Hypoxemia in patients with heart failure and preserved ejection fraction

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Background: Pulmonary abnormalities are common in patients with prevalent heart failure (HF). Arterial hypoxemia is considered rare in HF, but this has not been rigorously evaluated in patients with HF and preserved EF (HFpEF).

Methods:

Results: Patients with HFpEF (n=539) and no clinically-relevant lung disease underwent invasive cardiopulmonary exercise testing with simultaneous blood and expired gas analysis. Exertional hypoxemia was defined by oxyhaemoglobin saturation <94%. As compared to those without hypoxemia (n=403), patients with hypoxemia (n=136, 25%) were slightly older, heavier, and had higher NT-proBNP levels. They had higher cardiac filling pressures, higher pulmonary vascular pressures, greater alveolar-arterial O2 difference compared to those without hypoxemia. These differences were replicated in a sensitivity analysis where patients with any spirometric abnormalities were excluded. Regression analyses revealed that increases in pulmonary arterial and capillary pressures were related to lower PaO2. The presence of exertional hypoxemia was associated with two-fold increased risk for death over 2.8 (IQR 0.7-5.5) years of follow up, (Adjusted:HR 2.00 (95%CI: 1.01−3.96), p=0.046).

Conclusion: One quarter of HFpEF patients displayed arterial desaturation during exercise. Patients with hypoxemia display more severely abnormal hemodynamics and increased mortality. Further study is required to better understand the mechanisms in patients with HFpEF.
Risk of death in HFpEF with hypoxemia

HR 2.00 (95% CI: 1.01-3.96), p=0.046

No. at risk

Follow-up Time (Years)

Hypoxemia

No Hypoxemia

137 106 95 75 59

285 247 184 131