

ASTRO white paper provides guidance for optimal quality, safety of HDR brachytherapy

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The American Society for Radiation Oncology (ASTRO) has issued a new white paper, "A review of safety, quality management, and practice guidelines for high-dose-rate brachytherapy," that recommends specific guidance to follow in the delivery of high-dose-rate (HDR) brachytherapy to improve quality and patient safety, according to the manuscript published in the March-April 2014 print issue of *Practical Radiation Oncology (PRO)*, the official clinical practice journal of ASTRO.

Commissioned by ASTRO's Board of Directors as part of the Target Safety campaign, the white paper evaluates the current safety and practice guidance for HDR brachytherapy, makes recommendations for guidance applications to the delivery of HDR brachytherapy, suggests topics where additional guidance is needed and examines the adequacy of general physics, quality assurance (QA) and clinical guidance currently available for the most common treatment sites with regard to patient safety. The manuscript also addresses HDR brachytherapy procedures, the use of checklists and forms, the multidisciplinary treatment team, challenges to maintaining safe use of HDR brachytherapy and key measures for avoiding catastrophic failure.

To ensure correct actions are followed for a specific brachytherapy procedure, the white paper recommends the use of a [quality management](#) program, including checklists and forms to maintain quality and prevent errors. ASTRO's white paper references the American Association of Physicists in Medicine (AAPM) Task Group (TG) 59 report that includes examples of forms for quality control and checklists for the various stages of treatment, which can be customized by the treatment team. The AAPM TG-100 report that includes the tools and process for creating an effective quality management program is also

cited.

Due to the multidisciplinary nature of HDR brachytherapy treatment, the modality requires coordination among several clinicians to treat the patient accurately and safely. The white paper details the roles and qualifications of those directly involved with radiation therapy decisions: the radiation oncologist, medical physicist, medical dosimetrist, radiation therapist and surgeon. The roles and qualifications are based on ASTRO's Safety is No Accident: A Framework for Quality Radiation Oncology and Care, a comprehensive book detailing minimum recommended guidelines for [radiation oncology](#) practices, and the AAPM TG 59 report specific to HDR brachytherapy.

The white paper addresses 12 anticipated challenges to maintaining quality in HDR brachytherapy because of the constant changes in the modality. Anticipated challenges include the replacement of the traditional radiation therapy simulator with a computed tomographic simulator, which requires significant changes in how HDR brachytherapy procedures are performed; the use of new procedures and methods, which can lead to mistakes due to inadequate training, QA or inappropriate procedures; the proliferation of devices, applicators and radionuclides used for brachytherapy treatment, which leads to an increased number of possible processes, types of equipment and clinical uses, making it increasingly difficult to determine how to assure that all of the variations are used with appropriate process control and quality management; and the potential for increased use of model-based algorithms such as Monte Carlo methods for dose calculations for brachytherapy sources, which will require new procedures for commissioning, new algorithm QA and new patient-specific planning checks. The full list of anticipated challenges is available in the

supplemental material.

The manuscript makes seven recommendations for improved safety and quality in HDR brachytherapy. The white paper recommends that practitioners follow relevant guidance documents and that deviation from consensus recommendations should be supported by clinical studies or pursued in the setting of a clinical trial approved by an institutional review board; that practitioners receive training in a new procedure before beginning its practice, that the training should include a practical, "hands-on" component and that all team members directly involved with the radiation therapy decisions should participate in at least five proctored cases before performing similar procedures independently; and that professional societies should accelerate the generation of new or updated guidance documents for the following disease sites and techniques: skin, central nervous system, gastrointestinal, lung or endobronchial and esophagus, and, while outside the charge of this panel, assess the need for updated guidance documents for accelerated partial breast irradiation using electronic brachytherapy. The complete list of recommendations is available in the supplemental material.

The white paper describes six benchmarks to provide facilities with measures to evaluate compliance with the seven recommendations in the manuscript. The six benchmarks are: 1) HDR brachytherapy procedures are supported with the appropriate team as described in the report of the AAPM TG 59 and the American College of Radiology HDR Brachytherapy Practice Standard; 2) commissioning of the treatment unit, treatment planning system and each new source is performed by a qualified medical physicist and verified through a QA process; 3) assay of the HDR brachytherapy unit source is performed using a well-type ionization chamber with a calibration traceable to the National Institute of Standards and Technology, and this assay is performed or confirmed for each source change. Planning system source strength parameters must be updated with each source change; 4) treatments are performed according to the guidelines from the American Brachytherapy Society when available for the treatment site; 5) treatment plans and programs are checked through

independent verification before treatment delivery; and 6) daily QA checks of the HDR brachytherapy system are performed before any treatment.

"As the technology and use of HDR brachytherapy advances, it is imperative that clinical, physics and quality assurance guidance be reviewed and updated, as necessary, to ensure quality and patient safety in the treatment delivery," said Bruce R. Thomadsen, PhD, a professor in the Department of Medical Physics at the University of Wisconsin School of Medicine and Public Health. "This white paper affirms that HDR brachytherapy is a safe treatment option when current process guidance is followed and appropriate clinical decisions are made based on clinical guidance provided in white papers such as this."

More information: The executive summary and supplemental material are also available as open-access articles online at <http://www.practicalradonc.org>.

Provided by American Society for Radiation Oncology

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