Development of lung diffusion to adulthood following extremely preterm birth

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Shareable abstract (@ERSpublications)
Pulmonary diffusing capacity following extremely preterm (EP) birth was reduced compared with term-born subjects. From mid-childhood to adulthood, development tracked in parallel in the EP and term-born groups, with preterms following lower trajectories. https://bit.ly/3ARPD7D

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Abstract

Background Gas exchange in extremely preterm (EP) infants must take place in fetal lungs. Childhood lung diffusing capacity of the lung for carbon monoxide (D_{LCO}) is reduced; however, longitudinal development has not been investigated. We describe the growth of D_{LCO} and its subcomponents to adulthood in EP compared with term-born subjects.

Methods Two area-based cohorts born at gestational age ⩽28 weeks or birthweight ⩽1000 g in 1982–1985 (n=48) and 1991–1992 (n=35) were examined twice, at ages 18 and 25 years and 10 and 18 years, respectively, and compared with matched term-born controls. Single-breath D_{LCO} was measured at two oxygen pressures, with subcomponents (membrane diffusion (D_M) and pulmonary capillary blood volume (V_C)) calculated using the Roughton–Forster equation.

Results Age-, sex- and height-standardised transfer coefficients for carbon monoxide (K_{CO}) and D_{LCO} were reduced in EP compared with term-born subjects, and remained so during puberty and early adulthood (p-values for all time-points and both cohorts ⩽0.04), whereas alveolar volume (V_A) was similar. Development occurred in parallel to term-born controls, with no signs of pubertal catch-up growth nor decline at age 25 years (p-values for lack of parallelism within cohorts 0.99, 0.65, 0.71, 0.94 and 0.44 for z-D_{LCO}, z-V_A, z-K_{CO}, D_M and V_C, respectively). Split by membrane and blood volume components, findings were less clear; however, membrane diffusion seemed most affected.

Conclusions Pulmonary diffusing capacity was reduced in EP compared with term-born subjects, and development from childhood to adulthood tracked in parallel to term-born subjects, with no signs of catch-up growth nor decline at age 25 years.