Original research article

**Measurement of primary tumor volume by PET–CT to evaluate risk of mediastinal nodal involvement in NSCLC patients with clinically negative N2 lymph nodes**

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**Abstract**

**Aim**

The study aimed to determine a prognostic value of primary tumor volume measured on the basis of integrated positron emission tomography–computerized tomography (PET–CT) in terms of mediastinal nodal metastases (N2) prediction in non-small-cell lung cancer (NSCLC) patients with PET–CT N2 negative lymph nodes.

**Methods**

The records of 70 potentially operable NSCLC patients treated with surgical resection were analyzed. All patients underwent diagnostic, preoperative PET–CT, which was the basis for tumor volume calculations as well as the evaluation of N2 nodes status. The logistic regression analysis was employed to determine correlation between mediastinal nodal involvement and volume of primary tumor (izoSUV2.5 volume), that is the volume of primary tumor inside SUV 2.5 line, tumor histology, location (peripheral vs. central), hilar node status.

**Results**

A statistically significant correlation between mediastinal node involvement and izoSUV2.5 volume, tumor histology, locations peripheral vs. central and hilar node status was found. The risk of mediastinal lymph node metastasis is 24% for tumor volume of 100 cm$^3$ and increases up to 40% for tumor volume of 360 cm$^3$. An increase of tumor volume by 1 cm$^3$ increases the risk of lymph node disease by 0.3%. Tumor histology adenocarcinoma vs. squamous cell carcinoma increases the risk of mediastinal lymph node involvement by 195%, location central vs. peripheral by 68% and hilar node involvement by 166%.

**Conclusions**

The study demonstrates that izoSUV2.5 volume of primary tumor may be considered as a prognostic factor in NSCLC patients, since it strongly correlates with mediastinal lymph node pathological status. This correlation is modified by primary tumor location, histology and hilar node involvement.

**Keywords**

Tumor volume; Nodal metastases; Mediastinal lymph node status; PET–CT; Non-small cell lung cancer