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Bridging the Gap: A Model for Safe Adoption of Lung SBRT in Routine Practice

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Abstract
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Colin P. Kirsch [1], Jacob Lee [2], Nikita Thawani [2]

1. Radiation Oncology, Creighton University School of Medicine, Omaha, USA 2. Radiation Oncology, Creighton School of Medicine, Omaha, USA

Corresponding author: Colin P. Kirsch, cpk82221@creighton.edu

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Abstract

Objectives:

Translation of research into clinical practice is challenging; Implementation science is becoming as important as the trial design and development. Implementation science methodologies have been shown to reduce research-to-practice gaps in many clinical settings. This is especially true for the field of Radiation Oncology where modern hypofractionated techniques, such as SBRT are at a high risk of over enthusiastic implementation or underutilization. We present the results of a multicomponent implementation methodology implemented to our lung SBRT program as a model to safely translate Clinical trial guidelines into clinical practice to ensure comparable outcomes

Methods:

After literature review and market research a clinical workflow was created with focus on machine requirements, immobilization devices, motion management techniques and QA methods. Clinical tools in the form of checklists were developed for patient selection, simulation, image fusion, target delineation, planning peer review, PSQA and treatment delivery. Plan quality guidelines defined per the RTOG 0618 and RTOG 0813 and AAPM TG 101. Clinical outcomes including clinical and imaging follow-up for tumor control and toxicity were recorded. For this report, all patients treated were reviewed and compared to published data to assess the success of the implementation methodology.

Results:

160 consecutive patients treated with lung SBRT from 1/2016- 12/2022 were eligible for the study. 130 patients with primary lung malignancies were included in this analysis to assess outcomes including control of disease and toxicity to compare to the published literature. Median follow up for these patients was 13 months. Histology-50.8%- Adenocarcinoma, 27.7%-Squamous Cell Carcinoma, and 2 others. By location- 49.2% were peripheral , 38.5% central and 12.3% Ultra central. All peripheral lesions were treated with 54 Gy/3 fr, central/ ultracentral lesions received 50/55 Gy in 5 fr. Local control rate was 96.8% at one year and 94% at 3 years. 7% developed regional progression and 6% distant metastasis. Acute toxicity was not seen. Subacute Pneumonitis Grade 1-16.92% and Grade 2- 1%. 30.77% patients showed signs of chronic grade 1 fibrosis after treatment noted on CT scans only. There were no grade 3 or 4 toxicities. OS was 51.56%(1 yr), 38.24%(3yr). These results are comparable to RTOG 0618/0813.

Conclusion(s):

Strong, well thought out Implementation methodologies are essential for translation of comparable results from clinical trials to routine practice. This is especially applicable for clinical trials utilizing advanced technologies to promote the culture of safety in clinical Radiation Oncology. Regular assessment and tracking of clinical outcomes can be potentially used as quality markers for directing care and future reimbursements and useful tools in clinical practice integration.