Adherence, Airway Inflammation and Adrenal Suppression in Children with Asthma

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Introduction and Aim:

Systemic absorption of inhaled corticosteroids (ICS) is greater in normal adults than asthmatics [Lancet 2000;356:556-61]. In children, ICS unpredictably causes adrenal suppression. We aimed to investigate the relationship between airway obstruction, airway inflammation and adrenal function; and hypothesized that adrenal suppression for a given ICS dose is less in asthmatic children with worse airway obstruction and inflammation.

Methods:

Single centre prospective cohort study of children aged 4-16 years prescribed ≥400µg/day beclomethasone (BDP) equivalent. Adherence was measured with an electronic monitoring device (EMD) for 12 weeks and the total dose for the week prior to adrenal function testing calculated. Adrenal function was assessed using the low dose Synacthen test (LDSST) (300 nanograms/m2, serum cortisol taken before and 15, 20, 25, 30 and 35 minutes post administration).

Results:

33 children were recruited, 14 (42%) had an abnormal LDSST. Those with a normal LDSST had significantly higher blood eosinophils (0.7x109/L versus 0.3x109/L, p=0.003) and significantly higher fractional exhaled nitric oxide (FeNO) (38ppb versus 24ppb, p=0.049). There was a trend for FEV1% predicted to be lower in those with normal LDSST (not to significance).

19 children completed adherence monitoring. Children with a normal LDSST had a trend to higher cumulative ICS exposure in the week prior to testing (5375µg/day versus 4500µg/day, p=0.37).

Conclusion:

Despite a higher cumulative dose of ICS in the week prior to testing, children with elevated blood eosinophil count and FeNO had normal adrenal function. There was a trend to lower FEV1 in those with normal adrenal function. We speculate that in children with asthma, adrenal suppression relates to the appropriateness of ICS dosage for the level of airway inflammation, rather than absolute dose.