



Hackaton

Non-small cell lung cancer (NSCLC)

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Outline

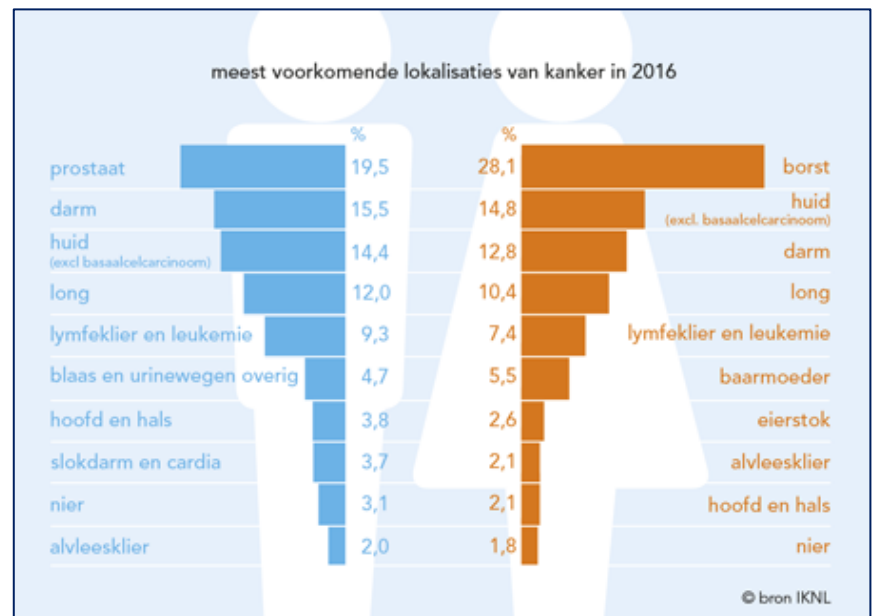
- What is non-small cell lung cancer (NSCLC)?
- What causes NSCLC?
- How do we diagnose NSCLC?
- How do we treat NSCLC?



Introduction

Lung cancer incidence Netherlands:

- 12.000 new patients/ year
- 85% of all lung cancer: non-small cell lung cancer (NSCLC)
- 1-yr OS 44% (2006-2010; so after 1 year 44% is alive, 56% died)
- 5-yr OS 17% (2006-2010)



What causes non-small cell lung carcinoma (NSCLC)?¹

- Tobacco smoking
- Secondhand tobacco smoking
- Diet
- Alcohol
- Air pollution
 - Proportion of lung cancers attributable to urban air pollution in Europe is estimated to be 11%² (Netherlands: contributes to 1200 new cases per year)
- Occupational exposure (asbestosis)
- Genetic factors

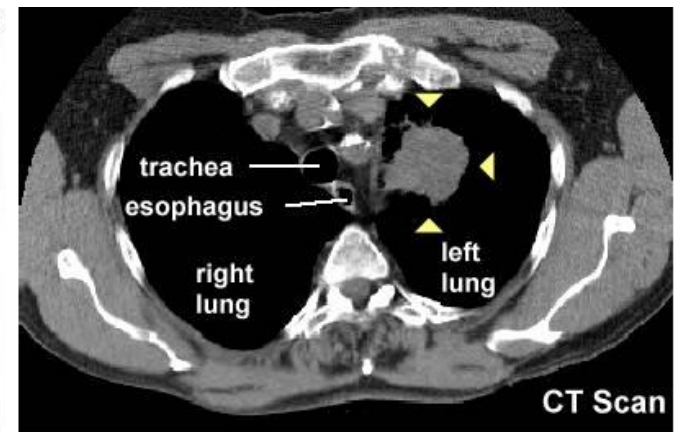
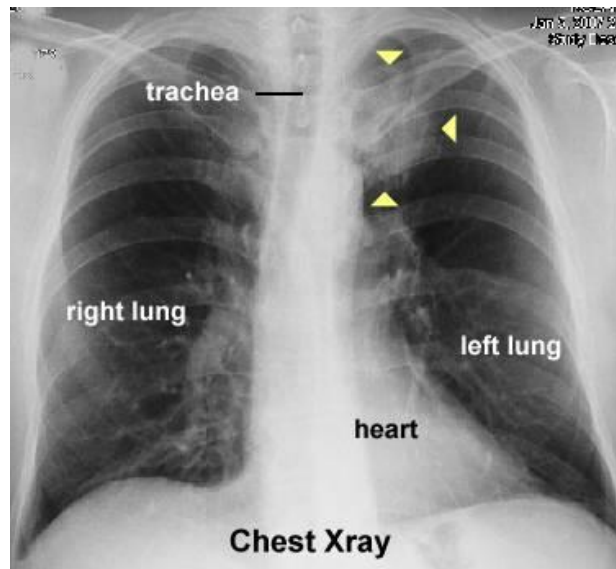


