TEACHING THE ART OF RADIATION THERAPY PLANNING

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MINDSET

CURIOSITY
What were you curious about when you started the project?
- What are our residents’ perceived the barriers to learning the principles of radiation therapy treatment planning?
- What aspects of this process do they find the most challenging?

What were you curious about having concluded the project?
- Does the planned intervention, i.e. creating a formalized radiation therapy treatment planning curriculum with a bank of standard cases), improve residents’ confidence/competence with regard to this skill as they progress through their training?

CONNECTIONS
Who did you connect with that informed your project?
- Current MCW radiation oncology residents
- MCW RO Graduates up to 5 years out of residency
- Attending Radiation Oncologists with varying years of experience

Who should you have connected with in this project?
- Information Technology Team: Create a central area where banked plans can be easily accessed. Explore possibility of de-identifying RT plans.

CREATING VALUE
How can your project transform medical education?
- Our survey could be conducted at other radiation oncology residency programs. If similar feedback is received, there would be an opportunity to collaborate with a group of residency program directors to establish a common core treatment planning curriculum available to all US radiation oncology residency programs.

What value did your effort create for students? For instructors?
- A potential to improve the quality of a key component of radiation oncology training.
- Relieve the burden on RO attendings to teach the basics of radiation therapy treatment planning; can focus more on the nuances of each case/patient.

BACKGROUND

Radiation therapy treatment planning refers to 3 main tasks:
1. Contouring: Outlining structures that will be the target of radiation therapy (RT), generally an intact tumor or a post-operative bed +/- draining regional lymph nodes that may harbor microscopic disease
2. Defining a prescription and dose constraints: Any curative intent RT plan is a delicate balance between adequately dosing the tumor while respecting the tolerance of the surrounding normal structures to treatment.
3. Plan Review: With input from the attending radiation oncologist (RO), a dosimetrist designs an RT plan with the goal of achieving the RO’s “wish list.” Plan is reviewed by the attending RO and adjustments are made to achieve the optimal balance between target/tumor coverage, while best avoiding normal structures.

The Problem: Many of these plan adjustments are made on the “fly” during a busy clinic day. Radiation oncology residents may not be present for any or all conversations between the dosimetrist and the attending RO and due to other clinic responsibilities. Residents always have access to the final “approved” RT plan, but often miss the opportunity to review the various iterations an RT plan went through that take it from good → better → best. After approval of a final plan, all working plans are deleted for safety purposes.

- A literature review did not reveal availability of a formalized curriculum for teaching radiation therapy treatment planning to RO residents.

METHODS

A listening session was carried out with our current RO residents to learn how treatment planning is currently being taught by the various attendings in the department and how this can be improved. Main suggestions for improvement:
1. Desire to be a part of the entire treatment planning process (contouring, reviewing every iteration of the plan in “real time” and an opportunity to review an RT plan before the attending has done so).
2. Access to a bank of RT plans of the most commonly encountered malignancies. Request to save all drafts of the RT plans on each patient in addition to the final “approved” plan

RESULTS

We have started to populate a bank of RT plans that will be the basis of a formalized radiotherapy treatment planning curriculum. Below are examples of two radiation therapy plans that have been added to our bank:

- Stage IIIB non-small cell lung cancer: An acceptable lung radiation therapy plan (top) and one in which the spinal cord dose has been lowered (bottom); particularly important in this patient who was planned to have another course of RT in the near future to for a contralateral, synchronous early NSCLC discovered at initial diagnosis.

- Stereotactic body radiotherapy (SBRT) plan for recurrent head and neck cancer: Although both plans met the attending RO’s “wish list,” the upper panel displays a plan that has a very steep dose gradient with a high max dose. The lower screenshot shows a plan that is safer with a much more homogenous dose distribution.

CONCLUSIONS & FUTURE DIRECTIONS

- Our current residents express a need for more formalized didactics to assist in learning the art of radiation treatment planning.
- A formal curriculum is in being generated.
- We plan to conduct surveys pre- and post- introduction of the radiation therapy treatment planning curriculum to examine its educational impact.

MY ENTREPRENEURIAL MINDSET

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