Balloon Pulmonary Angioplasty at UC San Diego: Hemodynamic and Functional Outcomes from the Largest North American Registry to Date

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Abstract:
Background: Chronic thromboembolic pulmonary hypertension (CTEPH) is form of precapillary pulmonary hypertension resulting from incomplete resolution of pulmonary thromboembolic and formation of chronic, flow-limiting, fibrotic thrombus within the pulmonary vascular bed. While pulmonary thromboendarterectomy (PTE) surgery is the primary treatment of choice, balloon pulmonary angioplasty (BPA) and targeted medical therapy are alternative options for patients not undergoing PTE. We present the clinical, functional and hemodynamic outcomes from the largest North American observational registry of BPA procedures to date.

Methods: Patients with confirmed CTEPH at UC San Diego not eligible for PTE were treated with targeted medical therapy and referred for BPA. Patients undergoing BPA at UCSD from June 23, 2015 to June 1, 2020 were recruited registry enrollment. Baseline subject characteristics, clinical and functional status, and hemodynamic parameters were recorded. Subgroup analysis for subjects with pre-PBA mean pulmonary artery pressure (mPAP) >30 mmHg was performed.
Results: A total of 119 subjects (36.1% men, age 59.9±14.9 years) with CTEPH undergoing BPA therapy were enrolled. PTE was not performed mostly due to distal disease (81.5%), high surgical risk (23.5%), or prior PTE (16.8%). Five-hundred twelve BPA sessions were performed overall (4.3 sessions/subject). The most common BPA sequelae was isolated hemoptysis (10.2%), clinically-relevant complications (reperfusion lung edema in 2, intubation and lobectomy in 1) were infrequent (0.5%), and no deaths occurred. A subgroup of 59 subjects (undergoing 341 total sessions) had mPAP >30 mmHg on medical therapy and subsequently underwent >2 BPA treatment sessions. Comparison of subgroup pre-BPA versus post-BPA parameters showed improved pulmonary artery pressures (mPAP 42.9 ± 6.7 to 35 ± 7.6 mmHg, p<0.001), pulmonary vascular resistance (5.9 ± 2.4 to 3.9 ± 1.6 Wood units, p<0.001), six-minute walk distance (371.4 ± 117.3 to 410.9 ± 109.6 meters, p<0.001), and World Health Organization functional class (20.3% to 59.3% in class I/II, p<0.001).

Conclusion:

This North American registry of 119 subjects who underwent 512 BPA sessions at UCSD demonstrates that BPA is predominantly performed due to inoperable distal disease and clinically-relevant complications were infrequently observed. Hemodynamic and functional improvements were demonstrated among those with uncontrolled pulmonary hypertension treated with multiple BPA sessions.