1. J.R. Molina et al., NSCLC: epidemiology, risk factors, treatment and survivorship, Mayo Clin Proc. 2008.
2. P. Boffetta, Human cancer from environmental pollutants, Mutat Res 2006.

Diagnosis

Clinical manifestations¹

- Cough
- Hemoptysis (coughing blood)
- Shortness of breath
- Chest pain



Left Upper Lobe Cancer

note how much more obvious the tumor is on the CT scan compared to chest Xray

Diagnosis

V-Sc

Trigge

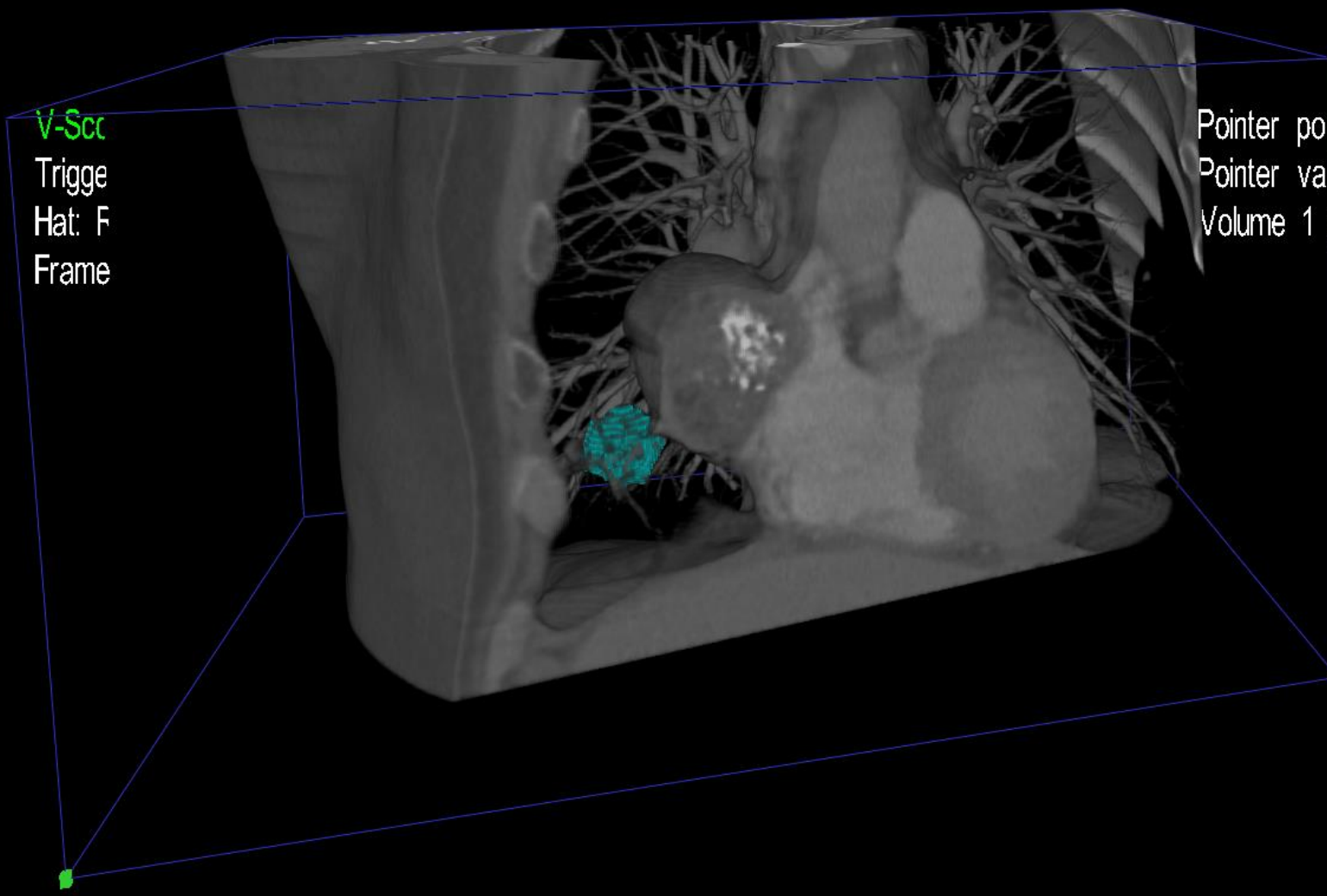
Hat: F

Frame

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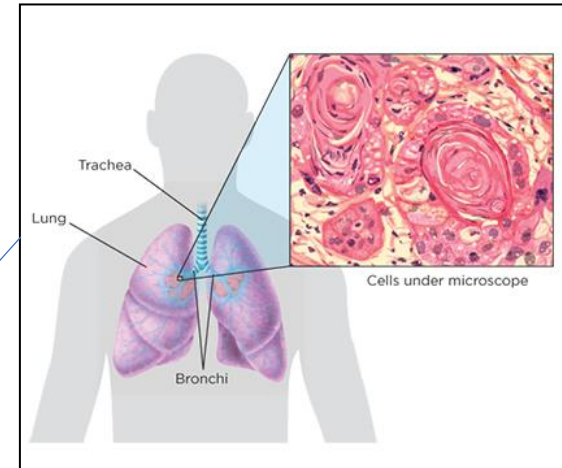
Volume 1 (C): 7.17 cm³



Treatment

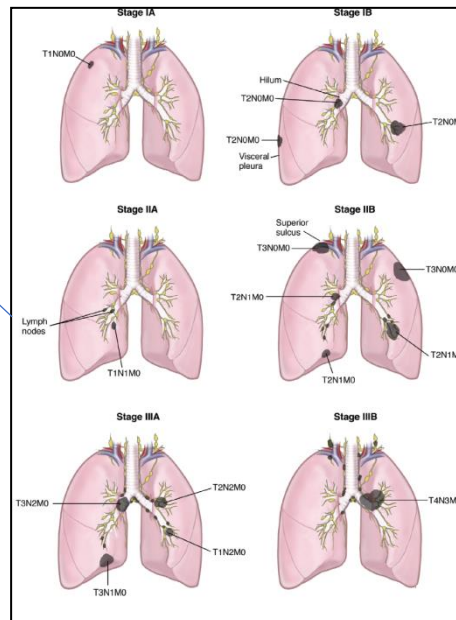
Treatment based on:

