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Original Report

Enhancing safety and quality through preplanning peer review for patients undergoing stereotactic body radiation therapy

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Abstract

Purpose: Because of its high dose per fraction delivery, stereotactic body radiation therapy (SBRT) requires real-time process assurance to promote safe, high-quality treatments. In an effort to assure safety and first-time quality, we instituted a pilot, single-institution, SBRT peer review process before treatment planning. Here, we present a summary of the results of that process over a 26-month period.

Methods and Materials: Before planning, all patients were presented at an SBRT "rounds" that required, at a minimum, the treating attending or resident physician, an independent attending physician, a physicist, and a dosimetrist. Items reviewed included imaging, image registration, target contours, prescription, and planning goals. The results of peer review were prospectively recorded and logistic regression models were used to assess the relationship between various physician and case characteristics and the odds of a change being made.

Results: A total of 513 SBRT cases were peer reviewed before planning. In 22.6% of cases, at least 1 change was made because of this process. A lower change rate was observed in higher volume SBRT body sites (lung and liver). In all body sites, gross and planning target volume contours were changed 8.2% and 5.5% of the time, respectively. The prescription was changed 4.9% of the time, and organs at risk goals were changed 7.2% of the time. The odds of having a change were significantly lower when the treating oncologist had more SBRT experience.

Conclusions: Preplanning peer review by an independent physician, physicist, and dosimetrist resulted in changes in nearly one-quarter of SBRT patients, potentially preventing suboptimal treatments. The odds of a change being required were decreased in higher volume body sites and when the treating oncologist was more experienced with SBRT, underscoring the potential importance of peer review in uncommon SBRT sites and at low-volume SBRT centers.

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Conflicts of interest: None.

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Introduction

Stereotactic body radiation therapy (SBRT) is a high-precision, high-dose radiation therapy treatment that is given in 1-5 fractions. Treatment planning for SBRT requires significant effort and resources because of the nature of the treatment. High plan conformity is required and target and normal tissue dose limits are strict to provide local control while minimizing the risk of toxicity. Because of the short time-course of treatment, traditional methods of peer review and quality assurance may not be optimally structured or timed. At our institution and many other radiation oncology departments, peer review for radiation therapy treatment plans is required and performed during a once-weekly chart rounds review.[1] As such, many SBRT plans reviewed in weekly chart rounds may already be completed or partially completed before review. Therefore, the threshold for making a change may be high and, in the cases in which a change is required, the overall quality of the treatment may be compromised because a potentially suboptimal plan could have already been partially delivered. In addition to the poor timing of peer review, observations in our clinic suggested that SBRT planning also suffered from inefficiency when incomplete instructions were provided to dosimetrists in terms of plan prescription, normal tissue dose limits, and presence of prior treatment requiring conservative adjustment of treatment planning goals.

In an effort to enhance safety and quality in the field, the American Society for Radiation Oncology (ASTRO) commissioned a series of reports to cover the safety and quality aspects of radiation oncology, including a report on enhancing the role of peer review in the field and another report on the quality and safety considerations for stereotactic treatments.[1,2] The 2013 report on peer review noted that it is one of the most effective means of quality assurance available to our field. However, the report also noted that this process is challenging and it would be impractical to peer review all aspects of plans. The report goes on to make many recommendations to aid in prioritization, timing, and workflow for peer review. In their prioritization, target volume definition was given the highest priority, followed by the decision to use radiation therapy, the planning directive, and the technical plan

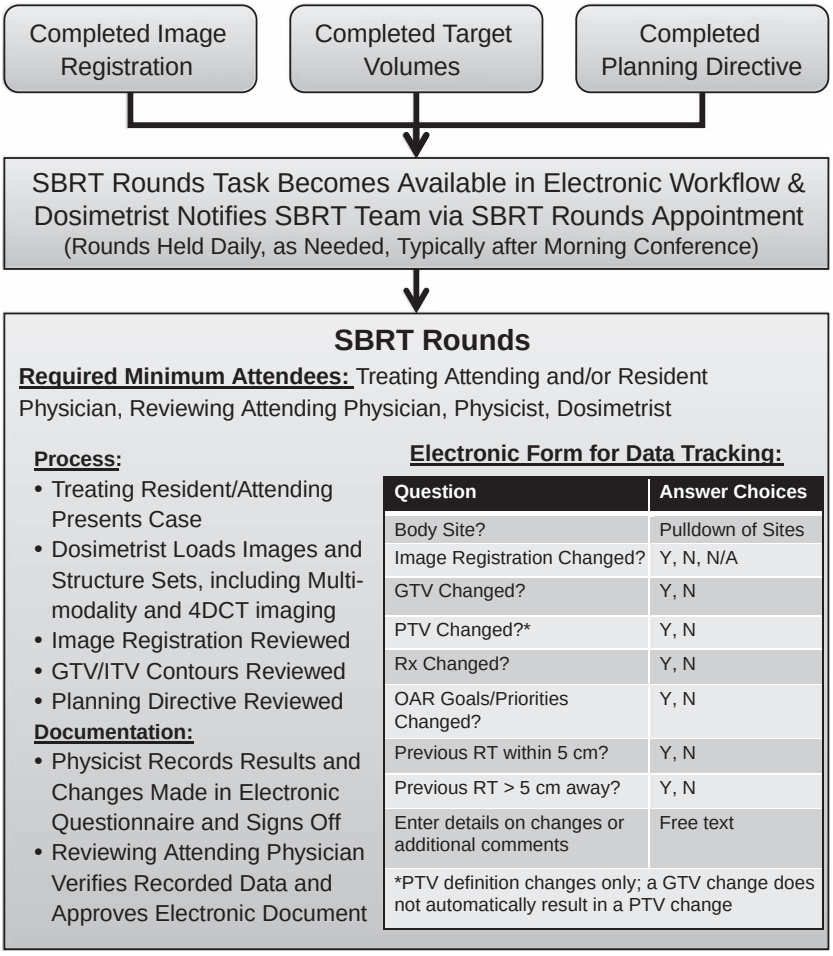

Figure 1 Basic workflow and electronic data tracking form involved with stereotactic body radiation therapy preplanning peer review.