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Original Report

An automated electronic system for managing radiation treatment plan peer review reduces missed reviews at a large, high-volume academic center

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Abstract

Background: Assuring quality in cancer care through peer review has become increasingly important in radiation oncology. In 2012, our department implemented an automated electronic system for managing radiation treatment plan peer review. The purpose of this study was to compare the overall impact of this electronic system to our previous manual, paper-based system.

Methods and materials: In an effort to improve management, an automated electronic system for case finding and documentation of review was developed and implemented. The rates of missed initial reviews, late reviews, and missed re-reviews were compared for the pre- versus postelectronic system cohorts using Pearson χ^2 test and relative risk. Major and minor changes or recommendations were documented and shared with the assigned clinical provider.

Results: The overall rate of missed reviews was 7.6% (38/500) before system implementation versus 0.4% (28/6985) under the electronic system ($P < .001$). In terms of relative risk, courses were 19.0 times (95% confidence interval, 11.8-30.7) more likely to be missed for initial review before the automated system. Missed re-reviews occurred in 23.1% (3/13) of courses in the preelectronic system cohort and 6.6% (10/152) of courses in the postelectronic system cohort ($P = .034$). Late reviews were more frequent during high travel or major holiday periods. Major changes were recommended in 2.2% and 2.8% in the pre- versus postelectronic systems, respectively. Minor changes were recommended in 5.3% of all postelectronic cases.

Conclusions: The implementation of an automated electronic system for managing peer review in a large, complex department was effective in significantly reducing the number of missed reviews and missed re-reviews when compared to our previous manual system.

Conflicts of interest: None.

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Introduction

The multidisciplinary management of patients with cancer can involve multiple care providers and forms of treatment, each of which may require complex care processes and multiple levels of quality assurance (QA). Assuring quality in cancer care has become increasingly important because of the greater complexity of treatments and the advancing knowledge of the diseases that are treated; thus, the goal of QA is to improve patient outcomes and eliminate medical errors. Specifically, for radiation oncology, in which treatments now incorporate evolving techniques and technologies of increasing complexity, the need for timely and expert QA in the form of peer review is greater than ever before.[1,2] To receive accreditation by the American College of Radiology and the American Society for Radiation Oncology, radiation oncology facilities are required to incorporate peer review into their respective processes and workflow.[3,1] The importance of peer review in raising the clinical standards of our specialty has been emphasized in several recent publications.[4,5]

Clinical peer review is the process by which health care professionals evaluate each other's clinical performance with the primary purpose of improving the quality and safety of patient care.[6] Peer review is widely practiced, largely through "chart rounds." During these sessions, members of the treatment team review each case (eg, prescribed doses, fields, treatment plans, patient setup).[7,8] To be consistent with standards of excellence required by accreditation programs, it is recommended that each individual patient radiation plan be peer reviewed (and the necessary plan revisions be made as needed) in a timely fashion to ensure the highest levels of quality assurance.[1] A recent survey demonstrated that more than 80% of institutions peer review all external beam therapy courses.[7]

Case-oriented peer review can be particularly challenging for a large, high-volume treatment center, especially one that offers a comprehensive portfolio of treatment modalities and techniques spanning multiple, separate treatment facilities with dedicated staff and faculty at each center. In an effort to achieve these stated goals in our department, we have implemented an automated, electronic peer-review system for managing radiation treatment plan review. This study compares the overall impact of using such an electronic system for peer review compared with a previous manual, paper-based system.

Methods and materials

Peer review process

Our department employs approximately 39 physicians, 43 medical physicists, and 30 dosimetrists across 7 treatment facilities (1 main academic center, 1 Department of Veterans Affairs facility, and 5 network affiliates). On average, approximately 90 new treatment courses begin each week. A course is defined by departmental policy as 1 or more plans used to treat a single patient diagnosis at one time. The department directive is for peer review to be performed for each plan for every treatment course, before the first fraction of radiation therapy is administered. If review cannot happen before the first fraction, we consider it acceptable to review standard external beam radiation therapy (EBRT) courses before the sixth fraction is given and stereotactic body radiation therapy (SBRT) courses before the second fraction. Thus, a "late review" is defined as a treatment plan that has not been reviewed by the sixth fraction if EBRT or the third fraction if SBRT. A "missed review" is defined as a treatment plan that fails to undergo peer review at all following physician approval. A "missed re-review" is defined as a treatment plan that has major changes recommended during peer review, but is subsequently *not* re-reviewed or brought back to chart rounds for additional peer review.

Each treatment course equals 1 chart rounds case that is reviewed and documented. At the main academic center, most cases are reviewed in one of 7 weekly disease site-based sessions occurring on different days of the week that we refer to as site-specific chart rounds (SSCRs). Cases from the rest of our network as well as any time-sensitive cases from the academic hub that were not covered in SSCR are reviewed on Fridays in 1 of 2 general chart round (GCR) sessions. These peer-review sessions are widely attended by attending physicians, medical and physics residents, nurse practitioners, physics and dosimetry staff, senior radiation therapists, nurses, administrators, and dosimetry and therapy students. Beginning in 2012, to all attendings could earn continuing medical education credits by attending and participating in chart rounds.

Previous management system

From approximately 2009 to 2012, we used "tasks" in the Aria (Varian Medical Systems, Inc., Palo Alto, CA) oncology information system to help keep track of which cases were due to be presented. This system required significant time investment and resources including 2 dedicated administrative assistants who were responsible for various tasks including scheduling, organizing lists, collecting records and charts, documenting peer review, filing records, and basic statistical analysis. This method also relied on the manual creation and updating of tasks, and there was concern that we were not capturing every case or following up appropriately when required. During this period, all documentation of the review and findings was also done on paper, making it difficult to perform an audit without labor-intensive manual chart review. In an effort to improve management, we developed and implemented an automated electronic system for case finding and documentation of review.