Background: Vascular wall remodeling in primary pulmonary hypertension (PPH) contributes to the development and maintaining of elevated pulmonary pressures. Optical coherence tomography (OCT) is a diagnostic tool that is able to image small arterial vessels. Aim of this study was to evaluate the vascular remodeling of small pulmonary arteries (from 1 to 4 mm diameter) in a group of patients with PPH and to relate morphologic changes to pulmonary hemodynamics.

Methods: 8 patients (group 1; n = 1, mean age 52.7 ± 9.2 years) with PPH and 6 patients (group 2) with normal pulmonary hemodynamics (3 m, 3 f, mean age 56.7 ± 11.7 years), underwent OCT examination during right cardiac catheterization. The image wire was pulled from distal to proximal portions of right and left distal 1.0 to 4 mm pulmonary arteries using a motorized pull-back system at a rate of 1.0 mm/sec. The following parameters were measured: endoluminal diameter (ELD), endoluminal area (ELA), wall thickness (WT), pulmonary systolic, mean and diastolic pressure (PSP, PMP, PDP), pulmonary wedge pressure (WP), cardiac output (CO), cardiac index (CI), pulmonary vascular resistances (PVR).

Results: PSP, PMP, PPR (r 0.75, p < 0.01), DPP (r 0.69, p < 0.01) while ELD/WT ratio was 5.7 ± 0.6 vs 2.6 ± 0.5 (p < 0.01). From a purely morphologic point of view, in all patients with PPH peripheral adventitial gaps not present in group 2 (79.3 ± 8.9 vs 43 out of 57 (75.4%) tissue areas above stent struts represented mature neointima.

Conclusion: OCT assessment of small pulmonary arteries gives useful morphologic and information on the remodeling process of pulmonary vasculature and on its relation with pulmonary hemodynamics in patients with PPH.