Survey On Practice and Technology Use in SRT and SBRT Delivery

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INTRODUCTION

Multiple reports, guidelines, reviews and textbooks covering recommended best practices of SRT/SBRT have been published, reflecting the growing number of practitioners actively pursuing and expanding this field. Due to the large doses delivered with stereotactic treatments, special attention to the quality assurance and safety aspects of SRT/SBRT program are required, as mistakes in any part of the workflow for an SRT/SBRT treatment planning and delivery process could lead to irreversible patient harm.

Published guidelines and reports[1,2,3] represent guidance for the current clinical best practice in SRT/SBRT and should not be considered as mandatory or regulatory requirements for performing these procedures. The continuing development of technologies and procedures will necessitate continued evolution of existing guidelines in order to encourage best care practices and adapt to technological developments. A key part of this process is to assess how various clinics have implemented and practiced SRT/SBRT, and publish the findings for other clinics to reference and compare their own practices. The purpose of this work is to assess SRT/SBRT practices by polling clinics participating in multi-institutional clinical trials.

AIM

To assess Stereotactic Radiotherapy (SRT)/Stereotactic Body Radiotherapy (SBRT) practices by polling clinics participating in multi-institutional clinical trials.

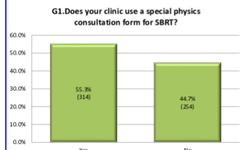
METHOD

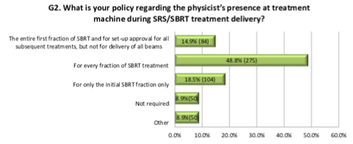
The survey was distributed by the Imaging and Radiation Oncology Core (IROC) Houston QA Center to the 1,996 radiation therapy institutions that participate in NCI's Clinical Trial Network (NCTN) clinical trials. Participation in the survey was not mandatory. A total of 568 (28.5%) institutions responded to the survey. The survey consisted questions, which covered general technologies, policies and procedures used in that specific institution for SRT/SBRT delivery, as well as site-specific questions for brain SRT, lung SBRT, and prostate SBRT.

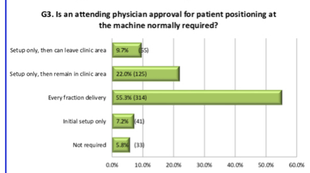
RESULTS

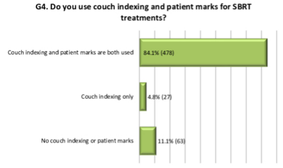
Results below show the percentage of participants who responded to each particular question/answer. Survey results were equally weighted, without considering the number of patients being treated or number of procedures performed at each responding institution.

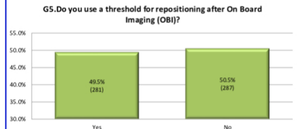
General questions

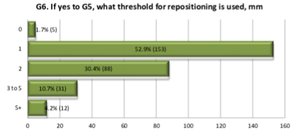


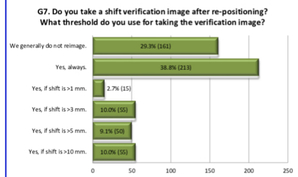


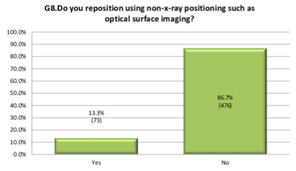












G9. If you like to make a change in the SBRT process, what will it be?

- 78 (25.7%) would like to add real time tracking/monitoring systems to their current SRT/SBRT program.
- 50 (16.4%) respondents were completely satisfied with their current SRT/SBRT program implementation
- 42 (13.8%) respondents report they would like to add/update respiratory motion management systems.
- • 42 (13.8%) report they would like to update their documentation, protocols or procedures in their current SRT/SBRT program implementation
- •22 (7.2%) would like to add a six degree-of-freedom couch for the better patient repositioning.
- •21 (6.9%) would like to change or update their current equipment or add new technologies.
- •16 (5.3%) want to update or improve patient immobilization technologies or techniques to make them easier to use.
- •16 (5.3%) would like to add flattening filter free (FFF) beams to their institution.
- •Remaining 5.6% listed miscellaneous desired changes to their current program, such as trying different planning techniques (single-iso multiple metastasis, non-coplanar beams, Varian HyperArc™), implementing other delivery techniques to reduce treatment times (i.e. arc treatments), adding new treatment sites to their current program, adding new imaging systems, updating their current dose calculation algorithm.

Site-specific questions

Treatment modality used most often

Devices/Modalities	Prostate	Lung	Brain
Other	2.9%	0.6%	0.0%
ViewRay	1.4%	0.0%	0.0%
Gamma Knife	0.0%	0.0%	2.8%
CyberKnife	22.1%	7.3%	11.1%
Dynamic conformal arc	0.7%	11.2%	14.3%
Linac with Cones	0.0%	0.0%	4.0%
IMRT	3.6%	9.4%	5.0%
VMAT/RapidArc	69.3%	71.5%	62.8%

Single energy used most often

	Prostate	Lung	Brain
Other	1.4%	0.0%	0.0%
15 MV or higher	0.7%	0.0%	0.0%
10 MV FFF	20.2%	6.4%	7.3%
10 MV	3.6%	1.2%	0.0%
6 MV FFF	28.8%	38.6%	40.7%
6 MV	45.3%	53.8%	50.0%
Co-60 (1.25 MeV)	0.0%	0.0%	2.0%

Which imaging system generally used for the main position correction/verification

	Prostate	Lung	Brain
CBCT	59.2%	80.2%	59.4%
2D KV or port imaging	23.2%	7.5%	16.5%
Other (please specify)	14.8%	12.1%	21.9%
Radio marker	2.8%	0.0%	0.0%
Optical surface imaging	0.0%	0.2%	1.2%
No imaging used	0.0%	0.0%	1.0%

What imaging technique generally used for position verification

Post Shift Verification	Prostate	Lung	Brain
CBCT	38.0%	60.9%	32.9%
2D KV or portal imaging	28.2%	17.6%	25.8%
Optical surface imaging	1.4%	7.5%	0.5%
Radio marker	3.5%	0.0%	0.0%
No imaging used	16.2%	4.7%	29.8%
Other (please specify)	12.7%	9.3%	11.0%

CONCLUSIONS

Results of this survey allow clinics to cross reference their programs and practices with the community at large, letting clinics know if they are falling behind, are ahead, or struggling with the same issues as other clinics and trying to follow the various published protocols, task groups, and guidelines.

This survey also has implications for multi-institutional clinical studies which depend on consistent treatment planning and delivery among participating clinics for study integrity.

Based on the variability in interpreting and enforcing treatment guidelines we believe protocol authors should (1) reference a standard to be followed such as the AAPM's TG-101 for the first treatment fraction and for subsequent treatment sessions, (2) specify training and credential therapists for SBRT setup if RO and/or QMP are not reviewing daily setup images, (3) recommend appropriate imaging technology, and (4) provide a minimal PTV margin appropriate to the imaging technology used for IGRT.

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CONTACT INFORMATION

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