

The effect of oral corticosteroids on circulating type-2 cytokine producing cells in patients with severe eosinophilic asthma

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Introduction

Oral corticosteroids are an important treatment for severe eosinophilic asthma. It has been hypothesised that type-2 cytokine producing cells including helper (Th2), cytotoxic (Tc2) T cells and innate lymphoid cells (ILC2s) are key drivers of severe eosinophilic asthma. The effect of oral corticosteroids (OCS) on circulating type-2 cytokine producing cells is unknown.

Aim

We aimed to examine the effect of OCS on clinical parameters, biomarkers of eosinophilic inflammation and circulating immune cells in patients with severe eosinophilic asthma.

Methods

Oral corticosteroid-naïve patients with eosinophilic inflammation were identified in our severe asthma clinic in Oxford, UK. These patients were invited to attend for assessment before and after having had a course of oral prednisolone at a dose of 30mg daily. Clinical data including spirometry, sputum cell differential, fractional exhaled nitric oxide (FeNO) and asthma symptom scores were collected and blood was taken for flow cytometry.

Results

Six patients (4 female) were assessed. The mean age was 57.5 years. The median inhaled beclomethasone dipropionate equivalent dose was 1600 micrograms per day and median duration of prednisolone was 11 days.

Overall patients improved clinically with mean FEV1 increasing from x-y (p=), asthma control questionnaire score from x-y (p=) and geometric mean exhaled nitric oxide reducing from x to y (p=) Table 1 shows flow cytometry data of circulating immune cells.

	Pre-OCS	Post-OCS	P value
Eosinophils ($10^9/L$)	0.5051±0.2141	0.0836±0.1234	0.018
Neutrophils ($10^9/L$)	4.6676±1.6047	7.0807±1.6263	0.034
Monocytes ($10^9/L$)	0.2760±0.0829	0.2259±0.1290	0.173
T cells ($10^9/L$)	1.830±0.7490	0.5889±0.2392	0.012
Th2 ($10^9/L$)	0.0218±0.0134	0.0067±0.0048	0.025
Tc2 ($10^9/L$)	0.0141±0.0072	0.0051±0.0060	0.065
ILC2 ($10^6/L$)	0.2482±0.2119	0.4218±0.3140	0.138

Table 1. Flow cytometry data before and after a course of oral corticosteroid.

OCS: oral corticosteroid; Th2 cells: type 2 helper T cells; Tc2 cells: type 2 cytotoxic T cells; ILC2: type 2 innate lymphoid cells.

Conclusions

In our patients with severe eosinophilic asthma a course of oral corticosteroids resulted in clinical improvement and a decrease in circulating eosinophils, Th2 cells and Tc2 cells. ILC2s however remained unchanged. This suggests that ILC2s are resistant to oral corticosteroids and may not be significant drivers of eosinophilic inflammation in this cohort of patients with severe eosinophilic airways disease.