Introduction and Objectives

- For patients with non-small cell lung cancer (NSCLC) treated with stereotactic body radiotherapy (SBRT), patient reported quality of life (QOL) may provide a useful secondary endpoint.
- This work measures the effect/correlation of the following parameters of NSCLC patients up to 36 months after SBRT:
  - Dosimetric parameters
  - Prospectively acquired patient reported quality of life (QOL)
  - Clinical toxicity (provider-reported)

Methods

- Under an IRB-approved protocol, 122 NSCLC patients receiving 12 Gy x 4 were evaluated
- Dosimetric parameters included the mean lung radiation dose (MLD) and the volume of normal lung receiving at least 5, 10, 13 or 20 Gy (V5, V10, V13 and V20), esophagus receiving at least 5 Gy, maximum and mean dose (EVS, Emax, and Emean)
- Quality of life was determined using the previously-validated Functional Assessment of Cancer Therapy-Trial Outcome Index (FACT-T0I) lung questionnaire which incorporated three subscale endpoints: lung subscale (LSC), physical well-being (PWB) and functional well-being (FWB)
- Clinical Toxicity, graded from zero to five, followed the Charlson comorbidity and toxicity index
- Pearson correlation and t-test analyses were used to measure correlations between radiation dose metrics with QOL and clinical toxicities.

Methods: Quality of Life

- Functional Assessment of Cancer Therapy-Trial Outcome Index (FACT-T0I) questionnaire was used to collect QOL data up to 36 months:
  - Standardized QOL scores range: [0-84] were determined by 21 questions related to the following 3 subscales, and baseline-corrected by subtracting pre-treatment QOL data
  - Lung subscale (LSC)
  - Physical well-being (PWB)
  - Functional well-being (FWB)
  - Trial outcome index: TOI = LSC + PWB + FWB

Methods: Clinical toxicities

- Charlson comorbidity and toxicity scoring was used to evaluate the toxicities of the following subcategories for baseline pre-treatment toxicity levels:
  - Respiratory, thoracic, and mediastinal disorders
  - Cough, dyspnea, pleuritic pain, and pneumonitis
  - Gastrointestinal and general disorders
  - Esophagitis, esophageal pain, and fatigue
  - Cardiac disorders, and injury, positioning and procedural complications
  - Pericarditis, pericardial effusion, and dermatitis

Results: QOL correlations to dose/volume/toxicity

- Based on the absolute magnitude of the observed Pearson correlation coefficient, the interpretation is as follows:
  - 0.10 - 0.39: Weak correlation
  - 0.40 - 0.69: Moderate correlation
  - 0.70 to 1.0: Very Strong correlation

Results: QOL clinically meaningful change

- Stage I/II and stage III data did not show clinically meaningful change.
- Stage IV data showed clinical meaningful improvement at 18, 24 and 36 months after radiation as shown in Table 2.
- A 2-3 point difference on the LCS subscale and 5-6 point difference on the TOI are associated with a meaningful difference in clinical indicators.

Results: Clinical toxicity

- The percentages of patients with ≥ 2 grade 3 clinical toxicities were less than 2%. No toxicity with grade ≥ 4 was observed. Cumulative incidences of toxicities at each follow-up time point are shown in Table 3.

Table 3: Cumulative incidence of toxicities over the follow-up time points, 3, 6, 12 and 18 months from pre-treatment baseline, shown for each toxicity grade

The correlations between dose/volume and clinical toxicity are presented in Table 4.

Table 4: A summary of clinical toxicity with dosimetric parameters

Conclusions

- Lung SBRT treatment for patients with NSCLC, using a 12 Gy x 4 dose regimen, was well tolerated.
- Unique QOL data (not previously reported) and clinical toxicities at up to 36 months follow up showed correlations with lung dose and subvolumes for different stages.

Limitations and Future Directions

- Despite promising preliminary conclusions, more patients with longer follow-ups are recommended to improve the predictive capability and increase the correlations between QOL and dosimetric parameters.

References

3. Common Terminology Criteria for Adverse Events (CTCAE, version 4.03), NIH

Acknowledgement: Work supported in part by Varian Medical Systems, Palo Alto, CA.

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