Reduced forced expiratory flow but not airway inflammation or hyper-responsiveness characterises paediatric sickle cell airway disease

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ON LINE SUPPLEMENT

Methods

Patient selection and recruitment

Children had to be >125cm in order to complete ergometer exercise testing.

Exhaled Nitric Oxide

We used a Chemiluminesence analyser [LR 2000 series, Logan Research, Rochester, UK] at an expiratory flow rate of 50 ml/sec, sensitive to NO from 1 to 5000 parts per billion (ppb) giving continuous online recordings with a resolution of 0.3ppb with a response time of 0.4 seconds. Weekly calibrations were carried out with a certified mixture of NO (90-500ppb) in N_2 [BOC Special Gases, Surrey Research park, Guildford, UK]. Ambient air NO levels were recorded, all tests were performed with ambient NO levels of < 50ppb.

Spirometry

Equipment (Vitalograph Compact Spirometer [Buckingham, UK]) was calibrated at least once daily. Testing was stopped if subjects became symptomatic with cough or wheeze or hypoxaemic with SaO_2<91%. Only traces free from artefacts were saved, n=3 per subject, and a maximum of 8 tests was permitted.

Methacholine Challenge Testing

The initial methacholine concentration used was 0.125mg/ml. Doubling concentrations up to 32.0 mg/ml were used for each successive test provided the FEV_1 had not fallen by >20% from baseline and oxygen saturation was maintained. Challenges were stopped when FEV_1 had fallen more than 20% from baseline. Throughout testing subjects were encouraged to report wheeze, dyspnoea or chest pain and these symptoms were recorded.

Nebulised salbutamol was administered with 5 L/min of oxygen to all subjects who had AHR.