Prospective Trial of Circulating Tumor Cells as a Biomarker for Early Detection of Recurrence in Patients with Locally Advanced Non-small Cell Lung Cancer Treated with Chemoradiation

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Background

• Assays identifying circulating tumor cells (CTCs) may allow for noninvasive and sequential monitoring of lung cancer.
  • Data assessing CTC use for monitoring treatment response and tumor recurrence in non-metastatic lung cancer patients are sparse.
  • This study is the largest prospective clinical trial to date of CTCs as biomarkers for locally advanced lung cancer.
Trial Eligibility Criteria

• Locally advanced non-small cell lung cancer (LA-NSCLC) (stage II-III)

• Concurrent chemotherapy; patients who were planning to get surgery were ineligible

• No prior active malignancy in the last 5 years

• Age 18 years or older
Trial Diagram

Consent Patient

Simulation

Pre-Tx

Weeks 1-2

Weeks 3-4

Weeks 5-6

1 Mo

3 Mo

6 Mo

12 Mo

18 Mo

24 Mo

Pre-Tx

Tx Start

On-Tx

 Tx End

Post-Tx

Treatment (Tx) Plan:
6660 cGy in 37 fractions
(180 cGy/frac)

Follow-Up:
PET/CT or CT scans ordered prior to
each of these time points

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each of these time points
Results

• 48 patients enrolled. 22 recurred. Acquired samples from 20 of 22.

  - Rise in CTC counts post-RT: 15 of 20

  - CTC counts negative on initial post-RT draw and rose prior to radiographic evidence of recurrence: 10 of 15

• Two-thirds of recurrent patients demonstrated a rise in CTC counts an average of 6 months (182 days) before PET/CT or CT scans detected the recurrence
Example Case

Pre-tx CTCs: +

Tx End
CTCs: -

6 month post-tx CTCs: +

Dec’d

4 month post-tx CTCs: -

Recurrence
Conclusions

• CTC monitoring in patients undergoing chemoradiation for locally advanced NSCLC is feasible

• CTC elevations in many patients meaningfully precede radiologic evidence of disease recurrence

• CTCs may be a promising biomarker of progressive or recurrent disease → may help guide early salvage therapeutic strategies

• Future research is needed to test whether the early detection of disease recurrence afforded by CTC analysis translates to improved outcomes