DE-ESCALATION OF SUPPLEMENTAL OXYGEN IN PATIENTS WITH CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION FOLLOWING BALLOON PULMONARY ANGIOPLASTY AT A HIGH ALTITUDE PH CENTER

Mark C. Beatty, BS[1]*, Todd M. Bull, MD[2], Robert K. Rogers, MD[3], Kailey Palmen BA, Frances D. Peacock, MBA, CCRP[4], Robert Quaife MD, James Chen PhD, Todd M. Bull, MD[2],
[1]Department of Pulmonary, Allergy and Critical Care Medicine, Pulmonary Vascular Disease Center, Department of Cardiology, University of Colorado School of Medicine, Denver, CO

Purpose:

Balloon pulmonary angioplasty (BPA) improves pulmonary hemodynamics in patients with chronic thromboembolic pulmonary hypertension (CTEPH). However, data guiding de-escalation of supplemental oxygen following BPA are limited, particularly in high-altitude environments where hypoxemia may be accentuated. We aimed to characterize changes in supplemental oxygen use and prescribed oxygen flow rate (L/min) following BPA at our high-altitude pulmonary hypertension (PH) center at 1,600 meters above sea level.

Methods:

Consecutive patients with CTEPH requiring supplemental oxygen at rest or with exertion who underwent BPA between June 2024 and February 2026 were enrolled in a prospective registry at a single high-altitude tertiary PH center (>1,500 m). Inclusion required confirmed CTEPH as the cause of PH. Patients underwent BPA as primary therapy or as secondary treatment following pulmonary thromboendarterectomy (PTE). Pre- and post-BPA data including hemodynamics, medication use, six-minute walk distance (6MWD), Borg dyspnea score, and supplemental oxygen requirements (continuous vs exertional use and prescribed flow rate) were recorded at baseline and after completion of the BPA series. The target oxygen saturation was >90%, assessed at each clinic visit. Oxygen therapy was titrated to maintain this threshold. Paired comparisons were performed between pre- and post-BPA measurements.

Results:

Twenty patients with CTEPH (11 female, 9 male; mean age 70.3±11.4 years; WHO functional class I–III: 2 [10%], 12 [60%], 6 [30%]; 7 [35%] with prior PTE) underwent a mean of 2.5±1.3 BPA sessions (76 procedures). Procedural complications were infrequent: vessel perforation occurred in 3% of procedures, with one episode each of hemoptysis (1%) and thrombus formation (1%). There was no intraprocedural mortality.

Before BPA, 13 patients (65%) required exertional oxygen and 7 (35%) required continuous oxygen, with a mean prescribed flow rate of 2.6±0.8 L/min. Post-BPA data were available for 18 patients; 11 (61%) required exertional oxygen and 4 (22%) required continuous oxygen. The mean prescribed flow rate decreased to 2.0 L/min, and 3 patients (17%) discontinued supplemental oxygen.

Baseline mPAP was 34.6±7.8 mmHg, PVR was 8.7±18.9 wu, and PAC was 2.1±0.7 mL/mmHg. Following BPA, mPAP improved to 30.9±6.4 mmHg (p=0.01), PVR decreased to 3.2±1.4 wu (p=0.10), and PAC improved to 2.4±0.8 mL/mmHg (p=0.05).

BALLOON **P**U**L**MONARY ANGIOPLASTY FOR CHRONIC THROMBO**E**MBOLIC P**U**LMONA**R**Y HYPERTENSION SURVIELL**A**NCE (PLEURA) REGISTRY

Guanylate cyclase stimulator use decreased from 80% to 67%, while phosphodiesterase-5 inhibitor use (15% to 16%) and diuretic use (75% to 72%) remained stable. Six-minute walk distance was unchanged (361.7±65.5 m vs 360.6±87.4 m), as were Borg dyspnea scores (3.2±2.4 vs 3.2±2.4).

Conclusions:

At a high-altitude PH center, BPA was associated with reduced supplemental oxygen requirements. After BPA, fewer patients required continuous oxygen therapy, prescribed flow rates decreased, and a subset discontinued supplemental oxygen. These findings suggest BPA may reduce oxygen dependency, even where hypoxemia is amplified by altitude.

Clinical Implications:

For patients with CTEPH undergoing BPA, a potential benefit is reduced need for supplemental oxygen. BPA may permit de-escalation of oxygen therapy and lower prescribed flow rates, decreasing treatment burden, equipment dependence, and cost. This may be particularly relevant for patients at higher altitude, where ambient oxygen pressure is lower. The potential for reduced oxygen requirements may be incorporated into shared decision-making discussions. Structured post-BPA oxygen titration protocols may further optimize long-term management and quality of life.