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A primary ciliary dysfunction might be present in severe asthma

Severe asthma, Epithelial cell

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Introduction: Mucociliary clearance(MCC) results from an effective interaction between the mucus layer and the normal coordinated ciliary beating. Ciliary dyskinesia is defined as an abnormal ciliary beat frequency(CBF) and/or ciliary beat pattern(CBP). Recent data demonstrated a ciliary dyskinesia in moderate and severe asthma, but it is unknown if this is primary, or secondary to chronic inflammation.

Aims: To determine if ciliary dyskinesia is primary or secondary in severe asthma.

Methods: Ciliated epithelial samples were obtained by nasal brushing from 10 adults with severe asthma. Beating cilia were recorded using digital high-speed videomicroscopy at 37°C. Ciliary functional analysis(CFA) was assessed by CBF and by the percentage of dyskinetic CBP(%DK). CFA was re-assessed after air-liquid interface(ALI) cell culture in a subset of 4 patients. Normal values for CFA were obtained from 14 healthy adults.

Results: Our results confirms that ciliary dyskinesia is increased in adults with severe asthma compared with healthy subjects, with a lower CBF($11.52 \pm 0.67\text{Hz}$ vs $14.79 \pm 0.58\text{Hz}$, $p=0.001$), and a higher %DK($29.3 \pm 4.23\%$ vs $17.28 \pm 2.04\%$, $p=0.010$). However, when comparing CFA before and after ALI cell culture, there is no significant difference in CBF($11.44 \pm 2.91\text{Hz}$ vs $12.88 \pm 1.75\text{Hz}$, $p=0.269$), or in the %DK($32.7 \pm 15.79\%$ vs $24.43 \pm 13.24\%$, $p=0.378$).

Conclusions: This pilot study confirms that ciliary function is impaired in patients with severe asthma, and may play a role in impaired MCC. Furthermore, our results suggest that ciliary dyskinesia may be primary

and not secondary to chronic inflammation in severe asthma, as ciliary function does not improve after ALI cell culture; this must be confirmed in higher numbers of patients.