

Original Article

**Oxygen inhalation can selectively dilate pulmonary arteries in patients with chronic thromboembolic pulmonary hypertension before balloon angioplasty**

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**Abstract**

**Background:** Pulmonary injury is a major complication of balloon pulmonary angioplasty (BPA) for chronic thromboembolic pulmonary hypertension (CTEPH). Lung injury after BPA can be exacerbated by a high mean pulmonary arterial pressure (PAP). Although oxygen inhalation is expected to lower mean PAP in patients with CTEPH, no relevant investigation has been conducted.

**Methods:** Consecutive patients with CTEPH who underwent BPA were enrolled in this study. We evaluated the hemodynamics using right heart catheterization while breathing ambient air and with administration of 5 L/min oxygen for 10 min.

**Results:** This study included 52 consecutive patients with CTEPH, of which 23 (44%) were treated with specific pulmonary vasodilators. Exposure to oxygen was well tolerated. Oxygen administration significantly decreased mean PAP by  $3.8 \pm 3.2$  mmHg ( $p < 0.001$ ) and pulmonary vascular resistance by  $0.8 \pm 1.8$  Wood units ( $p < 0.001$ ). Moreover, the ratio of pulmonary vascular resistance to systemic vascular resistance was significantly reduced by 13.5% ( $p < 0.001$ ). Multivariate regression analysis identified baseline mean PAP ( $\beta = 0.395$ ,  $p = 0.045$ ) as the only

significant predictor of decreased mean PAP under oxygen administration. No significant difference in oxygen effect on mean PAP was found between patients with and without vasodilators.

**Conclusions:** In patients with CTEPH, 5 L/min supplemental oxygen inhalation could decrease mean PAP significantly by selective pulmonary artery dilatation, regardless of the usage of vasodilators, and thus could be helpful to maximize the safety of BPA.

**Clinical Trial Registration:** UMIN Clinical Trials Registry (No.: UMIN000026882); URL: <http://www.umin.ac.jp/ctr/index.htm>.