ACRIN-NSCLC-FDG-PET
Summary

**Positron Emission Tomography Pre- and Post-treatment Assessment for Locally Advanced Non-small Cell Lung Carcinoma**

This was a multicenter clinical trial by the ACRIN Cooperative Group (now part of ECOG-ACRIN) and the RTOG Cooperative Group (now part of NRG) using FDG-PET imaging both pre- and post-chemoradiotherapy.

The objective of the ACRIN 6668 multi-center clinical trial was to determine if the PET standardized uptake value (SUV) measurement from FDG-PET imaging shortly after treatment is a useful predictor of long-term clinical outcome (survival) after definitive chemoradiotherapy. Eligible patients were those older than 18 years with AJCC-criteria clinical stage IIB/III non-small cell lung carcinoma who were being planned for definitive concurrent chemoradiotherapy (inoperable disease).

**Primary Aim Findings:** Higher post-treatment tumor SUV (SUVpeak, SUVmax) is associated with worse survival in stage III NSCLC, although a clear SUV cutoff value for routine clinical use as a prognostic factor was uncertain [1]. Later analyses found that larger pre-treatment metabolic tumor volumes (MTVs) were associated with significantly worse overall survival [2]. Other secondary analyses found potentially predictive image texture biomarkers.

**Study Design Summary:** Patients received conventional concurrent platinum-based chemoradiotherapy without surgery; post-radiotherapy consolidation chemotherapy was allowed. A baseline whole-body FDG-PET scan was performed prior to therapy. A second post-treatment whole-body FDG-PET scan occurred approximately 14 weeks after radiotherapy (at least 4 weeks after adjuvant chemotherapy).

Pre-treatment FDG-PET scans were performed on ACRIN-qualified scanners. Post-treatment FDG-PET scans were required to be performed within 12–16 weeks after completion of therapy, using the same scanner as that used for the pre-treatment scans.

**Acknowledgements**

This shared data set was provided in collaboration with the American College of Radiology Core Lab. Many thanks are due to the ACRIN 6668 trial team, and all the patients participating in the study.

This study was supported by the ACRIN Cooperative Group (now part of ECOG-ACRIN) and the RTOG Cooperative Group (now part of NRG) which received funding from the National Cancer Institute through UO1 CA080098 and UO1 CA079778.

**Data Access**

This is a **limited access** data set and is only available to members of NCI's Quantitative Imaging Network (QIN) with an anticipated public release of 2/5/2020. If you are a member of the QIN and would like to request access, please submit a CCP proposal to the QIN Coordinating Committee. Once access is granted, click the **Download** button to save a ".tcia" manifest file to your computer, which you must open with the **NBIA Data Retriever**. Click the **Search** button to open our Data Portal, where you can browse the data collection and/or download a subset of its contents.
**Detailed Description**

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**Study Accrual:** Accrual began in June 2005 and ended in May 2009. Thirty-seven institutions accrued 250 patients to the study. Sixteen patients were ineligible, and eight patients did not have evaluable pretreatment PET, leaving 226 patients. Of these 226 patients, 173 had evaluable post-treatment PET, representing the analysis cohort for the primary end point.

**Date Offsets:** All dates, like the visit date, are protected by presenting just the year; however, dates are also listed as offset days from the base date. The offset dates are used as a means of protecting patient information provided by the local sites in the original data, while allowing users to determine intervals between events. The standard DICOM date tags (i.e. birth dates, imaging study dates, etc.) have been de-identified so that all patients have a baseline study date of January 1, 1960. This falsified date represents the day patients were entered into trial database. The number of days between a subject’s longitudinal imaging studies are accurately preserved. A patient with a study performed on January 4, 1960 means the images were collected 3 days after the base date. For convenience, this calculation has been performed for all scans with the results inserted in DICOM tag (0012,0050) *Clinical Trial Time Point ID*. This means an imaging study that took place on January 4, 1960 would contain a value of ”3” in tag (0012,0050).

**Imaging Protocol:** Conventional modern equipment/techniques for FDG-PET (with or without PET/CT) were used in this study. Patients had to fast for 4 hours and have a blood glucose level less than 200 mg/dL before FDG injection. The FDG dose was not mandated; the recommended dose was 0.14 to 0.21 mCi/kg (approximately 10 to 20 mCi). Emission scanning began 50 to 70 minutes after FDG injection and included the body from upper/mid neck to proximal femurs. Acquisition times for emission and transmission scans were in accordance with the manufacturer’s recommendations.
**Image Analysis:** PET scans were interpreted qualitatively and quantitatively by nuclear medicine physicians/radiologists at each institution, using standardized reporting forms to record the FDG uptake in the primary tumor, regional lymph nodes, and common sites of distant metastasis (ie, bones, adrenals, liver, contralateral lung). These local reviewers were provided with educational materials on image interpretation, specifically describing how to measure peak SUV (SUVpeak). However, formal demonstration of expertise was not mandated. SUVs for regions of interest (ROIs) were determined using two different metrics, maximum SUV (SUVmax) and SUVpeak. SUVmax represented the highest single-voxel SUV within the ROI. SUVpeak represented the mean SUV within a small circular ROI (0.75 to 1.5 cm in diameter) that encompasses the SUVmax voxel. (Thus, SUVpeak will always be lower than SUVmax.).

In addition to the institutional interpretations, pre- and post-treatment PET scans were centrally reviewed at ACRIN by an expert nuclear medicine physician with extensive experience in FDG-PET. A single dedicated workstation was used for this purpose, and SUVpeak was measured with an automated program in a circular ROI 1.5 cm in diameter. The central reader was blinded to clinical data and the institutional SUV measurements.

**Outcomes:** Patients were observed for a minimum of 2 years (or until death) after completion of treatment in accordance with standard clinical practice. Non-protocol PET imaging was allowed but not mandated.

**Schema**

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Register
Note Stage (IIB/IIBA or IIIB) → Baseline Whole-body PET scan → Definitive Chemo-radiotherapy → Follow-up (Re-staging) Whole-body PET scan 12 to 16 weeks after end of XRT (at least 4 weeks after adjuvant chemo)
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**Metadata**

Much more information about this data set (ACRIN 6668 / RTOG 0235) can be found [https://www.acrin.org/6668_protocol.aspx](https://www.acrin.org/6668_protocol.aspx)

**Citations & Data Usage Policy**

This is a **limited access** data set and is only available to members of NCI's Quantitative Imaging Network (QIN) until 12/11/2018. If you are a member of the QIN and would like to request access, please submit a CCP proposal to the QIN Coordinating Committee. Upon receiving access you may only use it for the purposes outlined in your proposal. You are not allowed to redistribute the data or use it for other purposes. See TCIA’s Data Usage Policies and Restrictions for additional details. Questions may be directed to help@cancerimagingarchive.net.

Please be sure to include the following citations in your work if you use this data set:

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Other Publications Using This Data

TCIA maintains a list of publications which leverage our data. At this time we are not aware of any publications based on this data. If you have a publication you'd like to add please contact the TCIA Helpdesk.

Versions

Version 1 (Current): Updated 2018/12/31

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