

Research Letter

Analysis of Virtual Versus In-Person Prospective Peer Review Workflow in a Multisite Academic Radiation Oncology Department



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Abstract

Purpose: In radiation oncology, peer review is a process where subjective treatment planning decisions are assessed by those independent of the prescribing physician. Before March 2020, all peer review sessions occurred in person; however due to the COVID-19 pandemic, the peer-review workflow was transitioned from in-person to virtual. We sought to assess any differences between virtual versus in-person prospective peer review.

Methods and Materials: Patients scheduled to receive nonemergent nonprocedural radiation therapy (RT) were presented daily at prospective peer-review before the start of RT administration. Planning software was used, with critical evaluation of several variables including treatment intent, contour definition, treatment target coverage, and risk to critical structures. A deviation was defined as any suggested plan revision.

Results: In the study, 274 treatment plans evaluated in-person in 2017 to 2018 were compared with 195 plans evaluated virtually in 2021. There were significant differences in palliative intent (36% vs 22%; $P = .002$), but not in total time between simulation and the start of treatment (9.2 vs 10.0 days; $P = .10$). Overall deviations (8.0% in-person vs 2.6% virtual; $P = .015$) were significantly reduced in virtual peer review.

Conclusions: Prospective daily peer review of radiation oncology treatment plans can be performed virtually with similar timeliness of patient care compared with in-person peer review. A decrease in deviation rate in the virtual peer review setting will need to be further investigated to determine whether virtual workflow can be considered a standard of care.

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Introduction

In radiation oncology, peer review (also known as chart rounds) is a process where subjective treatment planning decisions are assessed by those independent of the prescribing physician.¹ Similar to the function of morbidity and mortality in many medical disciplines, peer review plays a key role in quality management and

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improvement and is attended by all physicians and representatives of medical dosimetry and physics.^{1,2} Performed retrospectively at most institutions, in 2018 we presented our experience with multicenter prospective daily peer review demonstrating improved plan quality without delaying patient care,³ a finding reproduced in the literature.^{4,5} Before March 2020, all peer review sessions occurred in person; however, due to the COVID-19 pandemic, the peer-review workflow was transitioned from in-person to virtual to minimize exposure. We sought to assess any differences between virtual versus in-person prospective peer review.

Methods and Materials

Patients scheduled to receive nonemergent nonprocedural radiation therapy (RT) at any of our 6 centers were presented daily (Monday to Friday) at prospective peer-review before the start of RT administration. Gamma Knife stereotactic radiosurgery, brachytherapy, and the majority of emergent plans were not reviewed prospectively. Planning software was used, with critical evaluation of rationale for treatment, simulation, contour definition, treatment target coverage, radiation dose fractionation, radiation treatment modality, and risk to critical structures. A deviation was defined as any suggested plan revision; revisions for minor deviations were not required for treatment, and revisions for major deviations were strongly recommended before administration of the next fraction of treatment. Variables analyzed other than deviations included treatment intent and timeliness of patient care (measured as the total time between simulation and the start of treatment). Fisher exact test was used for statistical analysis, with significance defined at $P = .05$ (GraphPad Software, San Diego, CA).

Results

A total of 274 treatment plans evaluated in-person in 2017 to 2018, prepandemic, were compared with 195 plans evaluated virtually in 2021, after pandemic onset. There were significant differences in treatment intent (36% of in-person plans were palliative vs 22% of virtual plans; $P = .002$), but not in the total time between simulation and the start of treatment (9.2 vs 10.0 days; $P = .10$). There were no differences in minor deviations (4.0% of in-person vs 1.5% of virtual plans; $P = .17$); however, major deviations (4.0% vs 1.0%; $P = .083$) trended toward significance. Overall deviations (8.0% in person vs 2.6% virtual; $P = .015$) were significantly reduced in virtual peer review. The number of any deviations per month was 7.3 for in-person (3.7 minor, 3.7 major) versus 5.0 (3.0 minor, 2.0 major) for virtual plans; there was no trend over time for number of deviations per month.

Discussion

Our findings indicate that prospective daily peer review of radiation oncology treatment plans can be performed virtually with similar timeliness compared with in-person peer review. The significantly fewer deviations observed in virtual versus in-person workflow is an important finding, indicating increased treatment consensus, and is worth further investigation. Although it is possible this may be due to the inherent differences between the virtual and in-person workflow environment, another cause could be the later timeframe of virtual workflow onset. At the time of our institution's transition from in-person to virtual peer review workflow, prospective daily in-person peer review had been implemented for more than 30 months. Previous work has shown that prospective peer review initiation over time results in decreased treatment plan changes.⁴ Our data set was limited to 3 months before the pandemic and 1 month after the pandemic, limiting ability to quantify any changes in deviation trend over time. An encouraging finding was that there was no difference in the total time between simulation and the start of treatment from in-person to virtual workflow; this is indicative that the pandemic did not significantly delay RT onset; such delays have unfortunately been reported elsewhere.⁶ Our findings also revealed significantly more treatment plans of palliative (rather than curative) intent in the in-person workflow environment, indicating that the proportion of plans with curative intent significantly increased during the pandemic. Although the rationale for this finding is unclear, it is possible this finding is connected to the dramatically decreased surgical oncology volume during the pandemic that has been well documented and may have resulted in more patients receiving definitive RT rather than surgery.⁷ Another possibility is a pandemic-induced decrease in the number of palliative patients being referred for RT.

Limitations of this study include factors changing during the pandemic, which may have contributed to our findings, as no virtual workflow occurred before the pandemic and no in-person workflow occurred after pandemic onset. Although many of these factors are being studied, some which have already been reported include increased use of hypofractionation, decrease in overall RT volume, decreased treatment of prostate and non-melanoma skin cancer, and increased treatment of esophageal, bladder, and rectal cancer.⁷ Additionally, no in-person plans were repeated during the virtual workflow given the time constraints of the daily workflow process.

Conclusions

The findings from this study indicate that the logistical advantages of virtual workflow (convenience, reduced COVID-19 infection risk) need to be further

studied to ensure that patient care is not compromised, given the decreased rate of deviations. The relative reduction in deviations observed in virtual peer review may be due to the inverse relationship between treatment plan changes and duration of prospective peer review initiation documented in the literature⁴ and deserves further investigation.

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