Patterns of systemic and local inflammation in patients with asthma hospitalised with influenza

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ABSTRACT

Background: Patients with asthma are at risk of hospitalisation with influenza, but the reasons for this predisposition are unknown.

Study setting: A prospective observational study of adults with PCR-confirmed influenza in 11 UK hospitals, measuring nasal, nasopharyngeal and systemic immune mediators and whole-blood gene expression.

Results: Of 133 admissions, 40 (30%) had previous asthma; these were more often female (70% *versus* 38.7%, OR 3.69, 95% CI 1.67–8.18; p=0.0012), required less mechanical ventilation (15% *versus* 37.6%, Chi-squared 6.78; p=0.0338) and had shorter hospital stays (mean 8.3 *versus* 15.3 days, p=0.0333) than those without. In patients without asthma, severe outcomes were more frequent in those given corticosteroids (OR 2.63, 95% CI 1.02–6.96; p=0.0466) or presenting >4 days after disease onset (OR 5.49, 95% CI 2.28–14.03; p=0.0002). Influenza vaccination in at-risk groups (including asthma) were lower than intended by national policy and the early use of antiviral medications were less than optimal. Mucosal immune responses were equivalent between groups. Those with asthma had higher serum interferon (IFN)-α, but lower serum tumour necrosis factor, interleukin (IL)-5, IL-6, CXCL8, CXCL9, IL-10, IL-17 and CCL2 levels (all p<0.05); both groups had similar serum IL-13, total IgE, periostin and blood eosinophil gene expression levels. Asthma diagnosis was unrelated to viral load, IFN-α, IFN-γ, IL-5 or IL-13 levels.

Conclusions: Asthma is common in those hospitalised with influenza, but may not represent classical type 2-driven disease. Those admitted with influenza tend to be female with mild serum inflammatory responses, increased serum IFN-α levels and good clinical outcomes.