Use of liquid biopsy in non-squamous NSCLC – A model-based assessment of clinical and economic performance in German clinical care setting

Fabienne, Englemier1; Annalen, Bleckmann4; Wolfgang, Brüch3; Klaus, Nagel1

1 Chair of Healthcare Management and Health Services Research, University of Bayreuth, Bayreuth, Germany; 1 Medical Clinic A, Haematology, Haemostasiology, Oncology and Pulmonology, University Hospital Münster, Münster, Germany; 1 Nuremberg Lung Cancer Center, Department of Respiratory Medicine, Allergology and Resp Medicine, General Hospital Nuremberg, Paracelsus Medical University Nuremberg, Nuremberg, Germany; 1 Department of Haematology and Medical Oncology, University of Medicine Goettingen, Goettingen, Germany

Introduction and Objective

- Lung cancer is one of the leading cancer deaths worldwide with non-small cell lung cancer (NSCLC) accounting for more than 80% of all lung cancer cases.
- Steady and growing insights into molecular tumour biology has allowed the development of molecular targeted therapies prolonging the PFS as compared to conventionally used cytotoxic agents.
- To initiate a targeted therapy, a molecular pathological examination is inevitable via tissue (gold standard) or liquid biopsy.

Cost-effectiveness analysis

The parameters used for modelling were obtained by evidence synthesis and pooling of relevant international RCT results and published national CRISP®-register data. Model input data, and where required, model related assumptions were validated with clinical experts.

- Model: Decision tree (microsimulation 10,000 trials)
- Population: non-squamous NSCLC metastatic stage (four subgroups: EGFR, ALK, BRAF-V600, ROS1)
- Intervention: Care pathway with liquid biopsy
- Comparator: Care pathway without liquid biopsy (only tissue biopsy can be performed for molecular profiling)
- Perspective: Public health insurer
- Outcomes: Direct medical cost (drugs, pathological examination, tissue biopsy) and progression-free survival (PFS)
- ICR = Cost Intervention – Cost Comparator

Results

- The results of the microsimulation demonstrated that the use of a liquid biopsy as an add-on was associated with an extended PFS2 in all subgroups.
- A care pathway with liquid biopsy as an add-on to tissue biopsy showed a moderate cost-effectiveness with an incremental cost-effectiveness ratio of €2,784.
- The care pathway with liquid biopsy showed an ICR of €3,423 in patients with an activated mutation in the EGFR gene and dominates the pathway without liquid biopsy.

Discussion

- Including liquid biopsy as an add-on into the care pathway of metastatic NSCLC had positive clinical effects in terms of PFS and a moderate cost effectiveness, depending on the genetic alteration (highly cost-effective for EGFR mutated patients).
- Liquid biopsy use also appears to be promising for patients with ALK translocations since resistance mechanisms are also well understood with further targeted therapies available and approved.
- The initiation of targeted therapies based on liquid biopsy derived information is linked to a higher response rate than chemotherapy-dominated treatment algorithms.
- However, patient access to both molecular differential diagnosis and targeted NSCLC therapies across the course of the disease in Germany is limited and can be traced back to not fully established and insufficient reimbursement policies which finally control access and translation into clinical practice.

Literature


Contact: Chair of Healthcare Management and Health Services Research, University of Bayreuth, fabienne.englemier@uni-bayreuth.de, Phone: +49 921 55 7085

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