Role of genetic testing in lung transplantation

Mohamed S A Mohamed
University of Cologne, Germany

Due to the increased incidence of end-stage lung diseases that lead to pulmonary failure, lung transplant becomes a frequent life-saving intervention. Unfortunately, there is a high incidence rate of primary graft dysfunction and failure after transplant. Research is progressing strongly in many directions to improve the clinical outcome of lung transplant. Interleukin-6 (IL-6) is a pro-inflammatory cytokine and an anti-inflammatory myokine. In humans, it is encoded by the IL6 gene. IL-6 is produced mainly by the T cells and the macrophages of the lung, bone marrow, spleen, lymph nodes, brain and skin. Nuclear factor kappa-light-chain enhancer of activated B cells (NF-kB) is the main regulator of IL-6 gene expression, which increases in all cases of tissue injury and inflammation. IL-6 is also secreted by the vascular smooth muscles as a pro-inflammatory cytokine, however, IL-6 processes an indirect anti-inflammatory effects through the antagonization of TNF-alpha and IL-1, and the activation of IL-10. IL-10 is another cytokine, but with anti-inflammatory actions. It down regulates the expression of cytokines in the T helper-1 cells, and the major histocompatibility class II antigens and stimulatory molecules on the surface of macrophages. Moreover, IL-10 antagonizes the activity of NF-kB accordingly; the balance between IL-6 and IL-10 can affect the prognosis of any inflammatory condition, including the ischemic reperfusion injury and the graft-host interaction. Hence, the ratio between both cytokines has the potential to predict the prognosis of lung transplant and the incidence of post-transplant graft failure. A high IL-6/IL-10 ratio post-transplant was found to be associated with severe primary graft dysfunction and 20 fold increased relative risk of death. The Toronto team for lung transplant, which is one of the leading teams in this regard, has already developed a chip to assess the expression levels of miRNAs of certain genes in graft biopsy, as markers for the prognosis of lung transplant. This includes the expression levels of IL-6 and IL-10. This technology is reliable and takes between 20-30 minutes, which can be performed while the graft on ex vivo perfusion. Due to the increased incidence of end-stage lung diseases that lead to pulmonary failure, lung transplant becomes a frequent life-saving intervention.

Mohammed.shehatta1@gmail.com