The Use of Routine CT Surveillance in the Follow-up Care of Early Stage Lung Cancer Survivors

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Background: After definitive treatment for early stage lung cancer, patients remain at risk for recurrence and metachronous cancers. Currently there is no consensus on the optimal strategy for surveillance after curative resection of non-small cell lung cancer (NSCLC). Although recent trials have validated the use of computed tomography (CT) scans for screening high-risk individuals for lung cancer, the role of routine CT imaging postoperatively for surveillance in lung cancer survivors has not been well defined.

Methods*:* We reviewed the outcomes of consecutive patients with early stage (pathological stage I or II) NSCLC resected at a single institution between 2004 and 2009.   Patients who had undergone neoadjuvant therapy were excluded.   All patients underwent surveillance with routine chest/upper abdomen CT scans.   Data on recurrence and second lung primary cancers, diagnostic modalities, treatment and outcomes were abstracted from the medical record.   Recurrence and new primary cancers were distinguished using the Martini-Melamed criteria.

Results: During the study period, 1290 consecutive patients with early stage NSCLC underwent resection, and recurrences developed in 237 (18.2%) patients while second primary lung cancers were diagnosed in 80 (6.2%). The median follow-up time for surviving patients was 35 months. Of the 237 recurrences, 179 (75%) involved distant metastases, while 58 (25%) had locoregional recurrence only. The majority of new primary cancers (75, 94%) were identified through scheduled routine CT scanning, however, 37% of recurrences (n=86) were diagnosed outside of routine follow-up, most often due to interval development of symptoms. During the first 48 months after surgery, the risk of recurrence ranged from 6-9% per person-year, but dropped to 1% thereafter. Conversely, metachronous lung cancer occurred at a rate ranging from 0.5-5% per person-year following surgery, and this did not decrease over time. The vast majority of second primaries (75, 94%) were detected at early stage (stages I and II), and more than half (57%) underwent surgical resection. 87% (40) underwent sublobar resections.   By univariate analysis, overall survival was significantly longer in those patients with recurrence detected by routine CT vs. those with recurrence detected by symptoms (p=0.006).

Conclusions: Among early stage lung cancer survivors, nearly one in four may experience a recurrence or develop a new cancer. Routine surveillance CT scans in early stage NSCLC survivors detects most early stage second primary lung cancers but may be less sensitive for recurrences.   The risk for recurrence among early stage NSCLC survivors remains elevated for the first 4 years after resection and shortening the interval between scans during this period may increase the sensitivity of surveillance CT. The improved survival among patients with asymptomatic, CT-detected recurrences requires prospective validation.