International Conference 'Advances in Pneumology'
Bonn, 17-18 June 2011

SERUM CONTROL FOR THERAPEUTIC ANTIBODY AND IGE DURING TREATMENT WITH OMALIZUMAB

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Introduction: Therapeutic antibodies (TAb) are a new generation of pharmaceuticals which increasingly become more important. Some are already in clinical use but a high number is in pipeline in more than 1000 studies worldwide. These antibodies are directed against specific proteins to inhibit their disease-causing effect.
The common characteristic of any antibody treatment is, that all commercial available tests are failing in serum control after the first injection. The reason for this is, that components of the test system are already in the sample:
- The TAb binds to the same epitope than the capture antibody of the Kit, the results are to low.
- The TAb binds to other epitopes than the antibodies of the test kit. The assay cannot differentiate between the target and the target-TAb complex, the results are too high.
- The different kinetic of the reaction between the TAb, the capture antibody and the target is not known, the results are purely coincidental.
Methods: The aim of our work was to develop an in-vitro procedure for the estimation of both the therapeutic antibody and the antigen in serum samples by use of a sandwich assay. Therefore we have investigated the influence of the therapeutic antibody on the calibration curves of a sandwich assay for the antigen. In samples of unknown composition the recovery was estimated from the addition of a certain amount of the antigen. The system was adapted on a couple of new therapeutic antibodies.
Results: The application of the Recovery-ELISA is shown on clinical serum samples of patients treated with Omalizumab and with Adalimumab. It was possible to demonstrate therapeutic levels of therapeutic antibodies, and free antigen in serum.
In 7 asthmatics during Omalizumab-therapy the IGE level decreased from 783 to 14 IU/mL (Mean) the recovery of added IgE after therapy was only 3% (100% before therapy).
In 5 patients with rheumatoid arthritis with anti TNF-a-therapy the free TNF-alpha was unchanged (4,3 vs. 4.2 ng/mL) but recovery of added TNF-alpha decreased to 1,1%. The serum levels of therapeutic Antibody after therapy was 32 resp. 8 ?g/mL, the pre-treatment level was 0 both.
In additional comparison-analyses was shown the strong deviation of the results of IgE-measurement during Omalizumab-treatment with different test-kits.

Discussion: The use of traditional test-kits is obsolete during an antibody-treatment. The R-ELISA enables the serum control of therapeutic antibodies and the target antigen during treatment with therapeutic antibodies. The method can get major importance during pre clinical development, clinical permission and therapy control of therapeutic antibodies.