Health Technology Assessment of minimal residual disease detection as a prognostic biomarker and therapeutic target in hematologic cancers

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Background

A biomarker which can detect minimal residual disease (via the detection of leukemic stem cells or LSCs) in acute myeloid leukaemia (AML) is currently under development at the Department of Haematology, Medical University of Graz. It will supply early information on a patient's prognosis during chemotherapy treatment and supports the development of a tumour-specific marker on residual LSC or CSC (cancer stem cells) suitable for targeted therapy.

The economic impact of this technology has not yet been assessed. For this reason a HTA-type assessment is planned focussing on the (cost-) effectiveness, budget impact and potentially required organisational changes.

Aim

The aim of this project is to evaluate the clinical and economic impact of minimal residual disease detection as a prognostic biomarker and therapeutic target in hematologic cancers.

Methods

The analysis focuses on Austria and Germany and consists of two main modules: a scoping research and a cost-effectiveness analysis.

The purpose of the first module is to gather an overview of the area and consists of the following three steps:

(1) The estimation of the target population will be assessed from the literature;
(2) Possible treatment pathways and related costs, outcomes and probabilities will be predicted through literature reviews and expert interview;
(3) Burden of illness will be assessed from a societal perspective using epidemiologic and labour market data, as well as a systematic literature review of existing burden-of-illness estimates in this area.

Systematic literature searches will be conducted in PubMed and the database of the Centre for Reviews and Dissemination (Cochrane, NHS EED, DARE, HTA) using search terms related to the disease and clinical- and cost-effectiveness. There will also be a search of the grey literature (e.g. reports). Initial information is being elicited using the following data extraction form:

	How many patients are affected by chemotherapy-resistant relapse?		How is chemotherapy-resistant relapse currently detected?	At what stage is chemotherapy-resistant relapse currently detected and how?	What is the impact of chemotherapy-resistant relapse in terms of patient management (are other management options available) and patient outcomes?	What would be the likely implication of earlier detection or in predicting which patients are likely to incur this in terms of patient management (could alternatives forms of chemotherapy or alternative treatment options be pursued instead?) and patient-relevant outcomes?	What are likely current costs of chemotherapy-resistant relapse in terms of (i) health care budgets and (ii) societal costs?	Are there any influential factors in any of the above aspects in terms of patient characteristics, type of chemotherapy etc.?	
Source	**Prevalence**	**Incidence**	**Diagnosis: How**	**Diagnosis: When**	**Outcome: Baseline**	**Outcome: Impact of intervention**	**Cost**	**Survival period**	**Average Age**
Author / Year									

Table 1: Data extraction form to elicit information related to the target population and treatment pathways

The purpose of the second module is a cost-effectiveness analysis (CEA) of minimal residual disease detection as a prognostic biomarker and therapeutic target in hematologic cancers through an economic model. This evaluation will use data generated within the clinical study conducted by the Department of Haematology as well as information obtained in the first module described above. In so doing it will build upon published economic evaluations in the area of biomarkers. The proposed CEA will comply with the recommendations of the HTA Core Model (EUnetHTA[1]).

(Preliminary) Results

Preliminary searches revealed that data is available regarding the prevalence and incidence of minimal residual disease in acute myeloid leukaemia (AML) and possible treatment pathways in developed countries[2], including Austria and Germany. Our ongoing literature review has so far identified 23 sources, including guidelines and potentially relevant peer-reviewed publications which are currently being extracted.

By the end of the first module, we expect to have information on the target population, possible treatment pathways and the associated costs, outcomes and probabilities of different events, as well as an estimated burden of illness. We hope to define an incremental cost-effectiveness ratio (ICER) for this biomarker technology by the end of the second module.

(Expected) Conclusion

We expect to summarise the information available on the clinical and cost-effectiveness of minimal residual disease detection as a prognostic biomarker and therapeutic target in hematologic cancers, and thereby be able to provide recommendations for clinical practice and decision makers.

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[1] www.eunethta.eu [2] Döhner et al., Blood. 2010 Jan 21;115(3):453-74.

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