HINTERGRUND

According to the WHO up to 3 - 4 million people are infected annually with the hepatitis C virus (HCV). About 130 - 170 million people are chronically infected with HCV, which corresponds to 2 - 3% of the world population. The introduction of all-oral direct-acting antiviral (DAA) therapy has revolutionized care of patients with chronic HCV infection. Unfortunately, the very high cost of these drugs (e.g. Sofosbuvir) limits the access to therapy for many patients and has now become the primary barrier to HCV eradication. Total treatment costs can be as high as $150,000 per patient. With more than a million patients needing HCV treatment in the next 3–5 years in the USA alone, the exceptional prices of these drugs will substantially impact healthcare budgets. Nevertheless, there is considerable variation between patients in time to stable HCV RNA negativity under DAA treatment. If patients who respond fastest to treatment could be identified then, an individually tailored, more cost-effective approach to prescribing shorter courses of DAA therapy may be possible; in turn, this could lead to more efficient resource allocation and treatment of more patients.

LÖSUNG

This technology provides a method to predict early viral control after starting DAA therapy in patients with chronic HCV infection. The frequency of certain immune cells (CD3+ T cells and CCR7+ CD45RA+ naive CD8+ T cells) in the patient's peripheral blood is measured by flow cytometry prior to therapy. This allows conclusions to be drawn as to whether the patient is a so-called „fast“ or „slow responder", i.e. whether he responds quickly or slowly to DAA therapy. DAA treatment most prominently altered the distribution of CD8+ memory T cell subsets. Knowing only pretreatment frequencies of CD3+ and naive CD8+ T cells allowed correct classification of 83% of patients as “fast” (HCV RNA-negative by 4 weeks) or “slow” responders with a sensitivity of 75.0% and specificity 91.0% (n=24 patients). Critically the false-positive rate for prediction of fast-responder status is only 9.1%.
VORTEILE

- Shortening DAA therapy in individuals predicted to be fast responders, thereby substantially reducing costs.
- Flow cytometry-based assays used for this study are highly standardized and the required reagents are commercially available.
- The assays can be performed for under $100 in less than 4 hours.

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