

Clinical Trial Personalizing Radiation Therapy Through a Novel Lung Function Imaging Modality

AAPM NIH Investigator Scientific Highlights

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Disclosures

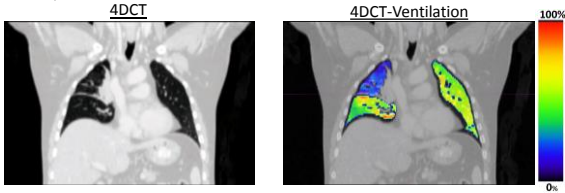
- Nothing to disclose

NIH Funding Information

- Clinical Trial Personalizing Radiation Therapy Through a Novel Lung Function Imaging Modality
- NCI: PAR-14-166: Early Phase Clinical Trials in Imaging and Image-Guided Interventions (R01)
- PI: Yevgeniy Vinogradskiy
 - Co-investigators
 - CU: Brian Kavanagh, Moyed Miften, Leah Schubert, Phillip Koo (radiology), Derek Linderman (pulmonology)
 - Beaumont Health System: Edward Castillo, Thomas Guerrero
 - UT Galveston (now Emory University): Richard Castillo
- Submission History: 8th percentile, first submission

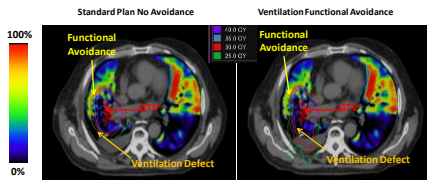
4DCT-Ventilation

- 4DCT acquired for simulation (reduced time, cost, dose)
- Anatomical + Functional information
- Good spatial resolution



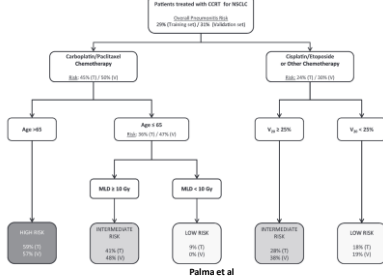
Functional radiotherapy with 4DCT-Ventilation

- Use patients 4DCT data to generate ventilation image
- Use 4DCT-ventilation image to generate functional avoidance plan
- Hypothesis: 4DCT-ventilation functional avoidance will lead to reduced rate of radiation pneumonitis
- Clinical trial to evaluate 4DCT-ventilation functional avoidance



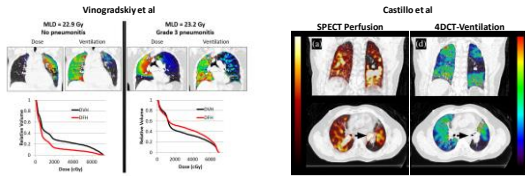
Clinical Motivation/Significance

- Radiation pneumonitis is a major limitation in thoracic radiotherapy



Preliminary Data

- Validation of 4DCT-Ventilation
- Functional avoidance feasible without sacrificing target/OAR goals
- Dose+function better predictor of pneumonitis than dose alone



Relevant Prior Experience

- PhD topic in radiation pneumonitis/Clinical toxicity
- Collaboration with relevant research team
- Experience writing a clinical trial
- 2-3 papers on the topic



Specific Aims

Clinical trial to evaluate 4DCT-ventilation functional avoidance in clinical trial for lung cancer patients

Specific aim 1: Evaluate clinical toxicity of functional avoidance radiation therapy

Specific aim 2: Treatment assessment using imaging and functional biomarkers

Specific aim 3: Identify quantitative imaging biomarkers that predict for clinical toxicity:

Implicit aim: Open + Complete a clinical trial

Key Scientific Outcomes

- Trial successfully opened at CU, William Beaumont, Denver VA
- 92 patients consented in 2.5 years

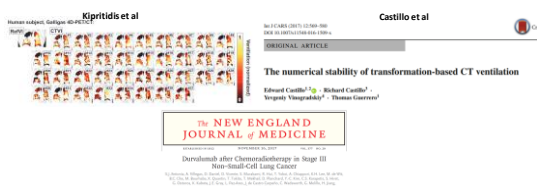
Key Scientific Outcomes

- Trial met pneumonitis futility criteria and progressed to stage II of accrual
- How to practically implement functional avoidance
 - Who can benefit
 - Workflow/QA
- Treatment planning



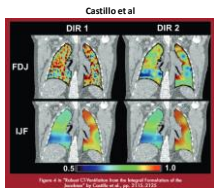
Key Questions

- What happens when primary trial physicist goes on vacation?
- Stability/Variability of image generation technique?
- What other factors effect toxicity?



Future research directions

- What happens when primary trial physicist goes on vacation?
 - Partner with vendor to produce a commercial grade image generation software
- Stability/Variability of image generation technique?
 - Improve image generation robustness
- What other factors effect toxicity?
 - What does functional avoidance look like in the setting of chemoRT+IO



Grant Advice for AAPM Members

- Keep applying (my funding success 4/28 = 14%)
- Range of ideas are suitable for grant applications

Thank you



University of Colorado
 Austin Faught PhD
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