Intermittent hypoxia-induced cardiovascular remodeling is reversed by normoxia in a mouse model of sleep apnea

ORAL COMMUNICATION

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BACKGROUND

Intermittent hypoxia (IH) is the principal injurious factor involved in the cardiovascular morbidity and mortality associated with obstructive sleep apnea (OSA). The gold standard treatment is continuous positive airway pressure (CPAP), which eliminates IH and appears to reduce cardiovascular risk. There is no experimental evidence on the reversibility of cardiovascular remodeling after IH withdrawal. The objective of the present study is to assess the reversibility of early cardiovascular structural remodeling induced by IH after resumption of normoxic breathing in a novel recovery animal model mimicking OSA treatment.

METHODS

We investigated cardiovascular remodeling in C57BL6 mice exposed to IH for 6 weeks vs. the normoxia group and its spontaneous recovery after 6 subsequent weeks under normoxia.

RESULTS

Aortic expansive remodeling was induced by IH, with intima-media thickening and without lumen perimeter changes. Elastic fiber network disorganization, fragmentation and the estrangement between end points of the disrupted fibers were increased by IH. Extracellular matrix turnover was altered, as visualized by collagen and mucoid interlaminar accumulation. Furthermore, left ventricular perivascular fibrosis was increased by IH, whereas cardiomyocytes size was unaffected. These cardiovascular remodeling events induced by IH were normalized after recovery in normoxia, mimicking CPAP treatment.

CONCLUSIONS

The early structural cardiovascular remodeling induced by IH was normalized after IH removal, revealing a novel recovery model for studying the effects of OSA treatment. Our findings suggest the clinical relevance of early detection and effective treatment of OSA patients to prevent the natural course of cardiovascular diseases.