Correlation of Mannose-Binding Lectin deficiency & disease severity in a cohort of cystic fibrosis patients.

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Introduction

Cystic fibrosis (CF) is a common lethal autosomal recessive condition that affects approximately 1 in 2500 individuals. CF is a multi-organ genetic disorder affecting cystic fibrosis trans-membrane conductance regulator (CFTR) gene. In CF lung severity is the most prominent measure of disease severity, progression and therapeutic efficacy.

Cystic fibrosis can cause chronic obstruction and infection of the respiratory tract, pancreatic insufficiency, elevated sweat electrolyte concentration and male infertility [1]. This gene controls the movement of salt and water in and out of cells. The clinical progression of CF leads to loss of lung function and respiratory failure. The CF lung is highly vulnerable to respiratory infections by bacterium and fungi.

Correlation of disease severity of CF patients with Mannose-binding lectin (MBL) deficiency was investigated. MBL is a multi-meric carbohydrate protein that is produced in the liver by hepatocytes and secreted into the bloodstream. Its normally oligomerized forms are associated with specific serine proteases (the MASPs) which are activated when MBL binds to microbial carbohydrate surface and activates complement cascade via the MBL or lectin pathway [2].

Method

One hundred serum samples were collected from CF patients that were from Barts Health Trust. MBL test was performed manually using MBL Oligomer ELISA kit. Phadia 250 immunoassay analyzer was used to process selected CF samples to run Total IgE, Aspergillus IgE, and Aspergillus IgG tests. Lung Function results (FVC and FEV1) were also obtained from patient records. Forced vital capacity (FVC) is a measure of lung size in litres and indicates the volume of air inhaled. The second is the forced expiratory volume in one second (FEV1) and is a measure of how much air is exhaled in one second

Results

The CF patients tested for MBL ELISA showed 72% had no deficiency, 12% had mild deficiency, 9% had non-functional MBL and 7% had functional deficiency. The control groups of paediatric and adult immunodeficiency clinic, showed no significant difference in CF patient MBL classification. The lung function test also showed no statistical difference between CF patients with deficient and normal MBL. Total IgE and IgG Aspergillus levels were raised in CF patients with non-functional and functional MBL deficiency. 26.6% [4/15] of patients with non-functional or a functional deficiency of MBL had a raised total IgE, compared to 62.8% [44/70] of CF patients with a normal MBL level.

Discussion

CF patients with MBL deficiency are more likely to have decreased lung function and are more susceptible to Aspergillus infection than those who have normal MBL function. Routine measurement of MBL in CF patients may be a useful tool in the management of CF patients.

References


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