Webinar-Based Contouring Education for Residents

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INTRODUCTION

As the field of radiation oncology has transitioned from a 2-D to a 3-D method of radiotherapy delivery, we have seen many changes in the requirements of residency education. In the modern era, it is essential that a radiation oncologist have a comprehensive understanding of radiologic anatomy, as well as an advanced ability to analyze a variety of imaging modalities, including CT, MRI, and PET. Advanced experience in these techniques allows the delineation of elegant and accurate target volumes and the creation of high-quality treatment plans. However, formal radiology and contouring education is exceedingly variable within US residency training programs. As a result, many specialty societies, including the American College of Radiation Oncology and the American Society for Radiation Oncology, have developed specific conference seminars geared at addressing the lack of standardization in contouring education for all levels of training.

Webinars offer a unique platform to address this educational variability. These online tutorials allow experts in the field a streamlined ability for national and even international outreach in the form of lectures and question-and-answer sessions. Over the past several years, we have curated a dedicated subcommittee focused on resident-specific webinars. To address the need for contouring training and to explore the current state of contouring education in the United States, we developed a contouring webinar series that included online resident surveys to investigate these topics.

MATERIALS

In the fall of 2016, we developed a three-part contouring series to address several high-yield topics in radiation oncology. The following webinar sessions were conducted: (1) 3-D image-based brachytherapy for cervical cancer, (2) an overview of selecting and planning spinal SBRT, and (3) contouring for H&N cancer. The consensus of our committee was that education in these three topics was particularly variable, as well as inconsistently encountered from institution to institution, and thus would benefit from a dedicated webinar.

A webinar schedule was developed over the course of several months, and advertisements were distributed via e-mail and social media. Resident participation was the primary focus of this outreach; however, medical student and attending physician participation was welcomed. A pre- and postwebinar survey was sent to registered participants for each webinar session. Surveys focused on participants' comfort and experience in the contouring and treatment planning process for each of the aforementioned treatment sites. An example resident survey is illustrated in Appendix 1. Survey completion was incentivized by entering participants into a raffle. To increase survey participation after the first webinar, advertisement adjustments were made, resulting in increased participation. Only resident-reported surveys were included within this report. Analysis of questions not dependent on webinar education were pooled between pre- and postwebinar surveys (eg, "Who contours normal structures on a majority of your treatment plans?"). We conducted a Pearson χ^2 test to compare pre- and postwebinar survey questions. P values $< .05$ were considered to indicate statistical significance.

RESULTS

A total of 36, 72, and 106 participants registered for the gynecologic, spinal SBRT, and H&N webinars, respectively, with a total of 102 pre- and postwebinar surveys completed. Of all participants, 16 (70%), 27 (87%), and 37 (74%) completed the prewebinar survey, and 8

1546-1440/17/$36.00 ■ http://dx.doi.org/10.1016/j.jacr.2017.03.013

(35%), 22 (71%), and 21 (42%) completed the postwebinar survey for each of the aforementioned webinars, respectively. A summary of participants for each session, including numbers of partakers of the pre- and postwebinar survey, is shown in Table 1. The most commonly reported resource used by residents for contouring was *Target Volume Delineation for Conformal and Intensity-Modulated Radiation Therapy* by Lee et al [1], which was in agreement with previous studies on contouring by residents [2]. In addition, approximately half of survey participates use the online resource eContour.org.

Taking the three webinars as an aggregate, the majority (28%) of responding residents were at the postgraduate year (PGY) 4 level of training, followed closely by PGY 3 and PGY 2 residents (25% and 24%, respectively). Seventy-three percent of survey participants reported residents as the party who contoured the majority of normal structures at their home institutions. Fusions (MRI, CT, and/or PET scans) were performed by dosimetrists the vast majority of the time (80%). As a result, only 41% of residents felt confident in their ability to correctly fuse ancillary imaging studies with planning CT scans. Interestingly, there was wide variability of in-person attending radiation oncologist review and feedback of contours among resident respondents, despite only 30% of residents stating that their attending radiation oncologist made few to no changes in their contours (Fig. 1). Nearly one-third of respondents reported that in-person attending contour reviews "rarely" or "sometimes" occurred, and nearly the same number reported receiving attending radiation oncologist feedback on contours either "rarely" or "sometimes."

Residents felt confident in their ability to identify normal structures on an anatomic atlas for gynecologic, spinal, and H&N cases 70%, 63%, and 74% of the time, respectively. These numbers were similar for identification of normal structures on CT scans (65%, 58%, and 74%, respectively), but they appreciably dropped for identification of normal structures on MRI (61%, 45%, and 62%, respectively). The majority of respondents felt confident in their ability to identify H&N primary tumor (79%), appropriate mucosal clinical target volume (57%), and at-risk nodal sites (67%), and although there was a nominal increase in confidence after the H&N webinar, this was not a statistically significant improvement. Similarly, the majority of residents felt confident in their ability to contour gynecologic malignancies (65%) and spinal SBRT (53%), though more variability was observed with spinal SBRT confidence.

Overall, there was less resident confidence in the ability to evaluate treatment plans and dose-volume histograms (DVHs) (47%-61%) across the three sites. Additionally, residents seemed to have the least confidence in their ability to evaluate port films and cone-beam CT scans (32%-56%). Of note, daily image-guided radiation therapy (IGRT) evaluation was not specifically addressed by each webinar, so these results represented a baseline level of confidence for resident participants. The only significant difference in the three webinars was related to spinal SBRT, for which residents were more confident contouring spinal SBRT ($P = .017$), evaluating a treatment plan for spinal SBRT ($P < .001$), and evaluating a DVH for spinal SBRT ($P = .002$) after the webinar. Figures 1 to 3 show the collective results of each webinar survey.

DISCUSSION

Our results demonstrate several prevalent themes on the basis of our contouring webinar surveys. First, there is a notable discrepancy in attending radiation oncologist in-person contour review and feedback and attending radiation oncologist adjustments of resident

Table 1. Webinar and survey participation

	Total Registrants	Live Webinar Attendants	Prewebinar Survey Completion	Prewebinar Resident Survey Completion	Postwebinar Survey Completion	Postwebinar Resident Survey Completion	Total Resident Surveys Completed
Gynecology	36	23	16	15	8	8	23
Spinal SBRT	72	31	27	21	22	16	37
H&N	106	50	37	28	21	14	42
Total	214	117	80	64	51	38	102

Note: H&N = head and neck; SBRT = stereotactic body radiation therapy.