The impact of perinatal inflammation and growth factors on the development of bronchopulmonary dysplasia and later lung function in very preterm infants.

Background

Despite increased survival of extremely preterm infants, morbidity and long-term disability remains mostly unchanged. Bronchopulmonary dysplasia (BPD) is a chronic neonatal lung disease that develops in a substantial proportion of infants after very preterm birth. Reduced lung function and pulmonary complications may persist into childhood and even adolescence.

Patient/Methods

Studies of three prospective cohorts of very preterm infants (born 2001-2007) with extensive assessment of lung function (spirometry, impulse oscillometry, body plethysmography, diffusion capacity measurements and nitrogen-washout) at 12 years of age. Analyses of biomarkers as club cell protein (CC16), insulin-like growth factor 1 (IGF-1), and cytokines from blood, tracheal aspirate and gastric fluid obtained after birth. Registration of respiratory data during hospitalization.

Objectives

To evaluate if low levels of CC16 in gastric fluid at birth, reflecting low levels of CC16 in the lung, would be associated with lung inflammation and early respiratory morbidity.

To evaluate how perinatal inflammatory biomarkers and neonatal risk factors are related to early and long-term respiratory morbidity.

To evaluate if longitudinal growth and postnatal levels of IGF-1 and CC16 are related to later lung function.

To determine differences in lung function at 12 years of age between children born extremely preterm and term born controls.

To investigate longitudinal changes in lung function between 6 and 12 years of age in extremely preterm infants.

Preliminary results

Low levels of CC16 in gastric fluid at birth were associated with increased tracheal inflammation and with need for respiratory support in the neonatal period.

Perinatal systemic inflammation with increased levels of IL-6 IL-8 and IL-10 were associated with development of BPD. Increased levels of IL-6 were associated with airway obstruction at 12 years of age.

A more severe intrauterine growth retardation was associated with lower diffusing capacity of the lung and lower alveolar volume, probably indicating an impaired alveolar development.

Conclusion

In very preterm infants, perinatal risk factors such as systemic or pulmonary inflammation as well as prenatal growth restriction may be of importance for early respiratory morbidity but also for long term pulmonary function.

Publication
