The Health Technology Report Series has been developed by the Institute of Family Medicine and Public Health, University of Tartu.

The use of next-generation sequencing panel tests to guide targeted therapies in metastatic solid tumour patients

Summary

Objectives: The aim of this health technology assessment was to analyse the costs and benefits of using next-generation sequencing (NGS) panel tests to guide targeted therapies for metastatic solid tumours, and the budget impact of the interventions from the perspective of Estonian Health Insurance Fund.

Methods: A systematic review of Summary of Product Characteristics (SPC) of targeted therapies with marketing authorisation in Estonia as of 2020 was conducted to describe requirements regarding genetic testing prior to starting treatment. In parallel, a systematic review of European Society for Medical Oncology (ESMO) and National Comprehensive Cancer Network (NCCN) treatment guidelines was conducted to describe current recommendations regarding the use of NGS panel tests and targeted therapies in metastatic solid tumour patients. Based on guideline recommendations and the current Estonian practices, it was decided to include non-small cell lung cancer (NSCLC) and colorectal cancer (CR) in the budget impact analysis. A simple closed-cohort budget impact model was constructed in Microsoft Excel. The size of the target group was estimated based on cancer incidence data from 2014–2017. The current Estonian practices (including testing numbers, methods used and costs) were described based on data from the three largest cancer treatment centres in Estonia (North Estonia Medical Centre, Tartu University Hospital, East Tallinn Central Hospital).

Results: The annual potential number of patients in Estonia that might benefit from testing with NGS panel tests is 1500 patients, including 135 metastatic NSCLC and 245 metastatic CR patients. Current practices of sequential single testing cost 422 euros to profile one NSCLC patient (EGFR and ALK) and 487 euros to profile one CR patient (KRAS, NRAS, BRAF and MSI). Replacing single tests with FoundationOne CDx panel testing would add costs by 600 000 – 965 000 euros and by 258 000 – 366 000 euros if Illumina TruSight Oncology 500 would be used.

Conclusions: In comparison with single-gene testing for metastatic NSCLC and CR patients, the testing expences with NGS panel tests would be 4–6 times larger with FoundationOne CDx and 2–3 times larger with Illumina Trusight Oncology 500.

Citation: Pruks L-L, Paabo T, Jaal J, Planken A, Kahre T, Kiivet R. *Geenitestid kasvajate ravivalikutes.* TTH50. Tartu Ülikool: peremeditsiini ja rahvatervishoiu instituut; 2020.