



Clinical use of various drugs as biologic targeted therapy for severe uncontrolled asthma

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Introduction: Several biologic drugs are currently used to treat patients with severe T2 asthma, targeting IgE or T2 cytokines (IL-5, IL-4/13). Choosing drugs for particular patients, especially for patients with the combined (allergic and eosinophilic) T2 phenotype of asthma is a challenge.

- **Materials and methods:** we studied three patients with severe uncontrolled T2-type asthma (GINA steps 4 to 5), concomitant polypous rhinosinusitis, high peripheral blood eosinophil counts (> 300 cells/ μ L), and sensitization to one or more allergens, confirmed with specific IgEs detected. Total IgE levels in all patients were >100 IU/ ml.
- All patients took part in a clinical study and were treated for 2 years with dupilumab, an antibody binding IL-4/13 signaling, with a pronounced clinical effect. After the termination of the study, when the asthma control worsened, omalizumab was prescribed, for 12 months in total, with a moderate effect in two patients and no effect in one. The patients were then switched to anti-IL-5 therapy with mepolizumab, with good effect in two patients and little improvement in one patient.
- Table 1 shows the lung function (FEV1) in patients before and during treatment with various biological agents.
- Table 1. Lung function values (FEV1) in patients at baseline and on treatment

FEV1	At baseline	Dupilumab	Omalizumab	Mepolizumab
Patient 1	53%	83%	56%	74%
Pat. 2	27%	36%	24%	29%
Pat. 3	45%	98%	50%	78%

All patients first had complaints on nasal breathing impairment and anosmia. On treatment with dupilumab, all patients recovered their nasal breathing and sense of smell; on treatment with omalizumab, the complaints of impaired nasal breathing and anosmia returned; while on treatment with mepolizumab, anosmia and problems with the nasal breathing persisted in 1 patient. Table 2 summarized peripheral blood eosinophils counts in patients at baseline and on treatment with various biologic drugs.

Table 2. Blood eosinophil counts in patients at baseline and on treatment

(cells/ μ L)	At baseline	Dupilumab	Omalizumab	Mepolizumab
Patient 1	320	130	250	230
Pat. 2	310	190	270	180
Pat. 3	660	210	410	315

Conclusions: our experience of the use of different biologics in targeted therapy for severe uncontrolled T2 asthma with combined phenotype (allergic and eosinophilic) and concomitant polyposis rhinosinusitis demonstrated high efficacy of dupilumab, which could be considered a first-choice drug for such patients. As an alternative, mepolizumab may be used.