2 ports
    g. Set-up first field, table will move patient to lateral sides
    h. From traditional aspect the table appears to be at 90 or 270, but [challenge with proton] table is actually at 0 or 180
    i. Gantry can only move 180 degrees

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   j. Load apertures and compensators
   k. Apertures shape field and are made of brass
   l. Compensators are made of wax and determine depth
   m. Set-up takes longer than conventional
7. Pre-treatment imaging? Why is accuracy critical?
   a. Cone beam CT--single slice CT taken in treatment position
   b. Digital imaging only anatomy
8. Why so critical that therapists are able to visualize images? Foundational understanding of 3d anatomy?
   a. Prostate [bladder] or any motion internally could affect range of beam
   b. Do not want burst of energy to happen outside of target
   c. Make sure the correct area is being treated
9. Who is a typical patient?
   a. Prostate, head and neck, most all treatment sites
   b. All scopes of patients, no one is eliminated, everyone has the option of proton therapy
10. Explain training and education necessary for proton therapists? What does on the job training look like and how long does it take to transition to proton?
   a. Ackerman uses competency sheets for proton comps
   b. Do set-up 3x for therapists to sign off on
   c. Usually takes a therapist about 3 months to complete
   d. Understand set-up, machine faults, compensators
11. Early start to proton therapy day? Advice to therapist that wants to transition and how?
   a. Proton therapy is not going anywhere
   b. May be the new IMRT
   c. Like to stay busy; get to see lots of new things; very fast paced
   d. Be flexible with machine and patients, schedule
   e. Person that likes to busy
12. Patient that is the reason you do what you do?
   a. So many of them, so many people
   b. Very young breast cancer patients
   c. See how grateful and appreciative for the proton therapy
   d. Extends life of so many patients