LUNG CANCER RISK ASSESSMENT METHOD AND TOOL

Know-how

UNIVERSITY OF LATVIA

FIELD

Personalized medicine

AIM

Improve the capacity and quality of non-invasive lung cancer risk assessment.

DESCRIPTION

A unique method developed by the authors is used for lung cancer risk assessment, which is based on the simultaneous analysis of 500+ different parameters, including liquid biopsy. The parameters analysed include image diagnostics (computer tomography), radionuclide (PET-positron emission tomography), laboratory (including oncomarkers), functional and molecular diagnostics (blood "liquid biopsies", detecting mutations in 324 genes and other parameters in cell-free tumour DNA), as well as demographic, social and environmental data. Data from patients with lung cancer and from a control group were analysed.

After data processing, using modern machine learning and statistical analysis methods, a risk assessment model for the specific patient has been developed. The model consists of an optimal set of parameters with the best predictive ability selected in the analysis. The contribution of each parameter in the set to the model is determined, considering the correlations between the parameters included in the set.

The selected parameters and the assessment of their impact on lung cancer risk are specific to the social and environmental conditions of Latvia. The model is the basis of the developed lung cancer risk assessment tool, which is suitable for use in medical institutions in online mode.

APPLICABILITY

Non-invasive assessment of lung cancer risk for the development of a personalized future treatment plan.

SOLUTION

Lung cancer risk assessment with non-invasive methods, improving and personalizing diagnosis and treatment for each patient. This makes it possible to assess the risk of lung cancer for a particular person and determine the future treatment plan.

ADVANTAGES

- Personalized non-invasive lung cancer risk assessment; reduced substantial risk of serious complications inherent in invasive technologies such as surgical biopsy;

- A unique method was used to create the risk model, using a coverage of 500+ demographic, risk, clinical and diagnostic parameters, from which an optimal set of parameters with the best assessment ability was selected;

- The risk model is specially adapted to the genetic, social, and environmental aspects of the population of Latvia (the entire Baltic region);

- High quality of lung cancer risk assessment, provided by the application of modern statistical and machine learning methods for selecting the optimal set of parameters;

- Can be used for the development of a personalized plan for treatment process, increasing the number of patients whose cancer is detected at an early stage and reducing the number of potentially lost years of life;

- Practical use of a simple risk assessment tool in medical institutions.