- Tumor type by microscope(morphology)/ mutation analysis



Squamous/ non-squamous

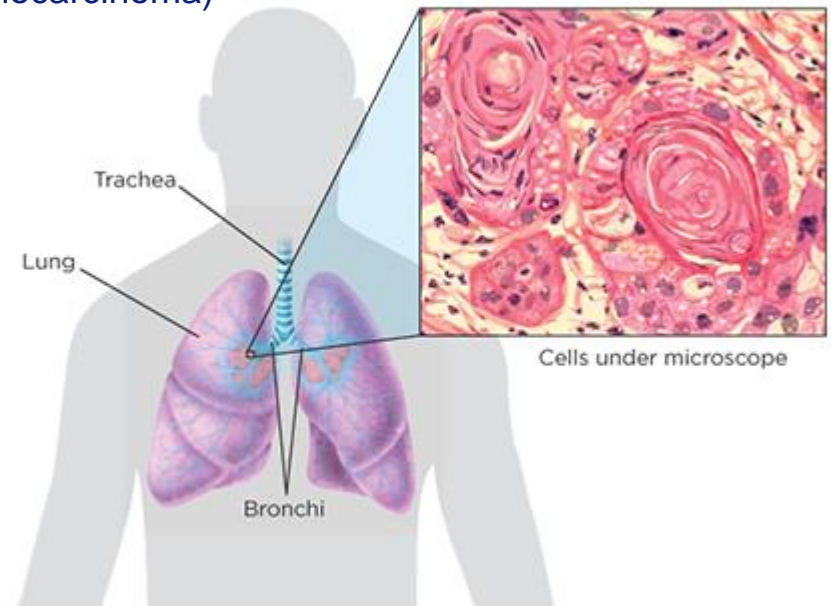
- Staging



Diagnosis

Non-small cell lung cancer

- Two types (obtained by biopsy, imaging by microscope):
 - Squamous cell carcinoma (*Nederlands: plaveiselcelcarcinoom*)
 - Non-squamous cell carcinoma (mainly adenocarcinoma)

