THE IMPACT OF TRAFFIC AIR POLLUTION ON CHRONIC LUNG REJECTION AND MORTALITY AFTER LUNG TRANSPLANTATION

Tim Nawrot, Hasselt University, Belgium
Robin Vos, Leuven University (KULeuven), Belgium
Lotte Jacobs, Leuven University (KULeuven), Belgium
Stijn Verleden, Leuven University (KULeuven), Belgium
Christel Faes, Hasselt University, Belgium
Shana Wauters, Leuven University (KULeuven), Belgium
Veerle Mertens, Leuven University (KULeuven), Belgium
Christoph Dooms, Leuven University (KULeuven), Belgium
Peter Hoet, Leuven University (KULeuven), Belgium
Dirk E Van Raemdonck, Leuven University (KULeuven), Belgium
Lieven J Dupont, Leuven University (KULeuven), Belgium
Benoit Nemery, Leuven University (KULeuven), Belgium
Bart M Vanaudenaerde, Leuven University (KULeuven), Belgium

Background and Aims: Approximately half of all lung transplant patients suffer from Bronchiolitis Obliterans Syndrome (BOS), the clinical correlate of chronic rejection, within five years after transplantation. This prevalence is much higher than for other solid organ transplantations, possibly due to the lung’s direct contact with the environment. We assessed the association of residential proximity to major roads with BOS and mortality in a cohort of lung transplant patients.

Methods: We calculated hazard ratios for BOS and mortality in relation to residential proximity to major roads, adjusting for relevant covariables, in 288 lung transplantations at the Leuven University Hospital between 1997 and 2009 and with follow-up until August 2009. Inflammatory parameters in plasma and bronchoalveolar lavage (BAL) were assessed in 207 patients.

Results: During follow-up 117 (41%) patients developed BOS and 61 (21%) died. Patients whose residence was within 171m of a major road (lowest tertile) were 2.06 (95% CI 1.39-3.05) times more likely to develop BOS and 2.20 (1.25-3.86) times more likely to die than those living farther away. The adjusted hazard rates (HR) of BOS and mortality were 0.57 and 0.72 for each tenfold increase in distance from major roads. Proximity to a major road was inversely associated with plasma CRP levels and neutrophil percentage and interleukin-6 concentration in BAL.

Conclusions: Living close to a major road represents a substantial risk of developing BOS and premature dying after lung transplantation. Overall, traffic-related air pollution appears to constitute a serious risk of BOS and mortality after lung transplantation.