THE GUT AND BEYOND

Butyrate-producing bacteria associated with ameliorating viral respiratory infections following allogeneic hematopoietic stem cell transplantation.

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Introduction and objectives

Respiratory viral infections occur commonly in patients undergoing allogeneic hematopoietic stem cell transplantation (allo-HCT). Following viral upper respiratory tract infection (URTI), nearly half of patients develop complicated lower respiratory tract infections (LRTI), with subsequent high morbidity and mortality rates. The intestinal microbiota has been shown to protect against both viral and bacterial pathogens in the lung. However, the relationship between the intestinal microbiota and risks of LRTI following URTI remains unexplored in the setting of allo-HCT.

Methods

A total of 360 patients were observed during the first 180 days following allo-HCT. URTI with LRTI was defined as clinical detection of a respiratory viral pathogen, along with concurrent respiratory symptoms and development of new parenchymal findings on chest imaging. Abundance of microbiota associated with butyrate production were assessed as risk factors for viral LRTI using survival analysis.

Results and interpretation

47 of 360 patients (13.1%) were diagnosed with viral LRTI following allo-HCT, with no significant differences in baseline characteristics. Estimated LRTI incidence at 180 days was 19.8% for the group in which intestinal butyrate-producing bacteria were absent, 16.4% when butyrate-producing species abundance was low (<1% sequences), and 2.7% when abundance was high (>1% sequences, log rank p=0.007). These protective effects were independent of other transplant and pulmonary factors (adjusted hazard ratio: 0.14, p=0.000). These results indicate that butyrate-producing bacteria are associated with resistance against viral LRTI in patients undergoing allo-HCT.