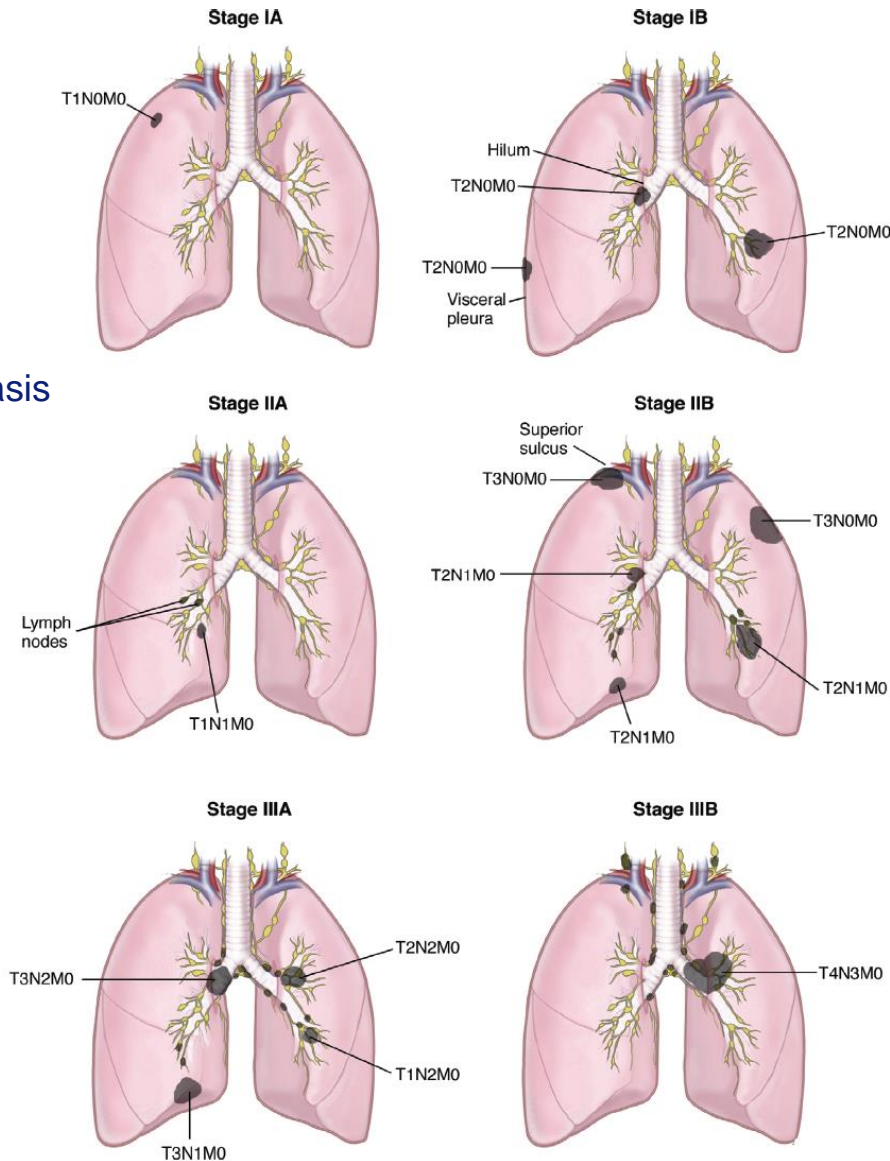


Diagnosis

Staging NSCLC based on TNM classification

- T= tumor size, N=lymph node, M= distant metastasis
- The more extensive, the worse prognosis
(chance to survive after 5 years at stage IV is 1%)

| Stage | TMN | 5-yr Survival Rates |
|-------|--------------------|---------------------|
| IA | T1N0M0 | ~70% |
| IB | T2N0M0 | ~60% |
| IIA | T1N1M0 | 55% |
| IIB | T2N1M0 T3N0M0 | ~40% |
| IIIA | T1-3N2M0 T3N1M0 | ~25% |
| IIIB | Any T4,N3, M0 | <5% |
| IV | Any M1 | 1% |



Treatment

Treatment NSCLC based on staging:

I

Stage I, II and resectable III → surgery + chemotherapy

II

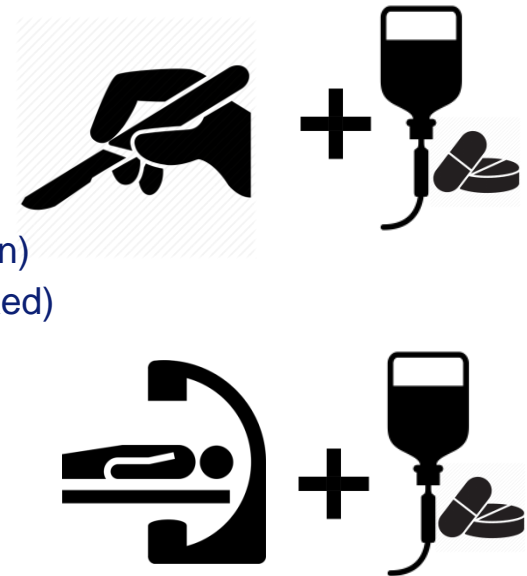
- Adjuvant chemotherapy
 - Squamous cell carcinoma: 4x chemotherapy (cisplatin/gemcitabin)
 - Non-squamous carcinoma: 4x chemotherapy (cisplatin/pemetrexed)

III

Stage III irresectable → radiotherapy + chemotherapy

III

- 3x chemotherapy (cisplatine/etoposide) and concurrent radiotherapie
- Stage III irresectable at recurrence: first/second line therapy stage IV



Treatment

IV

Stage IV → systemic therapy (chemotherapy, targeted therapy, immunotherapy)



First line therapy

- Treatable driver mutations:
 - E.g. HER2, BRAF, RET, MET, EGFR, ELM-ALK, ROS1 → TKI
- Without treatable driver mutations:
 - Platinum-based chemotherapy
 - Pembrolizumab for pts with a high level (>50%) PD-L1 expression (1)

Second line therapy

- Treatable driver mutations: E.g. T790M → TKI
- Without treatable driver mutations:
 - Nivolumab (3,4)
 - Pembrolizumab for pts with a level >1% PD-L1 expression (5)
 - Pemetrexed, docetaxel

To memorize !



- TNM classification
 - Tumor size, lymph node involvement, distant metastases
- Staging
 - Based on TNM
 - I, II, III and IV (bad to worse)
- Treatment
 - Based on stage
 - Stage I/II: chemo surgery
 - Stage III chemo radio, chemo
 - Stage IV chemotherapy/ targeted therapy/ immunotherapy