Improving differential diagnosis and follow-up in Graves’ disease

B·R·A·H·M·S TRAK human
Immunodiagnostic Assays
Stimulating and blocking antibodies

There are 3 different varieties of TSHR antibodies (TRAb) known: the stimulating, blocking and neutral type. While antibodies of the stimulating type bind exclusively to the conformational region of the receptor, the neutral TRAbs bind to the linear region. Blocking TRAbs bind to the entire extracellular part of the receptor (Figure 2), and thus cannot be distinguished from stimulating or neutral ones just based on the region of binding.3,4

While the stimulating TSHR antibodies are related to the Graves’ induced thyrotoxicosis, this stimulating antibody population might change to a less stimulating or even blocking one or vice versa during the course of the disease.5

For a reliable follow-up of Graves’ disease it is therefore important to monitor the full range of TRAbs in each patient. With the human TSH receptor used, the B·R·A·H·M·S TRAK human assays detect all of the clinically relevant antibody types.
Excellent prognostic value
It has been shown that TRAK human levels predict a relapse with high reliability (Fig. 3). The positive predictive value was found to be 96.4% at 10 IU/L as early as 6 months of anti-thyroid drug therapy. "End-of-treatment-cut-off" TRAK human of 3.85 IU/L had a prognostic value for relapse with a sensitivity of 85.3% (specificity 96.5%). In addition, TRAK human values are associated with the severity of Graves’ ophthalmopathy (GO) (Fig. 4).

Different treatment regimens
Antithyroid drugs are considered first-line therapy in patients with Graves’ disease. Lifelong hypothyroidism, as it results from the ablative therapies, can be avoided here. However, as drug treated patients have high relapse rates thyroidectomy or 131I-radiotherapy are viable second-line options.

For post-treatment surveillance the characteristic development of TRAb concentrations under different treatment regimens has to be taken into account (Fig. 5). In patients treated with medication or surgery, TRAb levels gradually decrease and reach the upper limit of the reference range (ULN) after 1 or 1.5 years. 131I-radiotherapy induces a different pattern. TRAb levels increase considerably to a peak approx. 3 months after treatment followed by a gradual fall. During this treatment TRAb levels do not reach the normal reference limit for at least 5 years after treatment.
High discrimination in the differential diagnosis of patients with Graves' disease

The distribution of TSHR-Ab concentrations in different patient groups demonstrates the high discriminative power of the Thermo Scientific B·R·A·H·M·S TRAK human assays in various indications (Fig. 6). All TRAK human assays allow for dilution of out of range samples for best follow-up of the course of the disease. On the KRYPTOR instrument a fully automated dilution is provided.

Figure 6 Distribution of TSH receptor antibodies in different groups of patients

References

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